LEGAL NOTICE – REPLACEMENT
ENVIRONMENTAL ASSESSMENT
CANYON CREEK WILDLAND-URBAN INTERFACE FUELS REDUCTION PROJECT

USDA FOREST SERVICE
MALHEUR NATIONAL FOREST
BLUE MOUNTAIN RANGER DISTRICT
GRANT COUNTY

This legal notice replaces and supercedes the legal notice published August 2, 2006. This restarts the objection period effective the date of publication of this legal notice – the primary change is the address where objections are to be filed.

Malheur National Forest Supervisor Gary L. "Stan" Benes, Responsible Official, is releasing the Canyon Creek Wildland-Urban Interface Fuels Reduction Project Environmental Assessment (a Healthy Forest Restoration Act project) for a 30 day objection period. The project is located on the Blue Mountain Ranger District, Malheur National Forest in the Canyon Creek watershed identified in the Grant County Community Fire Protection Plan as an "at-risk community". The objective is to reduce the risk to public safety, reduce loss of private property, protect evacuation routes, and protect public facilities and resources in or near the project area. This will be accomplished by creating forest conditions that would moderate potential wildfire intensity, reducing the risk of catastrophic fires and allowing firefighters better opportunities to control wildfires in the area. The project is also designed to improve forest health and sustainability and reduce future mortality and the resulting fuel accumulations. The project will reduce fuels and improve forest health on approximately 8,000 acres through commercial harvest, precommercial thinning, hand piling and mechanized piling of slash followed by slash pile burning, and application of prescribed fire. In addition, non-significant forest plan amendments to the Malheur National Forest Land and Resource Management Plan (1990), as amended, would be implemented to adjust big game winter range boundaries, reduce satisfactory and total cover below Forest Plan standards, exchange Dedicated Old Growth Area (DOG) 236 and Replacement Old Growth Area (ROG) 236 and remove limitations on harvesting in visual corridors.

This proposed hazardous fuels reduction project is subject to the objection process pursuant to 36 CFR 218, subpart A. It is not subject to the notice, comment, and appeal procedures found at 36 CFR 215 (36 CFR 218.3). Objections, including attachments, must be filed (regular mail, fax, e-mail, hand-delivery, express delivery, or messenger service) with the Reviewing Officer (Regional Forester Linda Goodman), ATTN: 1570 OBJECTIONS, 333 S.W. First Avenue, P.O. Box 3623, Portland Oregon 97208-3623, faxed to (503) 808-2255, or hand delivered to the above address between 7:45 a.m. and 4:30 p.m., Monday through Friday, except legal holidays. Electronic objections, in acceptable [plain text (.txt), rich text (.rtf) or Word (.doc)] formats, may be submitted electronically to appeals-pacificnorthwest-regional-office@fs.fed.us with Subject: Canyon Creek Wildland-Urban Interface Fuels Reduction Project. Objections will be accepted only from those who have previously submitted written comments specific to this project during scoping or other opportunity for public comment (36 CFR 218.6(a)). The objection including attachments must be filed within 30 days of the date of publication of this legal notice in the Blue Mountain Eagle. Notices of objection must meet the specific content requirements of 36 CFR 218.7. Incorporation of documents by reference shall not be allowed (36CFR218.7(c)). The publication date of this notice is the exclusive means for calculating the time period to file an objection (36 CFR 281.9(a)). Those wishing to object should not rely upon dates or timeframe information provided by any other source.

Objection to this Environmental Assessment must be in writing and must be fully consistent with 36 CFR 218.7. The objector must provide sufficient narrative description of those aspects of this proposed project addressed by the objection, specific issues and suggested remedies to resolve the objection. At a minimum the objection must include the objectors name and address with telephone number if available, a signature or other verification of authorship, identification of a lead objector if multiple names are listed on the objection, and the name of the project being objected to, the name and title of the Responsible Official and Forest and Ranger District on which the project will be implemented.

The Responsible Official may not issue a decision for this hazardous fuel reduction project until the Reviewing Officer has responded to all pending objections. When no objections are filed within the 30-day period, the decision may occur on, but not before, the fifth business day following the end of the objection-filing period.

The Environmental Assessment is available on the internet at:
http://www.fs.fed.us/r6/malheur/ www.fs.fed.us/r6/malheur/ For further information or a hardcopy of the EA, contact Eric Wunz or Lori Stokes at the Blue Mountain Ranger District Office, P.O. Box 909, John Day, Oregon 97845 or at (541) 575-3000.

Decision Notice

Finding of No Significant Impact
And
Non-Significant Forest Plan Amendment #61

Canyon Creek WUI Fuel Reduction Project

Environmental Assessment

December 21, 2006

Malheur National Forest

Blue Mountain Ranger District

Grant County, Oregon

Introduction

The United States Forest Service, Malheur National Forest proposes to reduce fire hazard through the use of timber harvest, precommercial thinning, machine and hand piling, pile burning, and prescribed burning on approximately 8,000 acres within the 22,000 acre Canyon Creek Wildland-Urban Interface (WUI) Fuel Reduction Project Area on the Blue Mountain Ranger District. All activities are planned within the WUI under the authority of the Healthy Forest Restoration Act of 2003 (HFRA). The Canyon Creek WUI Project Area is identified and delineated by the Grant County Community Fire Protection Plan as a "rural Community At Risk and in the Forest-Urban Interface".

The treatments prescribed reduce the risk of stand replacement wildfire in the urban interface area along Canyon Creek by reducing conifer stocking, lowering fuel loadings, eliminating fuel ladders, and burning accumulated natural fuels. Forest health and vigor will increase in treated units. The proposed fuel reduction activities will be done through a combination of timber sales, stewardship contracts, and service contracts which provide employment opportunities to the local community.

Location

The proposed project is located in Grant County, Oregon, approximately 10 miles south of Canyon City. The legal description is:

T.16S. R.32E. Sections 10, 11

T.15S. R.31E. Sections 1-17, 21-27, 36

T.15S. R.32E. Sections 5-9, 15-18, 20-22, 25-35

The Decision

Based on the analysis described in the Environmental Assessment, collaboration with the public, coordination with county, state, and federal agencies, and comments received from the public during this analysis, it is my decision to implement Alternative 2, as revised.

Pre-commercial Thinning and Commercial Harvest

- Commercial Thinning – 3150 acres
- Understory Removal (Thinning from below in multi-story stands) – 1000 acres
- Shelterwood Harvest (Regeneration to early seral species) – 1010 acres
- Precommercial Thinning to 9” DBH – 1830 acres
- Precommercial Thinning to 7” DBH (in existing plantations) – 50 acres

To enhance structural diversity for wildlife and visuals while restoring fire-adapted ecosystems, trees are left at a varied spacing, as opposed to even spacing, with the density varying as much as 50% across the stands. The areas with higher tree density and the unthinned areas should provide security/hiding cover in the short-term. Lower density areas will open up forest stands, breaking up the fuel continuity. In stands prescribed for an average density of 50 ft2 of basal area/acre, the following range of densities would be used:

Basal Area (ft2/acre)	Percentage of Stand
25	10%
40	15%
50	50%
60	15%
Unthinned	5-15%

The spacing of leave trees in the areas to be precommercial thinned will also be varied by as much as 50% to provide a variety of habitats and visual diversity. Unthinned areas are to be left for wildlife habitat that are 2 to 5 acres in size and cover 5 to 15% of the area to be treated. In goshawk post fledging areas and old growth connectivity corridors, retain unthinned patches at the 15% level where possible. In units immediately adjacent to the public/private boundary, retain unthinned patches at the 5% level.

Commercial Thinning in Wildlife Connectivity Corridors

Approximately 364 acres of connectivity corridors (10%) are in treatment units. About 260 acres (7% of the corridors) will be thinned with the objective to reduce stocking in these stands while still retaining sufficient trees per acre, compared to that of the standard commercial thinning described above, to provide denser forest stands for security. Specifically, the canopy cover is to be left in the upper 1/3 of the site potential.

Approximately 104 acres (3% of the corridors) are located close to private lands. Units 62, 90, 95, and 536 will be treated to reduce the fire hazard under the public health and safety provision in Forest Plan Amendment #2. These units are within ¼ mile of the public/private boundary and are considered high priority for treatment. Amendment #2 gives the Forest Service flexibility to modify or forgo connectivity direction for projects that address safety and health concerns. Therefore, the wildlife corridor standards recommending leaving the canopy cover within the upper 1/3 of the site potential do not need to apply in areas that need to be treated to provide public safety or protection.

Retention of Medium Sized Older Trees
Occasionally trees are found that are less than but are obviously older than the second growth trees in the rest of the stand. Often they are growing near old growth trees that are over 21" DBH and would normally be removed during thinning and understory removal treatments to reduce competition with the larger trees. Several comments were received that stated these trees were valued highly by the respondents as trees that could soon grow into trees over 21". These medium sized trees generally lack lower branches and do not pose a ladder fuel risk, and they comprise a relatively minor component of the forest. Therefore, they are not considered much of a fire hazard and most are to be retained.

Logging Systems
In keeping with the objective to keep road construction to a minimum, logging systems were designed to the existing road network. In a number of cases the existing roads are not suitable for skyline yarding, so helicopter yarding is prescribed.

- Helicopter - 2240 acres
- Skyline – 520 acres
- Tractor – 2400 acres

Road Construction and Maintenance for Proposed Action

- Commensurate use road maintenance – 86 miles
- Installation of 5 temporary culverts
- Temporary road construction and rehabilitation after use - There are 11 short temporary roads (200 yd to ½ mile long) being planned to access skyline landings that total approximately 2 miles in length. These are to be rehabilitated after this project.
- Opening of closed roads (to be re-closed) – 37 miles

Post Harvest Treatments

Shelterwood Harvest Areas
- Remove Silvicultural Undesirable Trees and Treat Fuels – 1,010 acres
- Planting – 1,010 acres

Understory Removal/Commercial Thinning Areas
- Precommercial Thinning and Fuel Treatment – 3,610 acres

Activity Fuels Treatments

- Whole Tree Yarding – 3,010 acres
- Whole Tree Yarding/Grapple Piling – 2,030 acres
- Yard Tops Attached/Hand Pile – 125 acres
- Grapple Pile – 550 acres
- Grapple Pile/Hand Pile – 230 acres
- Hand Pile – 3,750 acres

Prescribed Fire

- Prescribed burning – 3,000 acres

Areas with excess buildup of live and dead fuels, approximately 1,800 of the 3,000 acres will need mechanical treatments before burning can be done. Maintenance burning will be needed in the future to limit regeneration and to maintain low levels of surface fuels. This anticipated fuels reduction burning (outside of the 3,000 acres identified for this project) will take place more than ten years in the future, thus it is not included in this decision, but is identified in the Cumulative Effects in Appendix C as a reasonably foreseeable action.

Burning will occur in three allotments; Sugarloaf, Fawn Springs, and Seneca and would be coordinated with permittees. The recovery of vegetation, including forage production and species diversity, would be monitored after prescribed burning to ensure the areas are ready to support livestock grazing on a sustainable level.

Alternate Snowmobile Route

The snowmobile route on the 3925 and 3925-196 roads along Starr Ridge may be needed for log haul during the winter. If that happens, an alternate route on existing roads has been identified to replace the 3925-196 portion of the snowmobile route. It follows the 033, 920, 041, 032, 011, and 162 roads to tie the Starr Ridge snowpark in with the west end of the 3925 road. There is no good alternate route for the 3925 on the east end of the ridge, therefore snowmobile use will be suspended during log haul.

Associated Actions Included In Alternative 2

Road Construction to Access Private Lands

New road construction of approximately 200 feet long is proposed on a ridge near Unit 570. This road crosses National Forest Lands accessing private property. This road is scheduled to be constructed by the landowner at his own expense. This new access allows the landowner (Morris) access to perform vegetation treatments and timber harvest on his property to reduce fire hazards and to improve forest health. These private land actions compliment National Forest fuels and forest health programs.

Forest Plan Amendment # 61

Alternative 2 is consistent with the long-term objectives of the Malheur National Forest Land and Resource Management Plan, however there are four changes to the Forest Plan recommended to allow short-term management activities to be undertaken to reduce the fire hazard to an at-risk community.

Adjust MA-4a Boundaries
The Big Game Winter Range (MA-4a) boundaries will be adjusted, expanding them down to the National Forest boundary on either side of Canyon Creek. The MA-4a adjustments are proposed because:

- The proposed mapping refines the original mapping in the Forest Plan to tie winter and summer range to logical boundaries. Management Area 4a, Standard #8 (LRMP, page IV-71) directs the Forest Service to adjust winter range boundaries as necessary.
- The MA-4a additions better reflect how big game species use this area; i.e., lower elevations along Canyon Creek are primarily being used as winter range rather than summer range.
- Proposed changes permit a more accurate analysis of the effects of commercial thinning, precommercial thinning and prescribed fire on big game habitat.

Boundary adjustments will increase MA-4a designation on approximately 875 acres (see Map in Chapter 2, Page 16 of the EA). About 140 of the 875 acres would be converted from General Forest (MA-1). The remaining acres will overlap with Anadromous Riparian (MA-3a), Old Growth (MA-13), and Visual Corridors (MA-14). MA-4 standards and guidelines will apply to the additions. Standards and guidelines for MA-3a, MA-13 and MA-14 will also apply where they overlap with MA-4a.

Reduce Satisfactory and Total Cover below Forest Plan Standards
The Proposed Action will reduce satisfactory cover below Forest Plan Standards in the Vance Creek, East Fork Canyon Creek and Upper Canyon Creek subwatersheds. In Vance Creek and Upper Canyon Creek winter range, total cover is reduced below the 25% standard. Not all cover will be treated; at least 19% of each subwatershed will be retained as satisfactory/marginal cover. Cover is reduced to meet the purpose and need of reducing fire risk in the Canyon Creek Wildland Urban Interface. Hiding/security cover patches will be maintained in all proposed units to mitigate effects. Five to15% of each unit will be retained in untreated patches ranging in size from 2 to 5 acres.

Most of the treatments will occur in Dry Forest types. These stands are considered outside the historic range of variation (HRV), i.e., overstocked and likely unsustainable given the high risk of uncharacteristically severe fire and insect epidemics. Most of these stands would likely fall out of cover within the next 25 years if not treated. In a 2003 letter to the Eastside Forests, the Regional Office provided direction encouraging Forests to use site specific Forest Plan amendments to move the landscape towards HRV (USDA FS June 11, 2003).

Exchange Dedicated Old Growth Area (DOG) 236 and Replacement Old Growth (ROG) 236
The existing DOG is located immediately adjacent to the National Forest boundary. Private homes are located immediately adjacent to the Forest boundary and the landowners have expressed interest in treating stands in the DOG to reduce fire risk. The DOG is overstocked with trees and is high risk to wildfire and insect epidemics. The existing ROG is located one half mile or more from the Forest Boundary and therefore exchanging the current Dedicated Old Growth Area, for the Replacement Old Growth Area reduces fire risk to private land and structures (see Map 9 in Appendix B of the EA – the map shows the new designations).

In their current condition, the existing ROG provides better old growth than the DOG. MA-13 direction permits exchanging the status of DOGs and ROGs. There will be no net loss of old growth acres. The new designations meet Forest Plan standards for DOG and ROG sizes.

Management Area (MA-13) direction for old growth prescribes management to reduce residues and to maintain or enhance old growth and to protect old-growth from catastrophic wildfires. In a 2003 letter to the Eastside Forests, the Regional Office provided direction encouraging Forests to use site-specific Forest Plan amendments to move the landscape towards HRV (USDA FS June 11, 2003).

About 125 acres of the newly classified ROG (which is adjacent to private lands and structures) will be precommercially thinned by cutting trees up to 9"DBH (Units 352, 354, 355, 358, 364, and 366). Only those stands immediately adjacent to the public/private boundary will be treated. Precommercial thinning would reduce the risk of uncharacteristically severe fires and insect epidemics, and increase the growth rates on the remaining trees. These stands are expected to develop into old growth more quickly than if left untreated. Precommercial thinning helps meet the purpose and need for reducing fire risk in the Canyon Wildland Urban Interface while managing the ROG for future old growth.

Remove Limitations on Harvesting in Visual Corridors for this Project
The Proposed Amendment will allow shelterwood harvest without the limitations on unit size and eliminate the requirement to meet partial retention in the foreground and modification in the middle ground along the Wilderness Loop (County Road 65 and Forest Road 15) and Highway 395 visual corridors for this project. There are stands along the two corridors that are in poor health because of over-stocking, disease, and high fuel loadings resulting in a high fire hazard. These poor stand conditions would contribute to extreme fire behavior and put other resources as well as personal dwellings at risk in the event of a fire.

The most effective way to return these sites to a healthy condition and a low fire hazard is by prescribing regeneration harvest. Unit treatment size will exceed current Forest Plan standards. Treating at stands at the smaller scale directed by the Forest Plan, up to two acres in foreground and 10 acres in middleground is not effective. The Proposed Action also waives the size restriction on harvest acres in the foreground of sensitivity level 1 corridors until a corridor plan is completed.

Proposed areas impacted by this amendment change include Units 48, 52, 62, and 90 along the Highway 395 corridor. It also includes Units 140, 152, 166, 176, 178, 180, 182, 200, 202, 218, 228, 246, 504, 582, and 583 along the Wilderness Loop. The expected visual quality levels this harvesting pattern and combination of marking guides will create is visual quality objective of modification.

Determination that Forest Plan Amendment #61 is Not Significant
I have determined that this amendment is not a significant amendment under the National Forest Management Act implementing regulations [36 CFR 219.10 (f)]. In reaching this conclusion, I considered the following factors (from Forest Service Handbook 1909.12):

Timing
A change is less likely to result in a significant Forest Plan amendment if the change takes place late in the life of the plan. The proposed changes are taking place 16 years after the current 1990 Forest Plan ROD was signed, but before the next Forest Plan revision that scheduled for after 2007. Therefore the timing of the four changes in this amendment is not significant because of how late this change is taking in the life of the current Forest Plan.

Location and Size
The smaller the area affected, the less likely the changes will result in a significant Forest Plan amendment. Approximately 875 acres would be reclassified as Big Game Winter Range, less than 500 acres would have the cover standard reduced, about 125 acres would be thinned in the new ROG, and less than 700 acres would be temporarily below the visual standard. This is contrasted with the 1.5 million acre size of the Malheur NF. This amendment is not significant because it applies only to the Canyon Creek area (22,700 acres) and this decision does not apply to other locations.

Goals, Objectives, and Outputs
An action is more likely to be a significant Forest Plan amendment if it alters the long-term relationship between the levels of goods and services projected by the Forest Plan and particularly if it would forego the opportunity to achieve an output in later years. The reclassification of 875 acres to Big Game Winter Range, the reduction of satisfactory cover, switching of the ROG and DOG, and removing the visual corridor limitation on shelterwood harvest on less than 700 acres are minor changes to the amount of the National Forest that is available for timber harvest (MA-1). Even when all of the other cumulative changes of other amendments to MA-1 are considered, the change is less than 1 percent. Therefore, this reduction of MA-1 is an insignificant change to the potential timber output of other services for the Malheur NF.

Management Prescription
A change is more likely to require a significant amendment if it would apply to future decisions throughout the forest planning area. The amendment associated with Alternative 2 is just for the Canyon Creek Project area. The changes would not affect future actions. The designation of Big Game Winter Range is limited to the Canyon Creek Project area. The reduction in cover applies only to the three subwatersheds that are within the Canyon Creek Project, there is no change to the rest of the National Forest. The switching of the DOG and ROG will apply to future management but there is no net change in acres or the ultimate goal of maintaining quality old growth habitat. The removal of the limitation on shelterwood harvest in the visual corridor only applies to the Canyon Creek Project area. The planned activities will not detract from or jeopardize any of the Forest Plan goals because of the small magnitude of change and that it is limited to the Canyon Creek Project area. Therefore, this change is not significant.

Other Factors
After review of the environmental assessment and project record, I have determined that there are no other factors or unique circumstances affecting the Forest Plan from this amendment.

Based on the above factors, I conclude that this amendment is not a significant change to the overall Forest Plan direction as defined in the 1990 Malheur National Forest Land and Resource Management Plan and its Record of Decision, as amended. I further find that the action is not significant with respect to the implementing regulations of NFMA title 36, Part 219.10 (e) and (f); the Forest Service Manual at Chapter 1922.51 and 1922.52; and the Forest Service Handbook 1909.12 at Chapter 5.32. Therefore, I find that the action constitutes a non-significant amendment to the Forest Plan.

Rationale for the Decision

I have selected Alternative 2, as revised, because it best responds to specific fire-hazard concerns identified in the Grant County Community Fire Protection Plan. The project meets the purpose and need for action while meeting all direction provided in the Malheur Land and Resource Management Plan (1990) and the intent of the Healthy Forest Restoration Act (HFRA) to reduce fire hazards around communities at risk from wildfire and restore ecosystem health.

I have reviewed the public comments and issues identified for this project and have determined that Alternative 2 best addresses them. I selected Alternative 2 because it will combine with previous management activities to reduce high fuel loadings over a large portion of the Canyon Creek WUI Fuel Reduction Project area and reduce the risk of large-scale, high severity wildfire occurrence. The potential for tree mortality from insects and disease will be reduced over a portion of the area by thinning in overstocked stands and species conversion in the shelterwood treatments.

Alternative 2 will treat about 36% of the Canyon Creek WUI with a comprehensive, site-specific suite of fuel reduction activities. Fuel ladders will be reduced through thinning from below and removal of severely mistletoe-infected Douglas-fir. Thinning will also reduce the crown bulk density to levels that do not readily sustain crown fire. Treating the accumulated natural fuels and fuels created by vegetation management will reduce the overall risk of uncharacteristically severe wildland fire. Treated areas will be returned to Condition Class 1, where fire will function as it did historically, in a stand maintenance mode rather than as a stand replacement event.

Treatments are focused near private lands, along Highway 395, near the wilderness boundary, and along the ridge to the southwest. Fire behavior would be reduced in these areas, improving the firefighter’s ability to safely engage fires and protect both public and private property.

Burning and mechanical treatment will increase the quantity and quality of forage by stimulating new shoot production, retaining seed sources, and provide growing space for new plants in burned areas. Under the treatment regime of Alternative 2, forage improvement for big game and other wildlife should be effective for 20 to 25 years. Fuel treatments should be effective for about the same time before regeneration, stand growth, and fuels buildup creates fuel conditions that may require another treatment, such as a maintenance underburn.

Other Alternatives Considered

Alternative 1 (No Action): This alternative would leave the area in its existing condition. Alternative 1 was not selected because it did nothing to reduce fire hazard, protect the at-risk community along Canyon Creek, lower the potential for a large-scale wildfire, or improve forest health.

Public Involvement and Collaboration

Coordination with Agencies, Communities, Native Groups and Others
The Canyon Creek WUI project has been listed on the Malheur National Forest Schedule of Proposed Actions since 2003. The SOPA is distributed to over 200 people, including a wide array of government agencies, interest groups, and interested individuals. The SOPA is also posted on the Malheur National Forest web site (www.fs.fed.us/r6/malheur).
In December, 2003 letters were mailed to the Burns Paiute Tribe, the Confederated Tribes of Warm Springs, and the Confederated Tribes of the Umatilla to inform them of and seek input about the Canyon Creek project. Another letter was mailed in March, 2005, providing information and seeking public collaboration. In November, 2005 the Blue Mountain District Ranger contacted the wildlife biologist for the Confederated Tribes of Warm Springs, who indicated interest in project wildlife issues. The wildlife biologist for the Confederated Tribes of the Umatilla was also contacted in November, 2005 and stated he had no concerns about the proposed project.

Collaboration
The collaboration process for the Canyon Creek WUI project spanned 9 months. In March, 2005, a letter providing information and seeking public collaboration was mailed to approximately 200 individuals and groups. This included federal and state agencies, the Burns Paiute Tribe, the Confederated Tribes of the Umatilla Indian Reservation, the Confederated Tribes of the Warm Springs Reservation, municipal offices, businesses, interest groups, and individuals.

There were three formal indoor meetings and three formal field trips to the project area. In addition there were six field trips with small groups or individuals and a number of additional conversations in the office about specific concerns. There were substantial changes and improvements made to the Proposed Action based on the site specific information and concerns the collaborators brought to these meetings and field trips. Transcripts of the meetings are on file in the project record.

- A notice was sent out to “the Malheur NF all projects” mailing list on March 3, 2005 announcing the project and informing the public of a collaborative meeting to be held on March 10, 2005. The Blue Mountain Ranger District also issued a statement that was announced on the local radio station and placed an article in the Blue Mountain Eagle. Approximately 40 people attended this first meeting. A wide variety of comments and suggestions were gathered on how the collaborators thought the area should be managed.
- On May 6, 2005 there was a field trip with two interested parties to discuss management trade-offs between elk habitat and fire hazard reduction.

- On May 23, 2005 a field trip to the Canyon Creek area was scheduled and eighteen people attended. Comments and ideas for potential treatments were solicited for a variety of vegetation conditions.
- On October 5, 2005 an additional field trip was conducted in which twelve people attended. Sample treatment options were demonstrated by flagging trees to be left for the various treatment options. Discussed leaving patches of untreated areas for wildlife cover; group agreed to 2-5 acres in size and covering 5-15% of a unit.
- A second public meeting was held on October 13, 2005, with 19 people attending. This was a working meeting to examine a draft Proposed Action prepared by the FS and discuss how to improve it.
- As a result of discussions during the October, 2005, public meeting, three field trips with individuals were conducted looking at specific areas and concerns, resulting in a number on the ground adjustments to the Proposed Action:
- On November 2, 2005 a final collaboration meeting was held to present and work out refinements to the Proposed Action.
- Three more field trips with individuals looking at specific areas and concerns were conducted in November, 2005, resulting in additional on the ground modifications to the Proposed Action.
- On November 16, 2005, the District wildlife biologist met with Oregon Department of Fish and Wildlife.
- On November 28, 2005, an individual came in to the office to offer additional site specific suggestions for big game habitat protection. As a result we dropped harvest in a habitat area at the head of Bear Gulch where there are a lot of springs and seeps and adjusted the visual thinning prescription along the lower slopes to provide for wildlife travel corridors.
- On December 13, 2005, the revised Proposed Action was mailed to the collaborators for their final review and suggestions. In general the comments were supportive of the Proposed Action that emerged from the collaboration process. While individuals did not agree with everything that was proposed, most of the collaborators felt that it was a good balance between reducing the fire hazard to an acceptable level while maintaining an adequate level of wildlife habitat.

In all, collaboration resulted in a number of changes to the proposal:

- Total vegetation treatments were reduced from 10,640 acres to 7,040. Shelterwood regeneration was reduced 60%, understory removal by 45%, commercial thinning by 12%, and precommercial thinning by 21%.
- Variable density spacing was proposed initially, and was supported by most collaborators.
- Leave patches within treatment units were added and the size was increased from1-2 acres to 2-5 acres.
- The DOG and ROG would be switched (a Forest Plan amendment) to allow treatment next to private lands.
- Units were dropped in site specific areas to preserve special wildlife habitat; including calving and fawning sites, seasonal migration routes, and areas with concentrations of springs and seeps.

Scoping
On January 17, 2006, the proposed action that was developed through the collaboration process was sent out to the public mailing list. This included Federal, State and local agencies, Grant County Court, Tribes, permittees, property owners, advocacy groups, and the general public. The responses received are on file in the project record and are summarized in the EA Chapter 1.

Issues identified during scoping are normally addressed by developing alternatives to the proposed action; however, no alternatives are required for this HFRA project. Instead the interdisciplinary team considered the comments received during the scoping process and made further refinements to the proposed action. The resolution of the various issues is summarized in EA Chapter 2 .

Consultation
National Marine Fisheries Service (NMFS) and the US Fish and Wildlife Service (USFWS) were initially informed of the Canyon Creek Wildland Urban Interface project in November, 2003 at a Level 1 meeting. In April 2006, the Blue Mountain Ranger District presented project information on threatened and endangered fish species and Canada lynx to the Level I Team (USFWS and NMFS).

Cultural resource surveys of varying intensities have been conducted following inventory protocols approved by the State Historic Preservation Officer (SHPO). Native American communities have been contacted and public comment encouraged. The consultation and concurrence process with SHPO has been concluded. No significant effects on known cultural resources are anticipated. The Forest Specialist has certified that this project complies with Section 106 of the National Historic Preservation Act, under the terms of the 2004 Programmatic Agreement between Advisory Council on Historic Preservation (ACHP), SHPO, and the United States Forest Service, Region 6.

Objections
The environmental assessment was mailed out for the 30-day objection period on August 2, 2006. An advertisement announcing the availability of the environmental assessment and the objection period was placed in the Blue Mountain Eagle, a John Day, OR, newspaper, on August 2, 2006.

Three objections were received, filed by Dan Becker, the Oregon Natural Resources Council (ONRC) and the Sierra Club. The Reviewing Officer held a telephone conference with the Objectors on October 19, 2006, and responded to the objectors on October 20, 2006. He instructed the Deciding Officer to proceed with the issuance of a Decision Notice once several issues identified in the Objections were addressed in the EA:

- Add collaborator affiliations to the list in Chapter 4 of the EA
- Expand the discussion of effects of alternate snowmobile routes during log haul
- Clarify the effects of grazing on fine fuels and a shift towards more hazardous ladder fuels such as shrubs and trees
- Include the new road to provide access to private lands in the roads report and include a statement in the EA that the roads analysis is available for all existing or planned roads as outlined in PACFISH (RF-2).

In addition he suggested that the Deciding Officer meet with the Objectors to explore if there were any additional issues that could be resolved to common satisfaction. That meeting was held on October 27, 2006, with Tim Lillebo (ONRC) and Asante Riverwind (Sierra Club) present. Dan Becker was invited but declined the offer. The changes agreed to were to:

- Raise the average basal area to be left in units 404 and 405 from 50 ft^2/acre to 60 ft^2/acre
- Emphasize retention of the older age class orange-bark ponderosa pine that are less than 21"DBH
- Emphasize the training and monitoring of marking crews to ensure that the variable density concept and retention of the above older trees less than 21"DBH is implemented as planned.

The objections and the responses to the objections may be found in the project record.

Finding of No Significant Impact

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

1. *Impacts may be both beneficial and adverse [40 CFR 1508.27 (b)(1)].*

Both beneficial and adverse impacts of implementing the Selected Alternative have been considered within the EA. Beneficial and adverse direct, indirect, and cumulative environmental impacts discussed in the EA have been disclosed within the appropriate context and intensity. I find that my decision would have neither a significant beneficial or adverse impact because the anticipated effects are similar to those in past fuel reduction projects, which have not proven to cause significant impacts, thus it is not a significant federal action.

Project effects are generally limited to the project area, and, except for smoke and water, are not transported out of the treated areas. The project changes the current condition by moving forest and fuel conditions toward the natural conditions found historically in the area prior to fire suppression. This should have the added benefit of making future fuel and silvicultural actions less intensive, and less expensive. I base this finding on the cumulative effects for forest fire hazards (EA pages 17-28), air quality (EA pages 19-27), fisheries (EA pages 152-168), soils (EA pages 118-123), old growth habitat (EA pages 72-77), big game (EA pages 84-90), cavity nesters (EA pages 92-96), Goshawks (EA pages 97-99), land birds (Ea pages 107-111), and Threatened and Endangered species (EA page 102).

2. *The degree to which the action affects public health or safety [40 CFR 1508.27 (b)(2)].*

The Selected Alternative would not significantly affect public health or safety. Oregon Smoke Management Plan and the State Implementation Plan of the Clean Air Act guidelines will be followed to mitigate the effects of smoke created by project activities. The treatments will lead to a beneficial effect upon public health and safety because it has the potential to reduce the frequency and intensity of wildfires. Public lives and property are more likely to be safer, the chances of unhealthful smoke occurring is reduced, and public safety corridors (such as highway 395) will be more likely to be safe to travel under any given set of fire-weather conditions.

3. *Unique characteristics of the geographic area [40 CFR 1508.27 (b)(3)]*.

My decision will not affect any unique areas such as parklands, prime farmlands, wetlands, wild and scenic rivers, potentially eligible wild and scenic rivers, or ecologically critical areas, as there are no such areas in the project vicinity.

4. *The degree to which the effects on the quality of the human environment are likely to be highly controversial [40 CFR 1508.27 (b)(4)]*.

My decision falls within the scope of the analysis for the Malheur Land and Resource Management Plan (1990), as amended, and it's supporting Environmental Impact Statement. The desired future condition, standards and guidelines and the analysis for the Forest Plan support fuel reduction and related activities like those in this action for this area. My decision includes no activities that were not addressed in the Forest planning process. Effects on the quality of the human environment are not considered highly controversial because these types of activities have taken place in this area and in similar areas and the resulting effects are well known and understood.

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

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

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

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

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

Plant Species
No threatened or endangered plants are listed for the Malheur NF. Sensitive plant surveys were completed in 2003, and no sensitive plant species were found.

Wildlife Species
The Wildlife Biological Evaluation contains these findings for threatened, endangered, and sensitive wildlife species in the Canyon Creek Project area:
- No Effect for threatened Northern Bald Eagle and endangered Gray Wolf.
- Not Likely to Adversely Affect was made for threatened Canada Lynx.
- May Impact Individuals or Habitat for sensitive species California Wolverine and Pacific Fisher.
- A finding of No Impact was reached for sensitive species American Peregrine Falcon, Western Sage Grouse, Gray Flycatcher, Bobolink, Upland Sandpiper, and Tricolored Blackbird.

Aquatic Species
The Aquatic Biological Evaluation contains these findings for threatened, endangered, and sensitive aquatic species in the Canyon Creek Project area:
- No Effect for threatened Columbia River Bull Trout.
- Not Likely to Adversely Affect for threatened Mid-Columbia River Steelhead and it's Designated Critical Habitat.
- No Adverse Effect for Chinook Salmon Essential Fish Habitat.
- May Impact Individuals or Habitat for sensitive species Interior Redband Trout, Westslope Cutthroat Trout, Mid-Columbia River Spring Chinook, and Columbia Spotted Frog.

Consultation was done with National Marine Fisheries Service and U. S. Fish and Wildlife Service starting in November, 2003, and continuing through April and July, 2006, on the determination of effects on Threatened, Endangered, and Sensitive species. The effects analysis completed and documented in the BE or BA resulted in a call of Not Likely to Adversely Effect

(NLAA) OR No Effect (NE). This was done under the Section 7 Counterpart Regulations of the Endangered Species Act (Federal Register, December 8, 2003) and is in compliance with those regulations and the March 3, 2004, Alternative Consultation Agreement between the Forest Service, Fish and Wildlife Service, and National Marine Fisheries Service.

10. *Whether the action threatens a violation of Federal, State, or local law or requirements imposed for the protection of the environment[40 CFR 1508.27 (b)(10)]*.
I have examined this action and its relationship to HFRA, NFMA, ESA, NEPA, NHPA and related laws and find that my decision will not violate any federal, state, local laws or requirements for protection of the environment. The Wildland-Urban Interface used in the Canyon Creek WUI Fuel Reduction Project Environmental Assessment matches the WUI defined in the Grant County Community Fire Protection Plan, per the Healthy Forests Restoration Act, Section 101(3). There are no known significant irreversible resource commitments or irretrievable losses of timber production, wildlife habitats, or water quality

Consistency Findings

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

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

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

3. The Canyon Creek WUI Fuel Reduction Project is consistent with the goals and objectives of the Malheur LRMP, as amended, and will help achieve the Desired Future Conditions for the Malheur National Forest. The Canyon Creek WUI Project will meet the direction and intent of Regional Forester's Amendment #2 by retaining large trees, moving treated areas toward missing or under-represented old forest conditions, returning fire to its historical function, and by protecting wildlife habitat from large scale disturbances.

4. The Proposed Action for this HFRA project was developed and revised collaboratively with interested individuals and organizations. Public scoping was conducted and appropriate notices were published in the local newspaper, the Blue Mountain Eagle, for review of the project.

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

6. The Canyon Creek WUI Fuel Reduction Project is consistent with the intent and purposes of Title I of the Healthy Forests Restoration Act of 2003. This project was identified as a priority by the Grant County Community Fire Protection Plan and the Grant County Court. The project

was developed collaboratively with local landowners, contractors, and organizations. It reduces hazardous fuels and fire hazard in the wildland-urban interface of a defined at-risk community.

The Canyon Creek WUI Fuel Reduction Project Environmental Assessment is on file and available for public review at the Blue Mountain Ranger District, 341 Patterson Bridge Road, John Day, Oregon, 97845. The Environmental Assessment is also available for review on the Malheur National Forest Internet Website at:

www.fs.fed.us/r6/malheur

For further information about this project, contact Eric Wunz, Silviculturist, or Bob Crisler, Environmental Coordinator, Blue Mountain Ranger District, (541) 575-3000.

Administrative Review

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

Implementation of this project may begin immediately.

___/s/ Gary L. Benes___________ **___12/21/2006_______**
Gary L. (Stan) Benes **Date**
Forest Supervisor
Responsible Official

United States Department of Agriculture | Forest Service | Malheur National Forest | P.O. Box 909
John Day, OR 97845
(541) 575-3000
Fax (541) 575-3001
TDD (541) 575-3089

File Code: 1950
Date: January 3, 2007

Dear Interested Public:

Enclosed is the Decision Notice and Finding of No Significant Impact for the Canyon Creek Wildland-Urban Interface Fuels Reduction Project Environmental Assessment (a Healthy Forest Restoration Act project). This document and the revised Environmental Assessment are available on the Malheur National Forest website at www.fs.fed.us/r6/malheur. Paper copies of the Environmental Assessment may be obtained at the Blue Mountain Ranger District office in John Day, OR.

The project is located approximately ten miles south of Canyon City and consists of about 22,700 acres of National Forest lands located within one and one-half miles of the private properties along Canyon Creek. The project area is within the Wildland Urban Interface as identified in the Grant County Community Fire Protection Plan. The project will reduce fuels on approximately 8,000 acres through a combination of mechanical (tree cutting and fuel piling and burning) and prescribed burning treatments.

Also included in this decision is a new 200’ road to be built by John Morris to access his private property and Non-significant Forest Plan Amendment #61, which includes the following changes:

- The Big Game Winter Range (MA-4a) boundaries would be adjusted on approximately 875 acres, expanding them down to the National Forest boundary on either side of Canyon Creek.
- The Proposed Action would reduce satisfactory cover below Forest Plan Standards in the Vance Creek, East Fork Canyon Creek and Upper Canyon Creek subwatersheds. Cover is reduced to meet the purpose and need of reducing fire risk in the Canyon Creek Wildland Urban Interface.
- Exchange Dedicated Old Growth Area (DOG) 236 and Replacement Old Growth (ROG) 236 so that about 125 acres of the newly classified ROG (which is adjacent to private lands and structures) would be precommercially thinned to reduce fire risk in the Canyon Creek Wildland Urban Interface.
- Remove limitations on harvesting in visual corridors for this Project to allow shelterwood harvest without the limitations on unit size and to eliminate the requirement to meet the Visual Quality Objectives of partial retention in the foreground and modification in the middle ground along the Wilderness Loop (County Road 65 and Forest Road 15) and Highway 395 Visual Corridors for this project.

Three objections were filed by Dan Becker, Oregon Natural Resources Council (ONRC), and the Sierra Club/Blue Mountain Biodiversity Project. Jim Golden, the Reviewing Officer, held a telephone conference with the Objectors on October 19, 2006, and responded to the objectors on October 20, 2006. He instructed the Deciding Officer to issue a Decision Notice once the following issues identified in the objection process were addressed in the EA:

- Add collaborator affiliations to the list in Chapter 4 of the EA
- Expand the discussion of effects of alternate snowmobile routes during log haul
- Clarify the effects of grazing on fine fuels and a shift towards more hazardous ladder fuels such as shrubs and trees
- Include the new road to provide access to private lands in the roads report and include a statement in the EA that the roads analysis is available for all existing or planned roads as outlined in PACFISH (RF-2).

In addition he suggested that the Deciding Officer meet with the Objectors to determine if there were any additional issues that could be resolved to common satisfaction. That meeting was held on October 27, 2006 with Tim Lillebo (ONRC) and Asante Riverwind (Sierra Club). Dan Becker was invited but declined to attend the meeting. The changes agreed to were to:

- Increase the average basal area to be retained in units 404 and 405 from 50 ft2/acre to 60 ft2/acre
- Emphasize retention of the older age class orange-bark ponderosa pine that are less than 21"DBH
- Emphasize the training and monitoring of marking crews to ensure that the variable density concept and retention of the older trees less than 21"DBH is implemented as planned.

For further information contact Bob Crisler or Eric Wunz at the Blue Mountain Ranger District, Malheur National Forest, P. O. Box 909, 431 Patterson Bridge Road, John Day, OR 97845, (541) 575-3000

Thank you for participating in the management of your Malheur National Forest.

Sincerely,

/s/ Gary L. Benes
Gary L. (Stan) Benes
Forest Supervisor

Enclosure

Oregon Natural Resources Council
PO Box 11648, Eugene OR 97440
541-344-0675, fax 541-343-0996
dh@onrc.org http://www.onrc.org/

19 Sept 2006

Regional Forester Linda Goodman
USDA PNW Forest Service
ATTN: 1570 Objections
VIA: appeals-pacificnorthwest-regional-office@fs.fed.us

Subject: ONRC objection to the Canyon Creek WUI Fuels Reduction Project

Dear Forest Service:

Pursuant to 36 CFR 218, please accept the following comments/objection from Oregon Natural Resources Council concerning Canyon Creek WUI Fuels Reduction Project EA. ONRC represents about 5,000 members who support our mission to protect and restore Oregon's wildlands, wildlife, and water as an enduring legacy. Our goal is to protect areas that remain intact while striving to restore areas that have been degraded. This can be accomplished by moving over-represented ecosystem elements (such as logged and roaded areas) toward characteristics that are currently under-represented (such as roadless areas and complex old forest).

It is unfortunate and we regret that scheduling conflicts prohibited us from being more involved in the formal collaborative process for this project, but we did submit 4 scoping letters, met three times with Forest Service staff, and got out on the ground several times during development of this project. We are also pleased to be working with the Forest Service and other collaborative community members on forthcoming projects so that we will be in on the ground floor for future forest management actions.

We recognize all the hard work that has been contributed thus far from both the Forest Service and the collaborative community. We file this objection because under HFRA we have no other option to comment and influence the final decision. The recently released Canyon Creek WUI EA is our first opportunity to review the project in full detail.

We do not seek to stop this project outright. In fact, there are many things we like about this project such as the prescribed fire, pre-commercial thinning, and variable retention thinning from below prescriptions. However, we wish to improve this project by encouraging some incremental changes that will make this project more effective and less damaging, such as dropping a few units that provide critical ecological values, and retaining more of the larger and older trees that are fire-resistant and provide cool, moist conditions that reduce fire hazard, as well as providing big game cover and other wildlife values.

PROPOSED ACTION TITLE: Canyon Creek WUI Fuels Reduction Project Environmental Assessment

PROJECT DESCRIPTION: The proposed action involves:

- Land allocations include: elk winter range, visual corridors, old-growth
- 7040 acres of mechanical treatment/fuel reduction
    - 3150 acres of commercial thinning
    - 1010 acres of regen harvest and planting
    - 1000 acres of understory removal
    - 1880 acres of pre-commercial thinning
    - 2-5 acre unthinned patches provided for big game cover
    - 3010 acres of whole tree yarding
    - 2030 acres of grapple piling
    - 3750 hand pile only
    - 2400 acres of tractor logging
    - 2240 acres of helicopter logging
    - 520 acres skyline
- 3000 acres of prescribed fire (including 1,000 acres outside of thinning units)
- 2 miles of temp road construction (5 temporary culverts)
- 37 miles of closed roads to be opened, used for log hauling, and reclosed
- 86 miles of road maintenance
- 3 units will exceed 20% soil compaction (230, 504, 510) so skid trails will be subsoiled
- big game cover reduced below forest plan standards in Vance Creek and Upper Canyon Creek winter range
- 4 forest plan amendments including waiving the big game cover requirements and eliminating visual corridor protections to allow more logging

PROJECT LOCATION: Blue Mountain Ranger District, Malheur National Forest, south of John Day and Canyon City, near the Strawberry Wilderness.

DATE OF EA: July 2006

NAME OF RESPONSIBLE OFFICIAL: Malheur Forest Supervisor, Gary L. Stan Benes.

REQUEST FOR RELIEF: ONRC respectfully requests that the Forest Service modify the proposal as follows:

- We request a change in the basal area cut of some units that currently have old growth trees in them. These may not be Forest Plan Designated LOS, but they are currently in LOS condition. Some units with LOS character and a thick understory of smaller trees have a basal area prescription that appears to require cutting of old fire resistant trees to achieve the prescribed basal area. These Units are not individually tree marked yet, but we want to review these Units with the

Forest Service and get clarification on the prescription as to what trees would actually be cut.

- Retain all trees that show old-growth characteristics regardless of size, such as Ponderosa pines with yellowing bark.
- Drop shelterwood regen harvest or convert to variable thinning that retains the largest pine, larch and Douglas fir and leaves a fully stocked stand;
- Retain enough of the largest trees available to forest plan requirements for big game and visual corridors
- Adhere to the LRMP requirements for big game cover and visual resources and road management.
- Within *de facto* roadless areas adjacent to the Strawberry Mountains wilderness, avoid commercial logging. The EA says that "few" of the stands to be treated are "unaltered," but the EA fails to disclose which stands are unroaded, what the unique resource values of those areas are, what activities are planned in each area, and how those values may be impacted by logging. We would like to review portions of some units adjacent to the wilderness boundary to clarify and protect the roadless character of those lands.
- In visual corridors, instead of flush-cutting all stumps, high-cut some stumps to create patches of short snags.
- Retain more snags so that the proposed action is no worse than the no action alternative.

OR the Forest Service must prepare a new NEPA analysis with a full range of alternatives and follow the notice-comment-appeal regulation at 36 CFR 215.

STATEMENT OF REASONS

This project violates the HFRA so the Forest Service must use the regular NEPA process.

We accept that HFRA is the law of the land, but we wish to see HFRA used appropriately. There is a normal NEPA process that works better than HFRA because it requires full consideration of alternatives that might better accomplish the project's purpose and need. We want to see HFRA used only where it is authorized, and we want NEPA used whenever it is required. HFRA was a compromise that only authorizes fuel reduction in limited circumstances, such as when the forest plan does not need to be amended and using approved methods of fuel reduction. This project unfortunately does not fit these HFRA requirements so it must go through the normal NEPA process.

1. HFRA requires the Forest Service to use approved methods of fuels reduction including thinning and prescribed fire, but not shelterwood or regeneration harvest. HFRA §6511(2) provides: "The term 'authorized hazardous fuel reduction project' means the measures and methods described in the definition of 'appropriate tools' contained in the glossary of the Implementation Plan." The implementation plan glossary says that "appropriate tools" include "thinning," but the definition does not include shelterwood or any form of regen harvest. http://www.fireplan.gov/reports/11-23-en.pdf (page 18: Glossary says

"Appropriate Tools: Methods for reducing hazardous fuels including prescribed fire, wildland fire use, and various mechanical methods such as crushing, tractor and hand piling, thinning (to produce commercial or pre-commercial products), and pruning. They are selected on a site-specific case and are ecologically appropriate and cost effective.").

The Forest Service cannot argue that they have a wide range of discretion here, because Congress was very specific in delineating the types of projects that are authorized under HFRA. This definition lists several forms of fuel reduction only one of which involves commercial logging (i.e. thinning). The EA description of shelterwood logging (page 9) does not even mention fuel reduction or fire hazard reduction. The truth is that because most forms of commercial logging often make fire hazard worse instead of better. The Forest Service cannot stretch the HFRA glossary definition beyond reason to include regen harvest as an appropriate fuel reduction tool.

There are at least three reasons why regen logging methods such as shelterwood harvest are not an appropriate tool for fuel reduction:

a. Regen harvest results in forest conditions that are more hazardous than doing nothing. Shelterwood harvest will result in forest conditions that are hotter, dryer, and windier than other treatments or no action.[1]

1

> Thinning opens stands to greater solar radiation and wind movement, resulting in warmer temperatures and drier fuels throughout the fire season. [T]his openness can encourage a surface fire to spread, …

USDA Forest Service; Influence of Forest Structure on Wildfire Behavior and the Severity of Its Effects, November 2003.
http://www.fs.fed.us/projects/hfi/2003/november/documents/forest-structure-wildfire.pdf

> Opening up closed forests through selective logging can accelerate the spread of fire through them because a physical principle of combustion is that reducing the bulk density of potential fuel increases the velocity of the combustion reaction. Wind can flow more rapidly through the flaming zone. Thinned stands have more sun exposure in the understory, and a warmer microclimate, which facilitates fire (Countryman 1955).
> …
> [F]uel reduction activities – particularly mechanized treatments – inevitably function to disturb soils and promote the invasion and establishment of non-native species. Pile burned areas associated with the treatments are also prone to invasion (Korb et al. 2004). Annual grasses can invade treated areas if light levels are high enough, leading to increased likelihood of ignition, and more rapid spread of fire, which can further favor annual grasses (Mack and D'Antonio 1998). This type of feedback loop following the establishment of non-native plants may result in an altered fire regime for an impacted region, requiring extensive (and expensive) remedial action by land managers (Brooks et al. 2004).

Odion, Dennis. 2004. Declaration in NWEA v. Forest Service. c*iting* Countryman, C. M. 1955. Old-growth conversion also converts fire climate. U.S. Forest Service Fire Control Notes 17: 15-19.

> Theoretically, fuel treatments have the potential to exacerbate fire behavior. Crown fuel reduction exposes surface fuels to increased solar radiation, which would be expected to lower fuel moisture content and promote production of fine herbaceous fuels. Surface fuels may also be exposed to

b. Regen harvest, with or without replanting, will also result in the establishment of a dense growth of young trees that are one of the most hazardous types of forest structure because they provide a nearly continuous bed of resinous fuel close to the ground.[2] The EA (p 56) admits

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> intensified wind fields, accelerating both desiccation and heat transfer. Treatments that include prescribed burning will increase nutrient availability and further stimulate production of fuels with high surface-area-to-volume ratios. All these factors facilitate the combustion process, increase rates of heat release, and intensify surface fire behavior.
> …
> Thus, treatments that reduce canopy fuels increase and decrease fire hazard simultaneously. …. Still unanswered are questions regarding necessary treatment intensities … more information is clearly needed.

Omi, P.N., and Martinson, E. J. 2002. Effect of fuels treatment on wildfire severity. Final report. Western Forest Fire Research Center. Submitted to the Joint Fire Science Program Governing Board http://www.cnr.colostate.edu/frws/research/westfire/FinalReport.pdf

[2] Countryman, C.M. 1955. Old-growth conversion also converts fire climate. Fire Control Notes 17(4): 15-19.

Frost, E.J. and R. Sweeny. 2000. Fire Regimes, Fire History and Forest Conditions in the Klamath-Siskiyou Region: An Overview and Synthesis of Knowledge. Available at: http://www.worldwildlife.org/forests/attachments/fire_report.pdf

Harma K. and P. Morrison. 2003. Analysis of Vegetation Mortality and Prior Landscape Condition, 2002 Biscuit Fire Complex. Pacific Biodiversity Institute. Winthrop, WA. 25 p.

Ingalsbee, T. 1997. Fires burn hotter in tree farms. Headwaters Forest News 7(2): 10-11.

DellaSala, D.A., D.M. Olson, S.E. Barth, S.L. Crane and S.A. Primm. 1995. Forest health: moving beyond rhetoric to restore healthy landscapes in the inland northwest. Wildlife Society Bulletin 23(3): 346-356.

Martinson, E., Omi, P.N., and Shepperd W., 2003. Fire behavior, fuel treatments, and fire suppression on the Hayman Fire, Part 3 Effects of fuel treatments on fire severity. Hayman Fire Case Study, pp. 96-126, USFS Rocky Mountain Research Station Gen. Tech. Rep. RMRS-GTR-114. Ogden, UT. http://www.fs.fed.us/rm/pubs/rmrs_gtr114/rmrs_gtr114_2.pdf

Odion, D.C., J.R. Strittholt, H. Jiang, E.J. Frost and D.A. DellaSala. 2004. Fire history and severity patterns and forest management in the Klamath National Forest, northwestern California, USA. Ecological Applications.

Sapsis, D.B. and C. Brandow. 1997. Turning plantations into healthy, fire resistant forests: Outlook for the Granite Burn. California Dept. of Forestry and Fire Protection, Fire and Resource Assessment Program. Available at: http://frap.cdf.ca.gov/projects/granite_burn/gb.html

USDA Forest Service 2000. Final Environmental Impact Statement, Roadless Area Conservation. Vol. 1. Washington, D.C.

Weatherspoon, C.P. 1996. Fire-silviculture relationships in Sierra forests. In: Status of the Sierra Nevada: Sierra Nevada Ecosystem Project Final Report to Congress, Vol. II. Wildland Resources Center Report No. 37. Center for Water and Wildland Resources. Univ. of California, Davis.

that the shelterwood units will be established and managed as fast growing plantations and will be more susceptible to fire for 30 years.[3] Increasing fire hazard for 30 years is simply not the kind of activity that Congress sought to accelerate with the HFRA. The Forest Service also relies on the assumption of future stocking control to establish desired future fuel conditions, yet these are not profitable activities, and recent trends indicate that the need for timber stand improvement keeps increasing while the accomplishment keeps declining.[4] Given these trends, taking actions that will increase fire hazard in reliance on future stocking control is arbitrary and capricious and contrary to HFRA.

c. Regen harvest creates large amounts of hazardous logging slash that is never full treated. Incomplete treatment of logging slash results in increase fire hazard relative to no action. See Crystal L. Raymond. 2004. The Effects of Fuel Treatments on Fire Severity in a Mixed-Evergreen Forest of Southwestern Oregon. MS Thesis. http://depts.washington.edu/nwfire/publication/Raymond_2004.pdf The EA relies on activity fuel treatment to mitigate for the increased fire hazard caused by opening the canopy, but the EA fails to acknowledge the fact that activity fuel treatments are not fully effective. Nor does the EA carefully analyze the unavoidable fire hazard resulting from the growth of grasses, shrubs, and small trees due to opening the canopy.

To comply with HFRA, the Forest Service can either drop the shelterwood, shift to a more effective thinning treatment that retains enough canopy to maintain cool, moist understory and suppress tree regeneration, or prepare a new NEPA analysis with a full range of alternatives and a full public involvement process.

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[3] Note: the admission that fire hazard will increase for 30 years following shelterwood harvest and replanting was found in the vegetation section (p 56) but was missing from the fuels analysis. This is a NEPA violation.

[4] Powell, David C.; Rockwell, Victoria A.; Townsley, John J.; Booser, Joanna; Bulkin, Stephen P.; Martin, Thomas H.; Obedzinski, Bob; Zensen, Fred. 2001. Forest density management: recent history and trends for the Pacific Northwest Region. Technical Publication R6-NR-TM-TP-05-01. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Region. 22 p. http://www.fs.fed.us/r6/FDMwhitepaper.pdf ["Key Findings

• Timber stand improvement (TSI) attainment was 56,913 acres in fiscal year 2000—60% lower than 12 years before (FY1988)

• The trend for TSI funding has been downward over the last 12 years.

• The trend for TSI unit cost (treatment cost, in dollars per acre) has been upward over the last 12 years. Unit cost increased substantially during the last 2 fiscal years.

• The need for forest density management work (thinning and release) was 423,646 acres in fiscal year 2000— 61% higher than 12 years before (FY1988).

• Forest density management attainment was 50,670 acres in fiscal year 2000—55% lower than 12 years before (FY1988).

• The net result of these trends is that a backlog of FDM work accumulated on Pacific Northwest national forests. Projections indicate that if recent trends continue, the FDM backlog will increase by at least 50,000 acres (13%) between fiscal years 2000 and 2005.

• One implication of these trends is that not enough acres are receiving a forest density management treatment to have a noticeable impact on fire risk at a landscape scale."]

2. HFRA only grants authority to remove “hazardous fuels” (HFRA §6512(a)). The Forest Service cannot remove any tree that provides useful shade that helps keep fuels cool and moist or that helps suppress the growth of future ladder fuels. Most trees over 15” dbh and the overstory trees in the shelterwood units are fire resistant and help reduce fire hazard, so they are not hazardous fuels. Removing these larger fire resistant trees is not authorized by HFRA because these are not “hazardous fuels.”

   The EA admits that home ignition is caused by direct contact with flames, radiant heat, or firebrands. Firebrands are the longest distance threat and they can only go 1 km (EA p 8), so any fuel treatments in this project further than 1 km from homes is not reducing “hazardous fuels” so the are not authorized by the HFRA.

3. HFRA requires that authorized projects be consistent with the applicable forest plan standards and guidelines. HFRA Section 102(b) says “An authorized hazardous fuel reduction project shall be conducted consistent with the resource management plan and other relevant administrative policies or decisions applicable to the Federal land covered by the project.” HFRA only authorizes projects that are consistent with the forest plan. This project calls for four forest plan amendments, two of which significantly increase logging, and the project violates several road management requirements (PACFISH RF-3c and MA 3B Standard 41) (EA page 162), so the Forest Service has a choice of either conforming with the forest plan or using the normal NEPA process.

   This project allows big game cover to be reduced below 25% of each subwatershed (to be reduced to 19% in some subwatersheds). The EA does not disclose which logging units this modification facilitates. This projects also eliminates 2 and 10 acre unit size limitations for regen harvest in foreground and middleground visual corridors respectively. This modification affects units: 48, 52, 62, 90, 140, 152, 166, 176, 178, 180, 182, 200, 202, 218, 228, 246, 504, 582, and 583.

   Waiving big game cover and visual corridor protections will both allow more logging and shift the balance between fuel reduction objectives and other important resource objectives. In the HFRA Congress stuck a balance between competing objectives by accelerating only those fuel reduction projects that are fully consistent with the pre-existing forest plan. The Forest Service cannot alter the will of Congress by approving expedited logging that is inconsistent with the forest plan.

4. This project will degrade old-growth forests in violation of the HFRA and the east side screens. The EA admits that this project will reduce snag habitat (EA pp 35). Given the low levels of basal area retention in some stands that are well stocked with older tree, this project will also unavoidably remove trees <21” dbh that have old-growth characteristics such as yellow-orange bark.

The Forest Service must retain and protect all old trees and old forest characteristics because:

- HFRA requires the FS to maintain and restore old-growth forests regardless of tree size. The HFRA says that the structure and composition of old growth shall be fully maintained and restored.
- The east side screens require that all vegetation management projects move stands toward the historic range of variability. Since small-old trees and large snags are far below the HRV, the FS must retain large snags and pre-fire suppression trees regardless of whether they may be <21" dbh.

The Forest Service should follow these requirements by retaining not only all trees over 21" dbh but also smaller trees that have old growth characteristics such as Ponderosa pines with yellowing bark. All large snags must be protected by keeping workers out of the hazard zone. Large snag recruitment must be provided by retaining "extra" trees that will someday die and produce snags. Goshawk's are known to nest in old-growth forests, so goshawk nesting habitat must also be protected.

Where plans do not "fully maintain and restore" old-growth, such as within the shelterwood prescriptions proposed here, HFRA §102(f) requires that projects—"focus largely on small diameter trees, thinning, strategic fuel breaks, and prescribed fire," AND, to the extent consistent with fire resilient stands, "maximize the retention of large trees" appropriate to the forest type.

5. Degrading habitat for old-growth dependent species is arbitrary and capricious and violates the HFRA. The EA admits that this project will degrade the old-growth habitat of goshawks, Pileated woodpeckers, and pine marten. (EA p 36, 93). Since these three species are old-growth dependent, the Forest Service must explain how they are maintaining and restoring old-growth forests when habitat for old-growth species is being degraded.

6. The shelterwood harvest is intended to shift species composition from late seral to early seral species. "Late seral" is a term closely associated with old-growth. It is arbitrary and capricious to shift from older late-seral community to younger early seral community when HFRA requires the Forest Service to fully maintain and restore old-growth.

7. Prioritizing limited resources is one of the primary goals of the HFRA. The Secretary of Agriculture is required by HFRA §103(a) to develop a an Annual Program of Work that identifies this project as a higher priority than others that are not going to get done. The Forest Service must disclose how this project is part of an "Annual Program of Work." This project is intended to project only 40 homes within the project area. The same amount of work could protect hundred of homes if conducted in more densely populated and higher priority areas.

This project will have significant impacts and requires preparation of an EIS.

This is a large project involving many acres, involving regen harvest, involving several plan amendments that significantly reduce protection for wildlife and visual resources while increasing logging levels.

This project may have significant impacts because it involves:

- many acres of habitat manipulation and soil disturbance;
- complex and conflicting objectives; Logging both reduces fire hazard and increases fire hazard at the same time. The Forest Service proposes commercial removal of trees that should be retained to maintain a more fire resistant microclimate and provide visual quality and habitat for big game and other wildlife); The EA admits that logging will increase fireline intensity and flame-length (EA p 23, 24), and it concludes that the benefits of large fuel reduction outweigh the risk of small fuel increases but this conclusion is pulled out of thin air. The exceptions are not considered (e.g., when activity fuels are not adequately treated, and when future retreatments are not implemented or not funded). The conflicting hazards are not carefully weighed and evaluated. The effects are complex and there are few tools available to compare these risks. These complex and conflicting circumstances require an EIS.
- degradation of roadless values adjacent to the wilderness area;
- steep slopes;
- ESA listed steelhead;
- degrade goshawk habitat;
- degrade large snag habitat in both the short- and long-term;
- the cumulative effects of roads, ground skidding, grapple piling, and pile burning will likely violate soil standards;
- the amendment of the forest plan to disregard the big game cover requirements is a significant and fundamental shift in the priorities and assumptions of the forest plan. The EA says that the forest plan big game habitat effectiveness objectives are probably not sustainable, but this is a big conclusion that must be carefully considered in an EIS. The EA failed to consider all the other ecological values supported by the big game cover requirements[5] and failed to consider the fact that federal lands may need to provide more than a merely proportional share of big game habitat in order to compensate for significant habitat loss on non-federal lands.
- violation of the road management requirement in PACFISH and the forest plan;
- The Forest Service approach to maintain small old-growth allocations is totally inconsistent with current science that calls for restoring landscape characteristics to within the historic range of variability and the Forest Service practice of moving the old-growth allocation around to facilitate Forest Service logging priorities.

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[5] Retaining cover for big game also provides valuable habitat for myriad other species and retains canopy that helps provide a cool moist microclimate that is less hazardous from a fire perspective and canopy helps suppress the growth of future ladder fuels. The EA (p 79, 85) says that tree canopy inhibits the growth of shrub and grass species, but this is not factored into the fuels analysis.

The proposed action will reduce large snags in violation of the east side screens.

Large snags are already under-represented relative to the historic range of variability, yet this project will reduce large snag habitat both in the short-term and the long-term. (EA page 35). This violates the east side screens' requirement that all vegetation management projects move toward the historic range of variability.

The expected degradation of large snag habitat is also a violation of HFRA because snags are a critical component of old-growth forests and HFRA authorized projects are required to fully maintain and restore old-growth.

Furthermore, the forest plan snag standards are no longer scientifically defensible and the Forest Service has not yet developed new snag habitat standards pursuant to valid NEPA and NFMA procedures.

The EA failed to disclose consistency with substantive requirements of HFRA.

The EA (p 60) purports to describe this project's consistency with direction and regulations, but fails to describe consistency with HFRA, especially the requirements for protection of old-growth, large trees, and plan consistency.

NEPA requires disclosure of information necessary to determine compliance with legal requirements such as the Endangered Species Act, Clean Water Act, National Forest Management Act, and applicable Forest Plan Standards & Guidelines. See 40 CFR 15087.27(b)(10) and NW Indian Cemetery Protective Association v. Peterson, 795 F2d 688 (9th Circ 1986). In this G-O Road case, the NEPA document described water quality changes resulting from a road project in terms of 7-day average changes, whereas the applicable WQ standard was defined by daily peak changes. The court found this to be a NEPA violation.

The Office of General Counsel agrees that project level analysis must document "Project Compliance With Other Laws."

> In addition to consistency with the LRMP each project must be in compliance with NEPA, CWA, CAA and other laws. Simply being consistent with the LRMP does not fulfill the site-specific requirements of Federal law. Project level analysis is to "determine findings for NFMA, to ensure compliance with NEPA, and to meet other appropriate laws and regulations." Forest Service Land and Resource Management Planning, FSM 1920 and Forest Service Handbook 1909.12, 5.31. 53 Fed. Reg. 26807, 26836 (July 15, 1988).

OGC, "Forest Plan and Project Level Decisionmaking— Overview of Forest Planning and Project Level Decisionmaking,"
http://www.fs.fed.us/forum/nepa/decisionm/p4.html#14
http://www.fs.fed.us/emc/nfma/includes/overview.pdf

The CEQ NEPA regulations also require an analysis of legal requirements in order to determine whether an action may cause significant impacts on the environment. 40 CFR

§1508.27(b)(10) ("Significantly, as used in NEPA, requires considerations of both context and intensity: … The following should be considered in evaluating intensity: … Whether the action threatens a violation of Federal, State, or local law or requirements imposed for the protection of the environment." Emphasis added.) SAS v. Mosely 798 F.Supp. 1473 (W.D. Wash. May 1992) ("The FEIS has thus mentioned what appears to be a major consequence of the plan jeopardy to other species that live in the old growth forests without explaining the magnitude of the risk or attempting to justify a potential abandonment of conservation duties imposed by law. An EIS devoid of this information does not meet the requirements of NEPA." Emphasis added.)

See also Judge Hogan's ruling in <u>Klamath Siskiyou Wildlands Center v. Boody</u> (D. Or. #03-3124-CO. May 18, 2004) where he held "plaintiffs have raised a serious question as to whether BLM violated NEPA in failing to disclose sufficient information in the EA to confirm compliance with … the RMP." (Order at page 18).

Other NEPA short-comings

The EA fails to disclose the cumulative impacts of the alternate snow-mobile routes that will be created when log hauling occurs on snowmobile trails in winter.

The EA admits that the existing condition is in part a function of past livestock grazing (EA p 10) but the EA fails to analyze the effect of continued future grazing which will reduce palatable fine fuels like grasses and shift the plant community toward less palatable shrubs and trees which are more hazardous as ladder fuels. The EA surprisingly describe livestock grazing in beneficial terms because it reduces the height of the grass. This is a misleading and incomplete analysis of the effects of livestock grazing.

The EA analysis of crown base height (EA p 25) fails to disclose and consider that in shelterwood units the average crown base height will decrease significantly especially after the planted trees grow for a few years. The EA (p 37) describes Douglas fir as a fire resistant species. If the FS would thin the stands planned for shelter wood retaining the largest fire resistant pine, larch, and Douglas fir, this would help suppress the growth of hazardous young trees.

The analysis of crown fire initiation potential (EA p 25) fails to disclose how much of the benefit is from treatment of surface and ladder fuels versus canopy fuels.

The EA is inconsistent— admitting on page 35 that biologically valuable large snag habitat will be degraded by the proposed action, while stating on page 55 that "development of old forest structures will accelerate."

The EA (p 88-89) is inconsistent and misleading because it refers interchangeably to forest plan requirements for snag habitat (which are being met, but the EA fails to disclose that they are outdated) and the snag habitat requirement of the eastside screens (which are not being met). The EA also relies on Matz 1927 as evidence that the current low levels of snags are adequate, but the EA fails to disclose that the Matz data are a mere snapshot in time and do not represent the range of snag habitat conditions that encompass the full range of historic variability. The EA also fails to disclose that the federal lands might need to provide more than a proportional number of large snags in order to mitigate for the fact that large snag habitat is not being adequately provided on non-federal lands.

The EA discussion of landbirds fails to mention the management priorities for “mesic mixed conifer” forests. Even though most of this project area is warm dry, some of it is moving toward late seral mixed conifer species composition. While it may be appropriate to shift some of it over to early seral species (using the normal NEPA process because regen harvest and species conversion are not allowed under HFRA), the EA fails to analyze whether some of the mixed conifer forest might be appropriately retained as part of a mesic mixed conifer landbird conservation effort. Many of the forest stands in this project area probably always had a component of fir which develop into mixed forest, especially when they were missed by one or more periodic fires.

Sincerely,

Doug Heiken

Doug Heiken and Tim Lillebo

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PO Box 3623
Portland, OR 97208-3623
503-808-2468

File Code: 1570

Date: October 20, 2006

Mr. Doug Heiken and Mr. Tim Lillebo
Oregon Wild
P.O. Box 11648
Eugene, OR 97440

Dear Mr. Heiken and Mr. Lillebo:

This letter is in response to your objection dated September 19, 2006 (the objection was filed under the name of Oregon Natural Resources Council, though we now recognize your organization as Oregon Wild) on the Canyon Creek WUI Fuels Reduction Project. I have read the Environmental Analysis (EA) and reviewed the analysis in the project file, including documents incorporated by reference, and fully understand the environmental effects disclosed within it. I have also considered the comments submitted during the public scoping for this project and the Community Wildfire Protection Plan (CWPP). My review was conducted in accordance with 36 CFR 218 and I also focused on compliance with the Healthy Forest Restoration Act (HFRA).

I reviewed your objections to determine whether you have identified any substantial flaws in the project proposal. These are the key objection issues I was able to identify, and my responses.

Objection Statement #1: The objector requests that his "comments be analyzed in the EA and consideration of a fire alternative be included in the alternatives section" (Objection #006). Failure to do so is "a violation of NEPA" (Objection #006).

RESPONSE 1: The environmental assessment was prepared and provided to the public in accordance with the Healthy Forest Restoration Act (HFRA) (H.R. 1904-12). The objection process has been established for qualifying projects (36 CFR 218.1). Authorized projects processed under the provisions of HFRA are not subject to the notice, comment, and appeal provisions set forth in 36 CFR 215 (36 CFR 218.3). The Forest complied with applicable requirements for public comment.

Mr. Becker's letter is logged in the project file; his comments were similar to others and have been addressed. Chapter 1 of the EA page 13 explains that an HFRA project within a WUI area as defined in the Grant County Community Fire Protection Plan does not require alternatives to the Proposed Action. Chapter 2 of the EA page 2, Alternative B addresses the request for a fire alternative and why the buildup of fuels makes this proposal too risky to implement without pre-treatment. Therefore, the forest has complied with NEPA in responding to public comments on the project. Also see the response to Objection Statement #5 below.

<u>Objection Statement #2:</u> **Objectors "did not feel they could safely express their views within the so-called 'collaborative process' for this project" (Objection #008 p. 1). Furthermore, "written concerns…were largely ignored" and "[r]equests by an alliance of conservation organizations for both a meeting, and a field trip…were denied by the Malheur National Forest" (Objection #008 pp. 1-2).**

RESPONSE 2: Section 104(f) of the HFRA encourages meaningful public participation during authorized projects. Chapter 1 of the EA pages 9-12 lists the extensive collaborative process that was followed over a nine-month period. Attempts were made to include the environmental community within the framework of the project collaborative agreement (Personal Communication with Linda Batten 10/3/06). The Forest Service followed the standard scoping process. Collaborator affiliations will be added to the collaborator list in Chapter 4 page 2 of the EA to reflect which groups were represented in the collaboration efforts.

<u>Objection Statement #3:</u> **The objector states that he is "concerned about the proposed treatment to old growth" (Objection #006). He states, "Old Growth trees are not a fire hazard by themselves. An under- and midstory component is necessary to initiate crown fire. A commercial [sic] or non commercial [sic] thin of trees that were not present prior to forest management would alleviate any fire risk in a old growth stand" (Objection #006). The objector suggests that the Forest Service run a model like NEXUS to manage the stand without removal of healthy old growth stands (Objection #006).**

RESPONSE 3: Old growth is discussed in the Wildlife section of Chapter 3 of the EA pages 65 - 75. Specifically, on page 71, Table WL-2, the EA identifies that there has been a shift over time to Old Forest Multiple Strata from Old Forest Single Stratum. This Table also identifies that following the proposed action, percentages of single stratum trees would increase, and 50 years after proposed action, the percentages of stands in single stratum condition would be within the historic range of variability. Chapter 2 of the EA page 8 identifies that all trees greater than 21" dbh would be retained with minor exceptions. The fuels section in Chapter 3 of the EA page 26 compares current to post treatment crown initiation potential, and does document a decreased potential for crown fires after implementation. The fuels section in Chapter 3 of the EA page 7 identified that the INFORMS program was used for project analysis. The INFORMS program is adequate for the effects analysis conducted here. There is no requirement to run multiple programs. The Forest has conducted an adequate analysis of effects using recognized methods.

<u>Objection Statement #4:</u> **The objector asserts that there is "no 'grand plan' for providing a manageable fire program within the area" (Objection #006). For example, "[l]arge gaps are left between treatments, especially at the main ridges and adjacent to private land," which "does not provide for a good place to burn from in the future" (Objection #006). Also, "[m]anaged stands that are not underburned very often have higher fuel loads in the 0-3" class then [sic] the stand before management" (Objection #006).**

RESPONSE 4: Chapter 1 of the EA page 2 refers to the Grant County Community Fire Protection Plan, which states on pages 2 and 5 under "Fuels Reduction" that strategies are identified coordinating fuels treatment projects at the landscape level. The 'grand plan' concept is addressed in Chapter 3 of the EA page 21, Alternative-Proposed Action under "Direct and Indirect Effects," which states that the continuity of fuels within the project area is broken up

along boundaries, private land, major ridges and wilderness boundaries, thus creating contiguous blocks of treated ground over the landscape. Chapter 2 of the EA page 6 addresses the gap issue in treatments and is clarified by timing of treatments, which is based on low fire hazard acres being treated sooner as opposed to unsuitable conditions on acreage that would need mechanical treatment prior to prescribed burning.

<u>Objection Statement #5:</u> The objector would like this project to be burned rather than harvested (Objection #006). He states that "[t]hinning, handpiling and burning might be appropriate within 300' of private land" (Objection #006). He continues by stating that he would like to this scenario analyzed as well as "the economics of the various proposals" (Objection #006).

RESPONSE 5: An analysis of the economics of the proposal is in Chapter 3 of the EA on pages 214-225.

An all burning alternative was discussed in Chapter 2 of the EA page 2. Since one of the problems identified in the Canyon Creek WUI was the buildup of fuels and tree overstocking due to the lack of periodic burning, one idea was to reintroduce fire across most of the planning area. After consideration, this alternative was dropped from detailed consideration. It was decided that many areas within the WUI are so overstocked with trees, contain ladder fuels, and have enough of a surface fuel buildup that the reintroduction of fire would be risky until these conditions can be modified with mechanical treatment.

<u>Objection Statement #6:</u> Objection points listed below in bold, directly prior to specific responses.

RESPONSE 6:
The objector states that the "project violates the HFRA so the Forest Service must use the regular NEPA process" (Objection #007 p. 3). More specifically, ONRC states, "HFRA was a compromise that only authorizes fuel reduction in limited circumstances, such as when the forest plan does not need to be amended and using approved methods of fuel reduction" (Objection #007 p. 3). However, the objectors assert that "shelterwood logging (page 9) does not even mention fuel reduction or fire hazard reduction" and the "Forest Service cannot stretch the HFRA glossary definition beyond reason to include regen harvest as an appropriate fuel reduction tool" (Objection #007 p. 4; Objection #008 p. 5)).

The HFRA Interim Field Guide (2/2004) states on page 9 that projects must be consistent with the applicable resource management plans and they must be on lands managed by the USDA Forest Service. The guide further states that proposed actions not consistent with the plan must be covered by a plan amendment. This direction is being followed so no violation exists.

The glossary definition of shelterwood logging uses the phrase "various methods" and goes on to state examples. The glossary does not state or imply that these examples are all inclusive.

Reasons why logging methods (such as shelterwood harvest) regen are not an appropriate tool are:

1) "Regen harvest results in forest conditions that are more hazardous than doing nothing. Shelterwood harvest will result in forest conditions that are hotter, dryer, and windier than other treatments or no action" (Objection #007 p. 4; Objection #008 p. 5).

Chapter 3 of the EA page 24 discusses concerns about raised fire risk. Peterson (2004) and Agee (2005) are cited for information on increased surface air movement and drying. With effective post-activity fuel treatment, the thinning provides an overall reduction in fire behavior. Chapter 3 of the EA page 24 describes how benefits of reduced fire severity outweigh increased wind speed.

2) "Regen harvest, with or without replanting, will also result in the establishment of a dense growth of young trees that are one of the most hazardous types of forest structure because they provide a nearly continuous bed of resinous fuel close to the ground" (Objection #007 p. 5; Objection #008 pp. 5-6).

Chapter 2 of the EA page 9, explains that shelterwood harvested areas would be planted in understocked areas. This would be completed using desirable tree species. Chapter 2 of the EA page 6 addresses prescribed burning in the project area, both now and in the future. Chapter 3 of the EA pages 21-22 states that a "prescribed burning program into the future will be needed to maintain the desired fuel levels and limit regeneration from becoming a ladder fuel concern as well as a stand density concern." The Forest Service will address this issue by using prescribed burning to maintain fuels at desired levels.

3) "Regen harvest creates large amounts of hazardous logging slash that is never full [sic] treated" (Objection #007 p. 6; Objection #008 p. 6).

Chapter 2 of the EA pages 6-7, addresses the need for mechanical treatment, pile and burning, and prescribed fire where fuel loadings already permit. As parts of the proposed action, these treatments are fully intended to be implemented. Monitoring (a required component of this project) will determine the success rate of this action (Chapter 2 of the EA pages 32-33).

4) "Opening up closed forests through selective logging can accelerate the spread of fire through them" (Objection #008 p. 5).

Chapter 3 of the EA pages 21-22 explains that a short term increase in fire hazard will exist prior to slash treatment but there will be a long term beneficial effect on altering fuel structure and wildfire behavior.

5) "[Fuel reduction activities…inevitably function to disturb soils and promote the invasion and establishment of non-native species" (Objection #008 p. 5).

Chapter 3 of the EA pages 174 – 180 addresses the existing occurrence of noxious weeds and measures that will be employed to minimize the spread of these populations and the eradication of some populations. Chapter 3 of the EA page 175 addresses the regulatory framework and compliance with the Invasive Species ROD, 2005.

Objectors believe that "[t]o comply with HFRA, the Forest Service can either drop the shelterwood, shift to a more effective thinning treatment…or prepare a new NEPA analysis with a full range of alternatives and a full public involvement process" (Objection #007 p.

6; Objection #008 p. 6). The objectors state that "HFRA only grants authority to remove 'hazardous fuels' (HFRA §6512(a))," therefore, the Forest Service violates HFRA by removing "larger fire resistant trees" (Objection #007 p. 7; Objection #008 p. 6).

HFRA Interim Field Guide (2/2004) pages 28-29 states that treatments are to focus on small diameter trees. Also stated is direction to maximize the retention of large trees. However the Interim Field Guide also emphasizes that large tree retention requirements must not prevent agencies from reducing wildland fire risk. Chapter 2 of the EA page 8, states that all live trees over 21 dbh would be retained, except where removal is necessary for safety or to construct temporary roads and landings. These actions meet the HFRA direction.

The intent of the thinning is to leave the largest diameter trees. Chapter 2 of the EA page 8 states "This prescription would thin small/medium size trees (7 to 20.9" DBH) in immature forest stands by thinning from below to reduce stocking levels to reduce canopy fuels, enhance individual tree growth, and to allow for the reintroduction of fire. Thinning from below means the majority of the trees to be cut are in the smallest diameter sizes (9 to 13" DBH) and relatively few trees would be cut in the medium diameters (14 to 20.9" DBH)."

The objectors state, "The EA failed to disclose consistency with substantive requirements of HFRA" (Objection #007 p. 10).

The finding of consistency with appropriate management direction, laws and regulations will be addressed in the decision document. This is a required element of the decision document, "Findings Required by other Laws and Regulations," and it will address consistency with HFRA. The objector is correct that a Finding of No Significant Impact will have to address "context and intensity" (40 CFR 1508.27) as well as several other appropriate laws and regulations. Findings and Disclosures, Chapter 3, pages 234 to 237 of the EA, responds to the majority of the laws and regulations that need to be carried forward in to the decision notice.

The objectors point out that "HFRA only authorizes projects that are consistent with the forest plan" and "[t]his project calls for four forest plan amendments" (Objection #008 p. 6).

This has been addressed in the opening paragraph of this response.

<u>Objection Statement #7:</u> "The EA admits that home ignition is caused by direct contact with flames, radiant heat, or firebrands. Firebrands are the longest distance threat and they can only go 1 km (EA p 8), so any fuel treatments in this project further than 1 km from homes is not reducing 'hazardous fuels' so the [sic] are not authorized by the HFRA" (Objection #007 p. 7).

RESPONSE 7: In the Healthy Forest Initiative & Healthy Forest Restoration Act (Interim Field Guide) February 2004 page 15 under "Wildland Urban Interfaces Within or Adjacent to At-Risk Communities" the act encourages the development of a community wildfire protection plan under which communities designate their WUI areas, where HFRA projects may take place. Chapter 3 of the EA page 7 and 8, when read in its entirety, addresses the distance and need for treatment. Treatments further than 1 km from structures are effective because fuels reduction and thinning will decrease probability of ignition and fire intensity, thereby increasing the ability of firefighters to protect life and property.

<u>Objection Statement #8:</u> The objectors point out that this project reduces big game cover to below 25% of each subwatershed (Objection #007 p. 7; Objection #008 p. 6). However, "[t]he EA does not disclose which logging units this modification facilitates" (Objection #007 p. 7; Objection #008 p. 6). The objectors also point out that this project "eliminates 2 and 10 acre unit size limitations for regen harvest in foreground and middleground visual corridors respectively" (Objection #007 p. 7; Objection #008 p. 6). They argue, "Waiving big game cover and visual corridor protections will both allow more logging and shift the balance between fuel reduction objectives and other important resource objectives" (Objection #007 p. 7; Objection #008 p. 6).

RESPONSE 8: The purpose of the proposed project is to protect lives and property. This will be accomplished by moving the vegetation towards historical conditions. Historical vegetation conditions or historical range of variability are desirable objectives, but site specific Forest Plan amendments are needed for this project to also accomplish important fuel reduction goals. Chapter 2 of the EA page 17 discusses the proposed Forest Plan amendment related to reducing satisfactory and total cover below existing Forest Plan Standards and Guidelines. There are many references to modification of the proposed project to protect Big Game and migratory corridors. A Forest Plan amendment is proposed to remove the limitations on harvesting in visual corridors for this project, Chapter 2 of the EA pages 18 - 19. Page 9 of the HFRA Interim Field Guide identifies that if the proposed project is not consistent with current plans that a plan amendment or site specific plan amendment can be used.

<u>Objection Statement #9:</u> The objectors assert that "the Forest Service must explain how they are maintaining and restoring old-growth forests when habitat for old-growth species [such as goshawks, Pileated woodpeckers, and pine marten] is being degraded" (Objection #007 p. 8).

RESPONSE 9: Chapter 3 of the EA page 73 describes that shifting stands from old forest multiple stratum towards old forest single stratum would reduce habitat for old growth canopy dependant species such as pileated woodpeckers, and pine marten, while improving habitat for white-headed woodpeckers and flamulated owls. This shift in species would be consistent with moving stands towards historic vegetation conditions. As described in the EA, the Forest's network of dedicated old growth would continue to maintain populations of marten and pileated woodpeckers. Chapter 3 of the EA pages 95 and 96 discuss effects of the proposed action alternative related to goshawk territories and PFAs. The reduction in goshawk nesting habitat is tied to reducing understory cover and opening up stands, which would shift stands towards historic conditions. Therefore the EA does describe the effects of the project on the old growth network of the Forest.

<u>Objection Statement #10:</u> "It is arbitrary and capricious to shift from older late-seral community to younger early seral community when HFRA requires the Forest Service to fully maintain and restore old-growth" (Objection #007 p. 8).

RESPONSE 10: The HFRA Interim Field Guide (2/2004) page 25-29 states that treatments are to focus on small diameter trees. Also stated is direction to maximize the retention of large trees. However, it is emphasized that large tree retention requirements must not prevent agencies from reducing wildland fire risk, etc. This being stated, Chapter 3 of the EA page 55 explains that the stands dominated by late seral species trees are planned for shelterwood treatments. The shelterwood treatments would remove many of the late-seral species trees from stands, retaining the early-seral species that are there, and reforesting openings with early-seral species. This will shift the species composition closer to the historic composition. Treated stands would be more adapted to the natural disturbances that exist, increasing the overall resiliency to natural disturbances, and thus meeting the direction of the Healthy Forest Restoration Act. The analysis of the effects to old growth offers a reasoned explanation for the shifting seral stages.

Objection Statement #11: The objectors state that the Forest Service must disclose how this project is part of an "Annual Program of Work" (Objection #007 p. 8). They state, "This project is intended to protect only 40 homes within the project area. The same amount of work could protect hundred of homes if conducted in more densely populated and higher priority areas" (Objection #007 p. 8). Additionally, the Grant County Community Wildfire Protection Plan "notes that the Canyon Creek area does not meet HFRA interface or intermix WUI requirements" (Objection #008 p. 7). There is no rationale for choosing this project over other WUI projects (Objection #008 p. 7).

RESPONSE 11: The Canyon Creek Fuels Hazard Reduction is one of three federal projects listed in the Grant County Community Wildfire Protection Plan (page 19). It is a priority 2 project, listed for action in 2005 – 2007. This project does not preclude the Forest Service from proposing projects in the other areas. The highest rated one was not on the Malheur National Forest. The objectors are incorrect in stating that the Grant County Community Wildfire Protection Plan "notes that the Canyon Creek area does not meet HFRA interface or intermix WUI requirements". Rationale for choosing this project is listed in Chapter 3 page 4 of the EA in the fuels report. It discusses already ongoing projects by landowners and the fact that the majority of untreated land within and adjacent to the project is Forest Service and the greatest threat to life and property in on these untreated lands. The Forest Supervisor will document his rationale for a decision when he signs a decision document for this project.

Objection Statement #12: "The failure of Canyon Creek project and Grant County to meaningfully include private lands fuels reduction, including the creation of defensible space around all dwellings and structures, calls into question the legitimacy of the claimed need and landowner interest in this project" (Objection #008 p. 8).

RESPONSE 12: Interim Field Guide, page 9, states in part that all proposed HFRA actions must be on lands managed by the USDA Forest Service. Additionally, Chapter 1 of the EA page 3, states that "a number of private landowners…have already initiated projects…to reduce fuels and overstocked stands." Chapter 2 of the EA page 15 discusses a special use permit that would be issued to a private landowner for road construction. This access would allow the landowner to do vegetation treatments and timber harvest on his property to reduce fire hazards and to improve forest health. These actions would complement treatments on both private and National Forest Lands. These actions show community effort in meeting the HFRA objectives on all lands.

Objection Statement #13: "This project will have significant impacts and requires preparation of an EIS" (Objection #007 p. 8; Objection #008 p. 10). The significant impacts are:

- **habitat manipulation and soil disturbance**
- **complex and conflicting objectives**

- **degradation of roadless values adjacent to the wilderness area**
- **steep slopes**
- **ESA listed steelhead**
- **degrade goshawk habitat**
- **degrade large snag habitat in both the short- and long-term**
- **cumulative effects of roads will likely violate soil standards**
- **amendment to disregard big game cover requirements**
- **violation of road management requirement in PACFISH and the forest plan**
- **maintaining small old-growth allocations is inconsistent with current science that calls for restoring landscape characteristics to within the historic range of variability (Objection #007 p. 9; Objection #008 p. 10).**

RESPONSE 13: The analysis of effects will be considered when the decision maker decides whether to make a finding of no significant impact at the time the decision is made.

Objection Statement #14: **Objection points listed below in bold, directly prior to responses.**

RESPONSE 14:

The objectors argue that the proposed action will "reduce large snag habitat both in the short-term and the long-term," which "violates the east side screens' requirement that all vegetation management projects move toward the historic range of variability" (Objection #007 pp. 7 and 10; Objection #008 p. 11). Additionally, the "EA admits that this project will reduce snag habitat and goshawk habitat (EA pp 35, 36)" (Objection #008 p. 7).

Also, this project violates HRFA because "snags are a critical component of old-growth forests and HFRA authorized projects are required to fully maintain and restore old-growth" (Objection #007 p. 10, also see Objection #008 p. 7).

"The EA also fails to disclose that the federal lands might need to provide more than a proportional number of large snags in order to mitigate for the fact that large snag habitat is not being adequately provided on non-federal lands" (Objection #007 p. 12).

"The EA is inconsistent – admitting on page 35 that biologically valuable large snag habitat will be degraded by the proposed action, while stating on page 55 that 'development of old forest structures will accelerate" (Objection #007 p. 11).

The Eastside screens do not require that "all vegetation management projects move toward historic range of variability". As stated in Scenario A page 9, if one or both of the late and old structural stages falls below HRV in a particular biophysical environment within a watershed, there should be no net loss of Late and Old Structural (LOS) from that biophysical environment. Furthermore, no timber harvest activities should occur within LOS stages that are below Historical Range of Variability (HRV).

Under Scenario B on page 13, within a particular biophysical environment within a watershed, if the single, existing late and old structural stage is within or above HRV or if both types of LOS stages occur and both are within or above HRV, then timber harvest can occur within these stages, as long as LOS conditions do not fall below HRV. It then follows with: Enhance LOS structural conditions and attributes as possible, consistent with other multiple use objectives.

Chapter 3 of the EA pages 90 - 94 discusses snags and primary cavity excavators. Table WL - 6 identifies snag densities post-treatment and in 50 years. It identifies that snags 10-20" dbh would increase by 0.2 snags/acre, and >20" dbh would decrease by 0.1 snags/acre post-treatment. Overall snags would increase by 0.1 snags/acre over current conditions. For long term effects, the same table identifies that snags 10 - 20" dbh would increase by 1.1 snags/acre and snags > 20" dbh would increase by 0.9 snags/acre. This is moving towards forest plan standards, while providing increased assurance that the vegetation and stand components are sustainable and resilient to disturbance.

See objection #9 for a discussion of issues related to goshawk habitat.

"Furthermore, the forest plan snag standards are no longer scientifically defensible and the Forest Service has not yet developed new snag habitat standards pursuant to valid NEPA and NFMA procedures" (Objection #007 p. 10).

"The EA (p 88-89) is inconsistent and misleading because it refers interchangeably to forest plan requirements for snag habitat (which are being met, but the EA fails to disclose that they are outdated) and the snag habitat requirement of the eastside screens (which are not being met). The EA also relies on Matz 1927 as evidence that the current low levels of snags are adequate, but the EA fails to disclose that the Matz data are a mere snapshot in time and do not represent the range of snag habitat conditions that encompass the full range of historic variability" (Objection #007 pp. 11-12).

The Forest Plan snag standards and guidelines as amended by the Eastside Screens are still applicable until modified. Page 11 of the Eastside Screens allows for use of the best available science through models or other documented procedures to provide snags for 100 % potential population levels of primary cavity excavators. DecAID was considered and used in the wildlife specialist's report to determine what tolerance levels of snags were being provided currently and post-implementation, and discussed the historic and current ability of the vegetation to provide snags. All studies and information, including DecAID is a snapshot in time. The data from Matz 1927 was used because of the proximity to the proposed project.

<u>Objection Statement #15:</u> "The EA fails to disclose the cumulative impacts of the alternate snow-mobile routes that will be created when log hauling occurs on snowmobile trails in winter" (Objection #007 p. 11; Objection #008 p. 11).

RESPONSE 15: Chapter 2 of the EA page 29, Design Elements, addresses snowmobile trails that are co-located on haul routes. Plowing and use of these roads for harvest activities during the winter recreational season will be coordinated in advance with the forest recreation specialist, the sale administrator and the local snowmobile club. The objective of coordination will be to ensure safety and provide a continuous alternate route for snowmobile use when possible. The environmental analysis will be edited to expand discussion of snowmobile routes, including alternative routes and potential impacts (direct, indirect, and cumulative).

<u>Objection Statement #16:</u> The objectors believe that "[c]umulative impacts to wildlife species from past logging and road building are extensive and significantly severe across much of the area" (Objection #008 p. 9). They continue, "Our organization provided information during comment periods concerning this, and offered to help develop project design and answer agency questions, however we were never contacted by the agency about these serious issues" (Objection #008 p. 9)

RESPONSE 16: The wildlife section of Chapter 3 of the EA pages 62-111 and Appendix G of the EA discuss direct, indirect, and cumulative effects in sufficient detail to make an accurate determination of effects or impacts from both the proposed project, and cumulatively over time.

While the Oregon Chapter Sierra Club did provide written comments, and offered their cooperation and help in developing the proposed project, it does not appear that they involved themselves in the collaborative efforts of the Forest. The Forest Service afforded the opportunity to participate, and the Sierra Club chose not to until the public scoping and objection period (Letter to public February 23, 2005).

A Forest Service employee returned a phone call from one of the individuals. She asked him to come to the collaboration meetings and expressed surprise that he had not attended any collaboration meetings. He still expressed his desire to be involved with the scoping process, but did not have time to get involved with this project at the time of the call. (Conversation Record, September 6, 2005, Linda Batten). Comments from the scoping letter were considered in developing the proposed action. The responses received are on file in the project record. Similar comments from different responders were combined and are listed in Appendix E of the EA. Included in this list are the different ways that these comments were resolved and/or addressed within the document.

<u>Objection Statement #17:</u> The "EA fails to analyze the effect of continued future grazing which will reduce palatable fine fuels like grasses and shift the plant community toward less palatable shrubs and trees which are more hazardous as ladder fuels" (Objection #007 p. 11).

RESPONSE 17: This will be clarified in the revision of the EA in the cumulative effects section of fuels or range reports.

<u>Objection Statement #18:</u> "The EA analysis of crown base height (EA p 25) fails to disclose and consider that in shelterwood units the average crown base height will decrease significantly" (Objection #007 p. 11).

RESPONSE 18: Chapter 3 of the EA page 22 discusses how a prescribed fire program in the future requires further NEPA documentation. Further treatments will be needed to maintain the desired fuel levels and limit regeneration from becoming a ladder fuel concern as well as a stand density concern.

<u>Objection Statement #19:</u> "The analysis of crown fire initiation potential (EA p 25) fails to disclose how much of the benefit is from treatment of surface and ladder fuels versus canopy fuels" (Objection #007 p. 11).

RESPONSE 19: The EA cites (Graham et al. 2004)(Peterson 2004) & (Agee 2005) in Chapter 3 of the EA page 24 under "Ladder and Crown Fuels" addresses the benefits and the concerns of fuel treatments on surface and ladder fuels and removing canopy level trees which may increase the risk of fire.

Objection Statement #20: The objectors assert that "the EA fails to analyze whether some of the mixed conifer forest might be appropriately retained as part of a mesic mixed conifer landbird conservation effort" (Objection #007 p. 12).

RESPONSE 20: Chapter 3 of the EA pages 99 - 100 discuss landbirds analyzed, and identified that only habitats being effected by the proposed project are being addressed. Since mesic mixed conifer is not addressed, it is not being affected by the proposed project. Throughout the EA, it is identified that Alternative 2 would move stands within the watershed towards historic vegetation conditions, and historically these mesic mixed conifer sites had a limited and patchy distribution across the landscape.

Objection Statement #21: "The FS deferred to the county's general broadbrush plan, failing to conduct NEPA required site-specific analysis and accurately assess actual fuels continuity and potential for fire-spread from upland lightening strikes to residences below" (Objection #008 p. 8).

RESPONSE 21: The Grant County Community Wildfire Protection Plan is the plan that meets the requirements of the HFRA page 34 "Developing Community Wildfire Protection Plans". On page 33 Section 101(3) of the HFRA act describes a Community Wildfire Protection Plan (CWPP) as one that identifies and sets priorities for areas needing hazardous fuels reduction treatment and recommends the types of treatment on Federal and non-Federal lands that will protect one or more communities and their essential infrastructure. This EA is the site specific analysis that accurately assesses actual fuels continuity and potential for fire-spread. This is covered in the fuels report in Chapter 3 of the EA pages 4-28.

Objection Statement #22: The objectors believe that "[b]asal area formulas utilized to determine logging markings are inaccurate for this area" because the "formulas would further reduce mature-sized fire resistant trees" (Objection #008 p. 9). "This commercially motivated reduction of historical stand composition and density violates HFRA provisions" (Objection #008 p. 9). Also this project does not comply with HFRA provisions because it "would leave far too many fire-prone small diameter trees, ladder fuels, and thickets" (Objection #008 p. 9).

RESPONSE 22: The HFRA Interim Field Guide (2/2004) pages 25-29 states that treatments are to focus on small diameter trees. Also stated is direction to maximize the retention of large trees. However it is emphasized that large tree retention requirements must not prevent agencies from reducing wildland fire risk, etc. Chapter 2 of the EA page 7 explains: 1. Crown or canopy fuels would be reduced primarily by commercial thinning (when too dense) and shelterwood treatments (where tree species are not suitable or sustainable) and 2. Ladder fuels would be reduced by commercial and non-commercial thinning treatments and understory removal. The trees cut would vary in size from medium to smaller diameters. The intent of the thinning is to leave the largest diameter trees. Chapter 2 of the EA page 8 states "This prescription would thin small/medium size trees (7 to 20.9" DBH) in immature forest stands by thinning from below to reduce stocking levels to reduce canopy fuels, enhance individual tree growth, and to allow for the reintroduction of fire. Thinning from below means the majority of the trees to be cut are in the smallest diameter sizes (9 to 13" DBH) and relatively few trees would be cut in the medium diameters (14 to 20.9" DBH)." This alternative description clearly emphasizes the removal of smaller diameter material and thinning of species to sustainable densities or removal when not suitable or sustainable. This meets the direction of the Healthy Forest Restoration Act.

Objection Statement #23: The objectors allege the project violates road management requirements in PACFISH and the forest plan. (Objection #007 p. 8; Objection #008 p. 10).

The roads report does not list the one new segment of road that accesses the private land. A discussion of this road should be included in the roads report. The EA will include a statement that a road management plan as outlined in PACFISH (RF-2) is available for all existing or planned roads.

A roads analysis is required when a permanent road is built. 200 feet of road is proposed to access private land. Chapter 3 of the EA page 208 - 209 details the roads analysis process completed by the Blue Mountain Ranger District staff.

By copy of this letter, I am instructing District Ranger Brooks Smith not to proceed with issuance of a Decision Notice for this project until the issues identified in Objections Statements #2, #15, #17, and #23 are addressed in the EA. There will be no further review of this response by another Forest Service or USDA official.

Sincerely,

/s/ *Jim Golden*
JIM GOLDEN
Deputy Regional Forester

cc: Brad Siemens
Carole Holly
Brooks Smith
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September 20, 2006

Oregon Chapter Sierra Club et al Objection to the Canyon Creek WUI Fuels Reduction HFRA Project

Regional Forester Linda Goodman
USDA PNW Forest Service
ATTN: 1570 Objections
VIA: appeals-pacificnorthwest-regional-office@fs.fed.us

Pursuant to 36 CFR 218, the Oregon Chapter Sierra Club and the League Of Wilderness Defenders – Blue Mountains Biodiversity Project are jointly filing the following comments/objection concerning the Canyon Creek WUI Fuels Reduction Project EA.

The Canyon Creek Project directly and significantly affects the members and volunteers of both the Oregon Chapter Sierra Club and the League of Wilderness Defenders – Blue Mountains Biodiversity Project. The Sierra Club represents over 20,000 members throughout Oregon, including the Club's Juniper Group, which has over 1,000 members throughout central and eastern Oregon. LOWD-Blue Mountains Biodiversity Project has many members and volunteers throughout the Northwest. Sierra Club members feel strongly about nature, wilderness, natural forest ecosystems, wildlife, fisheries, and the environment. Sierra Club members regularly enjoy hiking, camping, wildlife watching, birding, ecological study, and photography within the national forests of central and eastern Oregon, including the project area within the Malheur National Forest. Members and volunteers of the LOWD-Blue Mountains Biodiversity Project regularly use the Malheur National Forest, including the project area, for hiking, ecological study, watching wildlife, viewing forest native botanical diversity, and avian species study. Implementation of the Canyon Creek project would adversely affect the Appellants/Objectors because the proposed logging activities would result in degradation in the ecological integrity and fish and wildlife habitat in and around the analysis area. Appellants/Objectors have a long-standing and well-documented interest in the management of the area in which the Canyon Creek Project is located.

Our organizations have participated as we were able throughout this project's development process. We submitted extensive written comments that addressed in depth the ecological and legal issues and concerns we have with the Canyon Creek project. Conservationists, including Sierra Club members and volunteers, living within the John Day/Canyon City/Malheur NF area did not feel they could safely express their views within the so-called "collaborative process" for this project (see attached article "Breaking the Silence"). The written concerns of our organizations were largely ignored in developing this commercial logging project, disguised as an HFRA "fuels reduction" project rather than the timber sale it largely is. As such, the project's development was directed largely by timber interests, including timber representatives with a vested economic interest in creating a volume producing timber sale. Requests by an alliance of conservation organizations for both a meeting, and a field trip, with Forest Service staff, including the Malheur Forest Supervisor, District Ranger, project planners, and wildlife and fisheries biologists, as well as project collaborators were denied by the Malheur National Forest. Requests that our written concerns be relayed to the collaborative group were admittedly "not done very well" by Forest Service staff. The result is an ecologically harmful and legally deficient project. None-the-less, the Canyon Creek project harms are intermixed with the inclusion of some necessary restoration work, creating a paradox: There are significant common sense changes that must be made to the project to prevent irreparable ecological harms. If these changes can be effectively made, the project has the potential to be a truly collaborative restoration project that can be endorsed by both the conservation and timber communities, and one that the Malheur NF can be proud of its potential to accomplish necessary restoration and fuels reduction goals. We file this objection in the hopes of resolving the issues herein, helping to create a better HFRA project. It is our hope that objection-period discussions will reach mutually successful resolution, and we will not be forced to seek further judicial review to rectify the legal and ecological issues arising from this now flawed project. This hope is founded in part out of respect for the effort put into this project by those involved in the collaborative process, and in part because of the small diameter tree thinning and fuels reduction portions of the project design. However, respect for the needs of area wildlife, salmonid species, forest ecological integrity, true restoration and fire-risk reduction, as well as federal environmental policy laws, conservation objectives, and a true collaborative process that should have welcomed and safely included conservationists in the area necessitates this serious objection. Hopefully we will not be forced to halt this project outright. The project's prescribed fire, pre-commercial, and small diameter tree thinning in areas that are overstocked with trees averaging up to 10 to 12 inches diameter and under, are helpful in restoring area forests and potentially reducing severe fire risks (though logging actions implementing this project remain a fire risk themselves). Changes needed include: greater retention of trees above 14 to 16 inches diameter to better match historical forest conditions – as extensive past logging has decreased trees in and above this age/size class throughout the area; a more cohesive fire reduction strategy that effectively reduces fire on a landscape level across the area – utilizing natural openings, roads, and the many logging created openings to locate units based upon fuels reduction needs rather than timber volume – as such some old and mature forest units could be dropped while some even-aged dense stands (containing trees averaging 16 to 18 inches dbh) – now slated to be left alone – could be thinned, thereby still producing the volume necessary to make this project economically feasible. Congressional intent mandates that HFRA projects be based upon ecologically sound restoration. It is our intent to help fine-tune this project to better match both Congressional intent, the needs of the area's forests and wildlife, and the fire-risk reduction concerns of the community.

PROPOSED ACTION TITLE: Canyon Creek WUI Fuels Reduction Project Environmental Assessment

PROJECT DESCRIPTION: The proposed action involves:

- Land allocations include: elk winter range, visual corridors, old-growth
- 7040 acres of mechanical treatment/fuel reduction
    - 3150 acres of commercial thinning
    - 1010 acres of regen harvest and planting
    - 1000 acres of understory removal
    - 1880 acres of pre-commercial thinning
    - 2-5 acre unthinned patches provided for big game cover
    - 3010 acres of whole tree yarding
    - 2030 acres of grapple piling
    - 3750 hand pile only
    - 2400 acres of tractor logging
    - 2240 acres of helicopter logging
    - 520 acres skyline
- 3000 acres of prescribed fire (including 1,000 acres outside of thinning units)
- 2 miles of temp road construction (5 temporary culverts)
- 37 miles of closed roads to be opened, used for log hauling, and reclosed
- 86 miles of road maintenance
- 3 units will exceed 20% soil compaction (230, 504, 510) so skid trails will be subsoiled
- big game cover reduced below forest plan standards in Vance Creek and Upper Canyon Creek winter range
- 4 forest plan amendments including waiving the big game cover requirements and eliminating visual corridor protections to allow more logging

PROJECT LOCATION: Blue Mountain Ranger District, Malheur National Forest, south of John Day and Canyon City, near the Strawberry Wilderness.

DATE OF EA: July 2006

NAME OF RESPONSIBLE OFFICIAL: Malheur Forest Supervisor, Gary L. Stan Benes.

REQUEST FOR RELIEF: Our organizations request that the Forest Service modify the proposal as follows:

- Retain all mature and old growth trees throughout the project area;
- Drop “shelterwood” and “regen” harvest plans, converting to variable thinning based upon accurate site-specific historical forest stand composition appropriate to unit areas, leaving stands fully stocked with mature and old trees where this already inherently exists or stocked with adequate tree cover to achieve historical stand composition density over time in younger stands.
- Retain at least enough of the largest trees available to meet Forest Plan requirements for big game and visual corridors.
- Change the project to comply with LRMP requirements for Elk and other native species “big game” cover and winter range, as well as visual resources.

- Avoid commercial logging within de facto roadless areas adjacent to Strawberry Mountains Wilderness.
- Retain sufficient snags to meet optimum wildlife habitat requirements for cavity nesting species.
- Concentrate on true fuels risk reduction by conducting restoration thinning of fire-prone ladder fuels and small diameter trees (under 10 to 12” dbh), basing unit location on areas with contiguous fuels risk from forest stands to residences below. Concentrate on restoring even-aged forest stands to historical densities and age classes, and restoring and protecting old growth and mature stands by thinning younger diameter trees while retaining all old and mature trees.
- Work with private landowners to ensure they also implement defensible space fire risk reduction around residences and structures.

Or – in the absence of the above changes, withdraw this project from HFRA authority and conduct NEPA environmental analysis (we recommend an EIS) with a full range of alternatives in compliance with NEPA process notice-comment-appeal regulations at 36 CFR 215.

STATEMENT OF REASONS

I. The Canyon Creek project fails to comply with the requirements of the HFRA - as such the Malheur National Forest must conduct the requisite NEPA EIS analysis.

While HFRA is the law of the land, it must be employed appropriately as Congress intended. Congressional intent is clear in the text of the HFRA, requiring:

1. The primary purpose of HFRA projects must be fuels reduction around wildlife-urban intermix or interface communities (WUI);
2. WUI communities must meet specified population density requirements, ensuring that such projects are not misused to commercially log interior forests far from human communities where population density is sparse, and where people have historically knowingly chosen to live within forest areas.
3. Project extent to be confined within ½ mile to 1.5 miles maximum from concentrated areas of human residences.
4. The Forest Service must use approved methods of fuels reduction including thinning and prescribed fire, not shelterwood or regeneration harvest. HFRA §6511(2) provides: “The term ‘authorized hazardous fuel reduction project’ means the measures and methods described in the definition of ‘appropriate tools’ contained in the glossary of the Implementation Plan.” The implementation plan glossary says that “appropriate tools” include “thinning,” but the definition does not include shelterwood or any form of regen harvest. http://www.fireplan.gov/reports/11-23-en.pdf (page 18: Glossary says “Appropriate Tools: Methods for reducing hazardous fuels including prescribed fire, wildland fire use, and various mechanical methods such as crushing, tractor and hand piling, thinning (to produce commercial or pre-commercial products), and pruning. They are selected on a site-specific case and are ecologically appropriate and cost effective.”). The Forest Service does not have

a wide range of discretion here, as Congress is clearly specific in delineating the types of projects that are authorized under HFRA. This definition lists several forms of fuel reduction only one of which involves commercial logging (i.e. thinning). The EA description of shelterwood logging (page 9) does not even mention fuel reduction or fire hazard reduction. In fact, it is well-established that most forms of commercial logging often increase, rather than reduce, fire hazards. The Forest Service cannot legally-misuse the HFRA glossary definition beyond reason to include regen harvest as an appropriate fuel reduction tool.

5. There are at several reasons why regen logging methods such as shelterwood harvest are not an appropriate tool for fuel reduction:
   - Regen harvest results in forest conditions that are more hazardous than doing nothing. Shelterwood harvest will result in forest conditions that are hotter, dryer, and windier than other treatments or no action. Thinning opens stands to greater solar radiation and wind movement, resulting in warmer temperatures and drier fuels throughout the fire season. [T]his openness can encourage a surface fire to spread, …USDA Forest Service; Influence of Forest Structure on Wildfire Behavior and the Severity of Its Effects, November 2003.m http://www.fs.fed.us/projects/hfi/2003/november/documents/forest-structure-wildfire.pdf
   - Opening up closed forests through selective logging can accelerate the spread of fire through them because a physical principle of combustion is that reducing the bulk density of potential fuel increases the velocity of the combustion reaction. Wind can flow more rapidly through the flaming zone. Thinned stands have more sun exposure in the understory, and a warmer microclimate, which facilitates fire (Countryman 1955).
   - C. [F]uel reduction activities – particularly mechanized treatments – inevitably function to disturb soils and promote the invasion and establishment of non-native species. Pile burned areas associated with the treatments are also prone to invasion (Korb et al. 2004). Annual grasses can invade treated areas if light levels are high enough, leading to increased likelihood of ignition, and more rapid spread of fire, which can further favor annual grasses (Mack and D'Antonio 1998). This type of feedback loop following the establishment of non-native plants may result in an altered fire regime for an impacted region, requiring extensive (and expensive) remedial action by land managers (Brooks et al. 2004). Odion, Dennis. 2004. Declaration in NWEA v. Forest Service. c*iting* Countryman, C. M. 1955. Old-growth conversion also converts fire climate. U.S. Forest Service Fire Control Notes 17: 15-19.
   - Regen harvest, without or without replanting, will also result in the establishment of a dense growth of young trees that are one of the most

hazardous types of forest structure because they provide a nearly continuous bed of resinous fuel close to the ground. Countryman, C.M. 1955. Old-growth conversion also converts fire climate. Fire Control Notes 17(4): 15-19.

- Regen harvest creates large amounts of hazardous logging slash that is never full treated. Incomplete treatment of logging slash results in increase fire hazard relative to no action. See Crystal L. Raymond. 2004. The Effects of Fuel Treatments on Fire Severity in a Mixed-Evergreen Forest of Southwestern Oregon. MS Thesis. http://depts.washington.edu/nwfire/publication/Raymond_2004.pdf

To comply with HFRA, the Forest Service can either drop the shelterwood, shift to a more effective thinning treatment that retains enough canopy to maintain cool, moist understory and suppress tree regeneration, or prepare a new NEPA analysis with a full range of alternatives and a full public involvement process.

6. HFRA only grants authority to remove "hazardous fuels" (HFRA §6512(a)). The Forest Service cannot remove any tree that provides useful shade that helps keep fuels cool and moist or that helps suppress the growth of future ladder fuels. Most trees over 15" dbh and the overstory trees in the shelterwood units are fire resistant and help reduce fire hazard, so they are not hazardous fuels. Removing these larger fire resistant trees is not authorized by HFRA because these are not legally "hazardous fuels."

7. HFRA requires that authorized projects be consistent with the applicable forest plan standards and guidelines. HFRA Section 102(b) says "An authorized hazardous fuel reduction project shall be conducted consistent with the resource management plan and other relevant administrative policies or decisions applicable to the Federal land covered by the project." HFRA only authorizes projects that are consistent with the forest plan. This project calls for four forest plan amendments, two of which significantly increase logging, and the project violates several road management requirements (PACFISH RF-3c and MA 3B Standard 41) (EA page 162), so the Forest Service has a choice of either conforming with the forest plan or using the normal NEPA process for non-HFRA projects.

8. This project allows big game cover to be reduced below 25% in each subwatershed (to be reduced to 19% in some subwatersheds). The EA does not disclose which logging units this modification facilitates. This project also eliminates 2 and 10 acre unit size limitations for regen harvest in foreground and middleground visual corridors respectively. This modification affects units: 48, 52, 62, 90, 140, 152, 166, 176, 178, 180, 182, 200, 202, 218, 228, 246, 504, 582, and 583. Waiving big game cover and visual corridor protections will both allow more logging and shift the balance between fuel reduction objectives and other important resource objectives. In the HFRA Congress stuck a balance between competing objectives by accelerating only

those fuel reduction projects that are fully consistent with the pre-existing forest plan. The Forest Service cannot alter the will of Congress by approving expedited logging that is inconsistent with the forest plan.

9. This project will degrade old-growth forests in violation of the HFRA and the east side screens. The EA admits that this project will reduce snag habitat and goshawk habitat (EA pp 35, 36). Given the low levels of basal area retention in some stands that are well stocked with older trees, this project will also unavoidably remove trees <21" dbh that have old-growth characteristics such as yellow-orange bark. The Forest Service must retain and protect all old trees and old forest characteristics because:
   - HFRA requires the FS to maintain and restore old-growth forests regardless of tree size. The HFRA says that the structure and composition of old growth shall be fully maintained and restored.
   - The east side screens require that all vegetation management projects move stands toward the historic range of variability. Since all mature and old trees and large snags are far below the HRV, the FS must retain large snags and pre-fire suppression mature and old trees regardless of whether they may be <21" dbh.
   - The Forest Service should follow these requirements by retaining not only all trees over 21" dbh but also smaller trees that have old growth characteristics such as Ponderosa pines with yellowing bark. Large snags must be reasonably retained, keeping workers out of the hazard zone as possible. It is highly unlikely that large diameter well-rooted standing snags would be in danger of falling in a smaller scale true fuels reduction/restoration thinning project, reasonably minimizing risks to workers and equipment. Large-tree snag recruitment must be provided by retaining adequate numbers of "extra" trees that will eventually become snags. Goshawk's are known to nest in old-growth forests, so goshawk nesting habitat must also be protected.
   - Where plans do not "fully maintain and restore" old-growth, such as within the shelterwood prescriptions proposed here, HFRA §102(f) requires that projects— "focus largely on small diameter trees, thinning, strategic fuel breaks, and prescribed fire," *and,* to the extent consistent with fire resilient stands, "maximize the retention of large trees" appropriate to the forest type.

10. Prioritizing limited resources is one of the primary goals of the HFRA. The Secretary of Agriculture is required by HFRA §103(a) to develop an Annual Program of Work that identifies this project as a higher priority than others that are not going to get done. The Forest Service must disclose how this project is part of an "Annual Program of Work." Particularly, the Grant County Community Wildfire Protection Plan (GCCWPP), notes that the Canyon Creek area does not meet HFRA interface or intermix WUI requirements. However, there are other communities prioritized among those listed as at risk that may meet these HFRA requirements, yet no rationale is given for choosing to implement this project in the canyon creek area over other more appropriate HFRA WUI areas, nor is a list of other HRFA projects disclosed under an

"Annual Program of Work." As this project area does not meet HFRA population requirements, it is highly legally questionable whether the GCCWPP can supercede Congressional intent. Additionally, it is further legally deficient that the GCCWPP can not only stretch Congressionally set population densities, but that this plan can also extend this non-WUI project boundary beyond the maximum 1.5 miles set by Congress for more populous communities that meet HFRA WUI requirements. Currently, the WUI averages 1.5 to 2 miles, and extends up to approx. 3 miles from inhabited residences.

11. The failure of the Canyon Creek project and Grant County to meaningfully include private lands fuels reduction, including the creation of defensible space around all dwellings and structures, calls into question the legitimacy of the claimed need and landowner interest in this project. Area residences include those with contiguous dense stands of trees – with abundant ladder fuels - touching houses and structures. These conditions not only negate any potential beneficial fuels risk reduction that may result from this project, they represent the reality that fire igniting in these at risk private lands homes could easily spread into adjacent private residences and public lands forests. The agency and county must address this serious significant issue before Canyon Creek may be considered a valid fuels reduction project. Area residential owners must conduct the requisite defensible space work that is needed to make the proposed Canyon Creek work meaningfully capable of actually reducing fire risk to area homes. Work needs to be conducted addressing fuels and fire risk issues stemming from thick stands of trees immediately adjacent to roofs and wooden sidings, out-structures and firewood piles. As the foundation of this project is based upon protecting area homes, without private landowner cooperation, the project has no viable foundation.

12. There is a lack of continuity of fuels capable of carrying a forest fire between upland forests across a significant portion of the project area south of Canyon Creek and the inhabited valley far below. A combination of extensive areas of past clear cuts - that have yet to sufficiently regenerate - old logging roads, and large naturally open slopes separate valley woodlands from upper ridge forests. The GCWFPP applied a broadbrush landscape-scale approach that included the entire area watershed. The FS deferred to the county's general broadbrush plan, failing to conduct NEPA required site-specific analysis and accurately assess actual fuels continuity and potential for fire-spread from upland lightning strikes to residences below. Overall, use of the GCCWPP absent this requisite fuels risk continuity analysis and underlying fire risk reduction strategy helping to accurately locate unit areas where thinning is necessary, undermines the effectiveness of this project, and extends logging across the area whether it is necessary or not. The resulting project represents a flawed "good enough for government work" approach that violates NEPA's requirements. The Forest Service was required to develop a fire-risk reduction strategy, based upon actual site-specific vegetation and fuels patterns and connectivity, utilizing existing natural openings, combined with past logging and road openings - to allow for effectively containing fires in much of the area, preventing spread to occupied areas. The project should be redesigned to effectively incorporate

these conditions, allowing less of the forest watershed to be commercially thinned.

13. Cumulative impacts to wildlife species from past logging and road building are extensive and significantly severe across much of the area. The EA fails to accurately assess and disclose the many adverse impacts of this project to numerous wildlife species. Our organizations provided information during comment periods concerning this, and offered to help develop project design and answer agency questions, however we were never contacted by the agency about these serious issues. The project would further harm wildlife species while failing to effectively address fire risk reduction to area homes.
14. Old growth forest stands, which are less susceptible to severe fires, are slated for cutting while adjacent even aged dense younger forest stands are left untouched - though these over-stocked young stands have abundant ladder fuels and represent far greater risk of severe fire spread to area homes. Overall, the project appears to be more of a timber Trojan horse - designed for commercial logging volume rather than true fuels and fire risk reduction. The project needs to be modified to rectify this or dropped and redesigned under an EIS process.
15. Basal area formulas utilized to determine logging markings are inaccurate for this area. The formulas would further reduce mature-sized fire resistant trees, leaving area forests - that already have had too many mature and old growth trees removed by logging - with even less stand density of mature trees than was historically present. This commercially motivated reduction of historical stand composition and density violates HFRA provisions.
16. Sample unit markings indicate that agency marking plans would leave far too many fire-prone small diameter trees, ladder fuels, and thickets throughout the project's units, while marking for logging removal too many mature-sized 14" to 20.9" dbh trees instead. The project needs to be changed to comply with HFRA’s mandates regarding appropriate fuels reduction thinning.

Changes needed:

A. Much of the area could benefit ecologically from restorative thinning of smaller diameter densely stocked stands. Basal formulas should match historical old forest stocking conditions. Fire resistant mature trees above 14" should not be removed in most instances, as cumulative loss of commercial sized mature and old growth trees has left most forest stands deficient in size classes above 14" dbh.

B. Unit locations should be based upon an effective fire risk reduction strategy founded upon site-specific fuels continuity conditions. Natural and logging/road created openings can be combined with unit locations to reduce fire risk without having to do thinning across the entire project area, allowing interior forest areas to be left unmanaged - or lightly thinned - to better provide for wildlife needs.

C. Fire resistance in area old growth stands could be improved by thinning dense patches of young trees (seedling to 10" or 12" dbh) and the removal of ladder fuels beneath mature and old trees.

D. Dense second growth stands could be commercially thinned to provide the necessary economic viability to make overall thinning treatments cost-effective. At present some of these stands are not proposed as thinning units, despite obvious fuels reduction thinning

needs and severe fire risk due to stand density and excessive ladder fuels in these younger stands (in some of which the trees average 14 to 18 inches diameter).
E. Local residences must participate in creating effective defensible space around homes and structures.
F. Roadless areas adjacent to the Strawberry Wilderness must be protected.

If all of the above concerns are incorporated into the Canyon Creek project design, it could become a commercially viable, ecologically effective, fuels reduction timber sale project that could – with care - move forward with both conservation and timber community support. Otherwise:

This project will have significant impacts and requires preparation of an EIS.

This is a large project extended across many acres, involving regen harvest, including several forest plan amendments that significantly reduce protection for wildlife and visual resources while increasing logging levels.

This project may have significant impacts because it involves:

- many acres of habitat manipulation and soil disturbance;
- complex and conflicting objectives (commercial removal of trees that should be retained to maintain a more fire resistant microclimate and provide visual quality and habitat for big game and other wildlife);
- degradation of roadless values adjacent to the wilderness area;
- steep slopes;
- ESA listed steelhead;
- degrading goshawk habitat;
- decreasing large snag habitat in both the short- and long-term;
- the cumulative impacts of roads, ground skidding, grapple piling, and pile burning will likely violate soil standards;
- an amendment of the forest plan to disregard the big game cover requirements, representing a significant and fundamental shift in the priorities and assumptions of the forest plan.
- a Forest Service approach to maintaining small postage stamp old-growth designations that is totally inconsistent with current science - that calls for restoring landscape characteristics to within the historic range of variability.
- the Forest Service practice of moving the old-growth allocation around to facilitate Forest Service logging priorities.
- Severe adverse impacts to numerous wildlife and aquatic species of concern, including ESA listed species (Steelhead, eagles, potential lynx, potential/eventual wolves), and species of concern including neotropical migrant birds, cavity excavators and nesters, elk and native ungulates, goshawk, marten, wolverine, pygmy and flammulated owls and other raptors, and numerous other wildlife species. Project implementation would degrade wildlife and aquatic habitat; reduce species populations,

> distribution and viability; and violate federal environmental policy laws including the National Forest Management Act, Endangered Species Act, Clean Water Act, and the Migratory Bird Treaty Act. The project's failure to adequately disclose impacts to these species, and to develop a true restoration only alternative as appropriate to HFRA direction violates the National Environmental Policy Act. Either significant modifications to the project (preferred), or a new EIS process are necessary to rectify this.

The proposed action will reduce large snags in violation of the east side screens.

Large snags are already under-represented relative to the historic range of variability, yet this project will reduce large snag habitat both in the short-term and the long-term. (EA page 35). This violates the east side screens' requirement that all vegetation management projects move toward the historic range of variability.

The expected degradation of large snag habitat is also a violation of HFRA because snags are a critical component of old-growth forests and HFRA authorized projects are required to fully maintain and restore old-growth.

Furthermore, the forest plan snag standards are scientifically indefensible and the Forest Service has not yet developed new snag habitat standards pursuant to valid NEPA and NFMA procedures.

Other NEPA short-comings

The EA fails to disclose the cumulative impacts of the alternate snow-mobile routes that will be created when log hauling occurs on snowmobile trails in winter.

HFRA is codified at 16 USC § 6501 et seq.
http://www4.law.cornell.edu/uscode/html/uscode16/usc_sup_01_16_10_84_20_I.html

Conclusion

The project as designed fails to match the claims within the EA, or meet the requirements of federal environmental policy laws, including the HFRA, NEPA, CWA, NFMA, ESA, MBTA and the APA, and if implemented would clearly violate significant requirements of all of these laws, in whole or part. Again, we reiterate our intention to work with the agency and collaborators to modify this project to achieve greater compliance with federal environmental policy laws, better protect wildlife and aquatic species and their habitat, better move the area towards restoration of its natural HRV compositions and fire resistance, and far more effectively reduce fire risks to homes and private lands in the Canyon Creek WUI area. Recent extensive discussions with Malheur National Forest officials indicate the strong potential that "common sense" practical changes can be made by the agency to address our many issues and resolve this Objection, thereby permitting this project to proceed in a timely manner without federal judicial review. It is also clear however, that absent such changes, the conservation community will have but little choice to file suit as need be to protect the ecological integrity of the area, private lands residences, and the integrity of federal laws from what is currently a flawed timber-dominated trojan horse. As is the Canyon Creek project is essentially too much of a timber sale disguised inappropriately as an HFRA fuels reduction project. Without significant changes as described above, federal laws will be violated; area wildlife, forest, and watershed resources will be irreparably harmed; and fire risk to private lands residences will be increased throughout much of the Canyon Creek project area. Hopefully, working together cooperatively we can successfully rectify these legal and ecological problems, effectively fine tuning the project to be one the Forest Service, area citizens, county officials, timber industry, and the conservation community can be jointly proud of. If this resolution does not succeed, it is imperative the Forest Service themselves responsibly withdraw and redesign this project to meet the reasonable legal and ecological objections noted herein. However, it is our intention to succeed at bridging differences and changing the project as described, so that withdrawal of the project through agency decision or by federal court order is not necessary. Recent successful resolution of appeal issues on similar "fuels reduction" timber sales across the region, by our organizations and the Forest Service, give foundation upon which to base such potential. It is now up to the agency and involved community to join with us in modifying this project as needed, helping to usher in a new era of cooperation and true collaboration instead of continued polarized contention and litigation.

As part of this Objection, we are including the accompanying photo exhibits I and II. During the Objection resolution process (and if need be federal review) we will also be utilizing agency aerial maps clearly depicting the lack of fuels continuity between HFRA logging units located along the upper ridges on the south side of Canyon Creek and the private lands homes far below (well over 1 mile distant). The agency already has these maps in its possession (as do we), and should include these in their internal review of this proposed project. The accompanying photo exhibits should be studied by the agency and referred to, aiding both understanding and making necessary changes to this otherwise flawed project.

For the Natural heritage of Us All,

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United States Department of Agriculture | Forest Service | Pacific Northwest Region | 333 SW First Avenue (97204)
PO Box 3623
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503-808-2468

File Code: 1570

Date: October 20, 2006

Oregon Chapter Sierra Club
League of Wilderness Defenders – Blue Mountain
Biodiversity Project
P.O. Box 963
Sisters, OR 97759

Dear Oregon Chapter Sierra Club & League of Wilderness Defenders – Blue Mountain Diversity Project:

This letter is in response to your objection dated September 20, 2006, on the Canyon Creek WUI Fuels Reduction Project. I have read the Environmental Analysis (EA) and reviewed the analysis in the project file, including documents incorporated by reference, and fully understand the environmental effects disclosed within it. I have also considered the comments submitted during the public scoping for this project and the Community Wildfire Protection Plan (CWPP). My review was conducted in accordance with 36 CFR 218 and I also focused on compliance with the Healthy Forest Restoration Act (HFRA).

I reviewed your objections to determine whether you have identified any substantial flaws in the project proposal. These are the key objection issues I was able to identify, and my responses.

<u>Objection Statement #1:</u> The objector requests that his "comments be analyzed in the EA and consideration of a fire alternative be included in the alternatives section" (Objection #006). Failure to do so is "a violation of NEPA" (Objection #006).

RESPONSE 1: The environmental assessment was prepared and provided to the public in accordance with the Healthy Forest Restoration Act (HFRA) (H.R. 1904-12). The objection process has been established for qualifying projects (36 CFR 218.1). Authorized projects processed under the provisions of HFRA are not subject to the notice, comment, and appeal provisions set forth in 36 CFR 215 (36 CFR 218.3). The Forest complied with applicable requirements for public comment.

Mr. Becker's letter is logged in the project file; his comments were similar to others and have been addressed. Chapter 1 of the EA page 13 explains that an HFRA project within a WUI area as defined in the Grant County Community Fire Protection Plan does not require alternatives to the Proposed Action. Chapter 2 of the EA page 2, Alternative B addresses the request for a fire alternative and why the buildup of fuels makes this proposal too risky to implement without pre-treatment. Therefore, the forest has complied with NEPA in responding to public comments on the project. Also see the response to Objection Statement #5 below.

<u>Objection Statement #2:</u> Objectors "did not feel they could safely express their views within the so-called 'collaborative process' for this project" (Objection #008 p. 1). Furthermore, "written concerns…were largely ignored" and "[r]equests by an alliance of conservation organizations for both a meeting, and a field trip…were denied by the Malheur National Forest" (Objection #008 pp. 1-2).

RESPONSE 2: Section 104(f) of the HFRA encourages meaningful public participation during authorized projects. Chapter 1 of the EA pages 9-12 lists the extensive collaborative process that was followed over a nine-month period. Attempts were made to include the environmental community within the framework of the project collaborative agreement (Personal Communication with Linda Batten 10/3/06). The Forest Service followed the standard scoping process. Collaborator affiliations will be added to the collaborator list in Chapter 4 page 2 of the EA to reflect which groups were represented in the collaboration efforts.

<u>Objection Statement #3:</u> The objector states that he is "concerned about the proposed treatment to old growth" (Objection #006). He states, "Old Growth trees are not a fire hazard by themselves. An under- and midstory component is necessary to initiate crown fire. A commercial [sic] or non commercial [sic] thin of trees that were not present prior to forest management would alleviate any fire risk in a old growth stand" (Objection #006). The objector suggests that the Forest Service run a model like NEXUS to manage the stand without removal of healthy old growth stands (Objection #006).

RESPONSE 3: Old growth is discussed in the Wildlife section of Chapter 3 of the EA pages 65 - 75. Specifically, on page 71, Table WL-2, the EA identifies that there has been a shift over time to Old Forest Multiple Strata from Old Forest Single Stratum. This Table also identifies that following the proposed action, percentages of single stratum trees would increase, and 50 years after proposed action, the percentages of stands in single stratum condition would be within the historic range of variability. Chapter 2 of the EA page 8 identifies that all trees greater than 21" dbh would be retained with minor exceptions. The fuels section in Chapter 3 of the EA page 26 compares current to post treatment crown initiation potential, and does document a decreased potential for crown fires after implementation. The fuels section in Chapter 3 of the EA page 7 identified that the INFORMS program was used for project analysis. The INFORMS program is adequate for the effects analysis conducted here. There is no requirement to run multiple programs. The Forest has conducted an adequate analysis of effects using recognized methods.

<u>Objection Statement #4:</u> The objector asserts that there is "no 'grand plan' for providing a manageable fire program within the area" (Objection #006). For example, "[l]arge gaps are left between treatments, especially at the main ridges and adjacent to private land," which "does not provide for a good place to burn from in the future" (Objection #006). Also, "[m]anaged stands that are not underburned very often have higher fuel loads in the 0-3" class then [sic] the stand before management" (Objection #006).

RESPONSE 4: Chapter 1 of the EA page 2 refers to the Grant County Community Fire Protection Plan, which states on pages 2 and 5 under "Fuels Reduction" that strategies are identified coordinating fuels treatment projects at the landscape level. The 'grand plan' concept is addressed in Chapter 3 of the EA page 21, Alternative-Proposed Action under "Direct and

Indirect Effects," which states that the continuity of fuels within the project area is broken up along boundaries, private land, major ridges and wilderness boundaries, thus creating contiguous blocks of treated ground over the landscape. Chapter 2 of the EA page 6 addresses the gap issue in treatments and is clarified by timing of treatments, which is based on low fire hazard acres being treated sooner as opposed to unsuitable conditions on acreage that would need mechanical treatment prior to prescribed burning.

Objection Statement #5: **The objector would like this project to be burned rather than harvested (Objection #006). He states that "[t]hinning, handpiling and burning might be appropriate within 300' of private land" (Objection #006). He continues by stating that he would like to this scenario analyzed as well as "the economics of the various proposals" (Objection #006).**

RESPONSE 5: An analysis of the economics of the proposal is in Chapter 3 of the EA on pages 214-225.

An all burning alternative was discussed in Chapter 2 of the EA page 2. Since one of the problems identified in the Canyon Creek WUI was the buildup of fuels and tree overstocking due to the lack of periodic burning, one idea was to reintroduce fire across most of the planning area. After consideration, this alternative was dropped from detailed consideration. It was decided that many areas within the WUI are so overstocked with trees, contain ladder fuels, and have enough of a surface fuel buildup that the reintroduction of fire would be risky until these conditions can be modified with mechanical treatment.

Objection Statement #6: **Objection points listed below in bold, directly prior to specific responses.**

RESPONSE 6:
The objector states that the "project violates the HFRA so the Forest Service must use the regular NEPA process" (Objection #007 p. 3). More specifically, ONRC states, "HFRA was a compromise that only authorizes fuel reduction in limited circumstances, such as when the forest plan does not need to be amended and using approved methods of fuel reduction" (Objection #007 p. 3). However, the objectors assert that "shelterwood logging (page 9) does not even mention fuel reduction or fire hazard reduction" and the "Forest Service cannot stretch the HFRA glossary definition beyond reason to include regen harvest as an appropriate fuel reduction tool" (Objection #007 p. 4; Objection #008 p. 5)).

The HFRA Interim Field Guide (2/2004) states on page 9 that projects must be consistent with the applicable resource management plans and they must be on lands managed by the USDA Forest Service. The guide further states that proposed actions not consistent with the plan must be covered by a plan amendment. This direction is being followed so no violation exists.

The glossary definition of shelterwood logging uses the phrase "various methods" and goes on to state examples. The glossary does not state or imply that these examples are all inclusive.

Reasons why logging methods (such as shelterwood harvest) regen are not an appropriate tool are:

1) “Regen harvest results in forest conditions that are more hazardous than doing nothing. Shelterwood harvest will result in forest conditions that are hotter, dryer, and windier than other treatments or no action” (Objection #007 p. 4; Objection #008 p. 5).

Chapter 3 of the EA page 24 discusses concerns about raised fire risk. Peterson (2004) and Agee (2005) are cited for information on increased surface air movement and drying. With effective post-activity fuel treatment, the thinning provides an overall reduction in fire behavior. Chapter 3 of the EA page 24 describes how benefits of reduced fire severity outweigh increased wind speed.

2) “Regen harvest, with or without replanting, will also result in the establishment of a dense growth of young trees that are one of the most hazardous types of forest structure because they provide a nearly continuous bed of resinous fuel close to the ground” (Objection #007 p. 5; Objection #008 pp. 5-6).

Chapter 2 of the EA page 9, explains that shelterwood harvested areas would be planted in understocked areas. This would be completed using desirable tree species. Chapter 2 of the EA page 6 addresses prescribed burning in the project area, both now and in the future. Chapter 3 of the EA pages 21-22 states that a “prescribed burning program into the future will be needed to maintain the desired fuel levels and limit regeneration from becoming a ladder fuel concern as well as a stand density concern.” The Forest Service will address this issue by using prescribed burning to maintain fuels at desired levels.

3) “Regen harvest creates large amounts of hazardous logging slash that is never full [sic] treated” (Objection #007 p. 6; Objection #008 p. 6).

Chapter 2 of the EA pages 6-7, addresses the need for mechanical treatment, pile and burning, and prescribed fire where fuel loadings already permit. As parts of the proposed action, these treatments are fully intended to be implemented. Monitoring (a required component of this project) will determine the success rate of this action (Chapter 2 of the EA pages 32-33).

4) “Opening up closed forests through selective logging can accelerate the spread of fire through them” (Objection #008 p. 5).

Chapter 3 of the EA pages 21-22 explains that a short term increase in fire hazard will exist prior to slash treatment but there will be a long term beneficial effect on altering fuel structure and wildfire behavior.

5) “[Fuel reduction activities…inevitably function to disturb soils and promote the invasion and establishment of non-native species” (Objection #008 p. 5).

Chapter 3 of the EA pages 174 – 180 addresses the existing occurrence of noxious weeds and measures that will be employed to minimize the spread of these populations and the eradication of some populations. Chapter 3 of the EA page 175 addresses the regulatory framework and compliance with the Invasive Species ROD, 2005.

Objectors believe that “[t]o comply with HFRA, the Forest Service can either drop the shelterwood, shift to a more effective thinning treatment…or prepare a new NEPA analysis

with a full range of alternatives and a full public involvement process" (Objection #007 p. 6; Objection #008 p. 6). The objectors state that "HFRA only grants authority to remove 'hazardous fuels' (HFRA §6512(a))," therefore, the Forest Service violates HFRA by removing "larger fire resistant trees" (Objection #007 p. 7; Objection #008 p. 6).

HFRA Interim Field Guide (2/2004) pages 28-29 states that treatments are to focus on small diameter trees. Also stated is direction to maximize the retention of large trees. However the Interim Field Guide also emphasizes that large tree retention requirement must not prevent agencies from reducing wildland fire risk. Chapter 2 of the EA page 8, states that all live trees over 21 dbh would be retained, except where removal is necessary for safety or to construct temporary roads and landings. These actions meet the HFRA direction.

The intent of the thinning is to leave the largest diameter trees. Chapter 2 of the EA page 8 states "This prescription would thin small/medium size trees (7 to 20.9" DBH) in immature forest stands by thinning from below to reduce stocking levels to reduce canopy fuels, enhance individual tree growth, and to allow for the reintroduction of fire. Thinning from below means the majority of the trees to be cut are in the smallest diameter sizes (9 to 13" DBH) and relatively few trees would be cut in the medium diameters (14 to 20.9" DBH)."

The objectors state, "The EA failed to disclose consistency with substantive requirements of HFRA" (Objection #007 p. 10).

The finding of consistency with appropriate management direction, laws and regulations will be addressed in the decision document. This is a required element of the decision document, "Findings Required by other Laws and Regulations," and it will address consistency with HFRA. The objector is correct that a Finding of No Significant Impact will have to address "context and intensity" (40 CFR 1508.27) as well as several other appropriate laws and regulations. Findings and Disclosures, Chapter 3, pages 234 to 237 of the EA, responds to the majority of the laws and regulations that need to be carried forward in to the decision notice.

The objectors point out that "HFRA only authorizes projects that are consistent with the forest plan" and "[t]his project calls for four forest plan amendments" (Objection #008 p. 6).

This has been addressed in the opening paragraph of this response.

<u>Objection Statement #7:</u> "The EA admits that home ignition is caused by direct contact with flames, radiant heat, or firebrands. Firebrands are the longest distance threat and they can only go 1 km (EA p 8), so any fuel treatments in this project further than 1 km from homes is not reducing 'hazardous fuels' so the [sic] are not authorized by the HFRA" (Objection #007 p. 7).

RESPONSE 7: In the Healthy Forest Initiative & Healthy Forest Restoration Act (Interim Field Guide) February 2004 page 15 under "Wildland Urban Interfaces Within or Adjacent to At-Risk Communities" the act encourages the development of a community wildfire protection plan under which communities designate their WUI areas, where HFRA projects may take place. Chapter 3 of the EA page 7 and 8, when read in its entirety, addresses the distance and need for treatment. Treatments further than 1 km from structures are effective because fuels reduction and thinning will decrease probability of ignition and fire intensity, thereby increasing the ability of firefighters to protect life and property.

<u>Objection Statement #8:</u> The objectors point out that this project reduces big game cover to below 25% of each subwatershed (Objection #007 p. 7; Objection #008 p. 6). However, "[t]he EA does not disclose which logging units this modification facilitates" (Objection #007 p. 7; Objection #008 p. 6). The objectors also point out that this project "eliminates 2 and 10 acre unit size limitations for regen harvest in foreground and middleground visual corridors respectively" (Objection #007 p. 7; Objection #008 p. 6). They argue, "Waiving big game cover and visual corridor protections will both allow more logging and shift the balance between fuel reduction objectives and other important resource objectives" (Objection #007 p. 7; Objection #008 p. 6).

RESPONSE 8: The purpose of the proposed project is to protect lives and property. This will be accomplished by moving the vegetation towards historical conditions. Historical vegetation conditions or historical range of variability are desirable objectives, but site specific Forest Plan amendments are needed for this project to also accomplish important fuel reduction goals. Chapter 2 of the EA page 17 discusses the proposed Forest Plan amendment related to reducing satisfactory and total cover below existing Forest Plan Standards and Guidelines. There are many references to modification of the proposed project to protect Big Game and migratory corridors. A Forest Plan amendment is proposed to remove the limitations on harvesting in visual corridors for this project, Chapter 2 of the EA pages 18 - 19. Page 9 of the HFRA Interim Field Guide identifies that if the proposed project is not consistent with current plans that a plan amendment or site specific plan amendment can be used.

<u>Objection Statement #9:</u> The objectors assert that "the Forest Service must explain how they are maintaining and restoring old-growth forests when habitat for old-growth species [such as goshawks, Pileated woodpeckers, and pine marten] is being degraded" (Objection #007 p. 8).

RESPONSE 9: Chapter 3 of the EA page 73 describes that shifting stands from old forest multiple stratums towards old forest single stratum would reduce habitat for old growth canopy dependant species such as pileated woodpeckers, and pine marten, while improving habitat for white-headed woodpeckers and flamulated owls. This shift in species would be consistent with moving stands towards historic vegetation conditions. As described in the EA, the Forest's network of dedicated old growth would continue to maintain populations of marten and pileated woodpeckers. Chapter 3 of the EA pages 95 and 96 discuss effects of the proposed action alternative related to goshawk territories and PFAs. The reduction in goshawk nesting habitat is tied to reducing understory cover and opening up stands, which would shift stands towards historic conditions. Therefore the EA does describe the effects of the project on the old growth network of the Forest.

<u>Objection Statement #10:</u> "It is arbitrary and capricious to shift from older late-seral community to younger early seral community when HFRA requires the Forest Service to fully maintain and restore old-growth" (Objection #007 p. 8).

RESPONSE 10: The HFRA Interim Field Guide (2/2004) page 25-29 states that treatments are to focus on small diameter trees. Also stated is direction to maximize the retention of large trees. However, it is emphasized that large tree retention requirements must not prevent agencies from reducing wildland fire risk, etc. This being stated, Chapter 3 of the EA page 55 explains that the stands dominated by late seral species trees are planned for shelterwood treatments. The shelterwood treatments would remove many of the late-seral species trees from stands, retaining the early-seral species that are there, and reforesting openings with early-seral species. This will shift the species composition closer to the historic composition. Treated stands would be more adapted to the natural disturbances that exist, increasing the overall resiliency to natural disturbances, and thus meeting the direction of the Healthy Forest Restoration Act. The analysis of the effects to old growth offers a reasoned explanation for the shifting seral stages.

<u>Objection Statement #11:</u> The objectors state that the Forest Service must disclose how this project is part of an "Annual Program of Work" (Objection #007 p. 8). They state, "This project is intended to protect only 40 homes within the project area. The same amount of work could protect hundred of homes if conducted in more densely populated and higher priority areas" (Objection #007 p. 8). Additionally, the Grant County Community Wildfire Protection Plan "notes that the Canyon Creek area does not meet HFRA interface or intermix WUI requirements" (Objection #008 p. 7). There is no rationale for choosing this project over other WUI projects (Objection #008 p. 7).

RESPONSE 11: The Canyon Creek Fuels Hazard Reduction is one of three federal projects listed in the Grant County Community Wildfire Protection Plan (page 19). It is a priority 2 project, listed for action in 2005 – 2007. This project does not preclude the Forest Service from proposing projects in the other areas. The highest rated one was not on the Malheur National Forest. The objectors are incorrect in stating that the Grant County Community Wildfire Protection Plan "notes that the Canyon Creek area does not meet HFRA interface or intermix WUI requirements". Rationale for choosing this project is listed in Chapter 3 page 4 of the EA in the fuels report. It discusses already ongoing projects by landowners and the fact that the majority of untreated land within and adjacent to the project is Forest Service and the greatest threat to life and property in on these untreated lands. The Forest Supervisor will document his rationale for a decision when he signs a decision document for this project.

<u>Objection Statement #12:</u> "The failure of Canyon Creek project and Grant County to meaningfully include private lands fuels reduction, including the creation of defensible space around all dwellings and structures, calls into question the legitimacy of the claimed need and landowner interest in this project" (Objection #008 p. 8).

RESPONSE 12: Interim Field Guide, page 9, states in part that all proposed HFRA actions must be on lands managed by the USDA Forest Service. Additionally, Chapter 1 of the EA page 3, states that "a number of private landowners…have already initiated projects…to reduce fuels and overstocked stands." Chapter 2 of the EA page 15 discusses a special use permit that would be issued to a private landowner for road construction. This access would allow the landowner to do vegetation treatments and timber harvest on his property to reduce fire hazards and to improve forest health. These actions would complement treatments on both private and National Forest Lands. These actions show community effort in meeting the HFRA objectives on all lands.

<u>Objection Statement #13:</u> "This project will have significant impacts and requires preparation of an EIS" (Objection #007 p. 8; Objection #008 p. 10). The significant impacts are:

- **habitat manipulation and soil disturbance**
- **complex and conflicting objectives**
- **degradation of roadless values adjacent to the wilderness area**
- **steep slopes**
- **ESA listed steelhead**
- **degrade goshawk habitat**
- **degrade large snag habitat in both the short- and long-term**
- **cumulative effects of roads will likely violate soil standards**
- **amendment to disregard big game cover requirements**
- **violation of road management requirement in PACFISH and the forest plan**
- **maintaining small old-growth allocations is inconsistent with current science that calls for restoring landscape characteristics to within the historic range of variability (Objection #007 p. 9; Objection #008 p. 10).**

RESPONSE 13: The analysis of effects will be considered when the decision maker decides whether to make a finding of no significant impact at the time the decision is made.

<u>Objection Statement #14:</u> Objection points listed below in bold, directly prior to responses.

RESPONSE 14:

The objectors argue that the proposed action will "reduce large snag habitat both in the short-term and the long-term," which "violates the east side screens' requirement that all vegetation management projects move toward the historic range of variability" (Objection #007 pp. 7 and 10; Objection #008 p. 11). Additionally, the "EA admits that this project will reduce snag habitat and goshawk habitat (EA pp 35, 36)" (Objection #008 p. 7).

Also, this project violates HRFA because "snags are a critical component of old-growth forests and HFRA authorized projects are required to fully maintain and restore old-growth" (Objection #007 p. 10, also see Objection #008 p. 7).

"The EA also fails to disclose that the federal lands might need to provide more than a proportional number of large snags in order to mitigate for the fact that large snag habitat is not being adequately provided on non-federal lands" (Objection #007 p. 12).

"The EA is inconsistent – admitting on page 35 that biologically valuable large snag habitat will be degraded by the proposed action, while stating on page 55 that 'development of old forest structures will accelerate" (Objection #007 p. 11).

The Eastside screens do not require that "all vegetation management projects move toward historic range of variability". As stated in Scenario A page 9, if one or both of the late and old structural stages falls below HRV in a particular biophysical environment within a watershed, there should be no net loss of Late and Old Structural (LOS) from that biophysical environment.

Furthermore, no timber harvest activities should occur within LOS stages that are below Historical Range of Variability (HRV).

Under Scenario B on page 13, within a particular biophysical environment within a watershed, if the single, existing late and old structural stage is within or above HRV or if both types of LOS stages occur and both are within or above HRV, then timber harvest can occur within these stages, as long as LOS conditions do not fall below HRV. It then follows with: Enhance LOS structural conditions and attributes as possible, consistent with other multiple use objectives.

Chapter 3 of the EA pages 90 - 94 discusses snags and primary cavity excavators. Table WL - 6 identifies snag densities post-treatment and in 50 years. It identifies that snags 10-20" dbh would increase by 0.2 snags/acre, and >20" dbh would decrease by 0.1 snags/acre post-treatment. Overall snags would increase by 0.1 snags/acre over current conditions. For long term effects, the same table identifies that snags 10 - 20" dbh would increase by 1.1 snags/acre and snags > 20" dbh would increase by 0.9 snags/acre. This is moving towards forest plan standards, while providing increased assurance that the vegetation and stand components are sustainable and resilient to disturbance.

See objection #9 for a discussion of issues related to goshawk habitat.

"Furthermore, the forest plan snag standards are no longer scientifically defensible and the Forest Service has not yet developed new snag habitat standards pursuant to valid NEPA and NFMA procedures" (Objection #007 p. 10).

"The EA (p 88-89) is inconsistent and misleading because it refers interchangeably to forest plan requirements for snag habitat (which are being met, but the EA fails to disclose that they are outdated) and the snag habitat requirement of the eastside screens (which are not being met). The EA also relies on Matz 1927 as evidence that the current low levels of snags are adequate, but the EA fails to disclose that the Matz data are a mere snapshot in time and do not represent the range of snag habitat conditions that encompass the full range of historic variability" (Objection #007 pp. 11-12).

The Forest Plan snag standards and guidelines as amended by the Eastside Screens are still applicable until modified. Page 11 of the Eastside Screens allows for use of the best available science through models or other documented procedures to provide snags for 100 % potential population levels of primary cavity excavators. DecAID was considered and used in the wildlife specialist's report to determine what tolerance levels of snags were being provided currently and post-implementation, and discussed the historic and current ability of the vegetation to provide snags. All studies and information, including DecAID is a snapshot in time. The data from Matz 1927 was used because of the proximity to the proposed project.

<u>Objection Statement #15:</u> "The EA fails to disclose the cumulative impacts of the alternate snow-mobile routes that will be created when log hauling occurs on snowmobile trails in winter" (Objection #007 p. 11; Objection #008 p. 11).

RESPONSE 15: Chapter 2 of the EA page 29, Design Elements, addresses snowmobile trails that are co-located on haul routes. Plowing and use of these roads for harvest activities during the winter recreational season will be coordinated in advance with the forest recreation specialist, the sale administrator and the local snowmobile club. The objective of coordination will be to ensure safety and provide a continuous alternate route for snowmobile use when possible. The environmental analysis will be edited to expand discussion of snowmobile routes, including alternative routes and potential impacts (direct, indirect, and cumulative).

<u>Objection Statement #16:</u> The objectors believe that "[c]umulative impacts to wildlife species from past logging and road building are extensive and significantly severe across much of the area" (Objection #008 p. 9). They continue, "Our organization provided information during comment periods concerning this, and offered to help develop project design and answer agency questions, however we were never contacted by the agency about these serious issues" (Objection #008 p. 9)

RESPONSE 16: The wildlife section of Chapter 3 of the EA pages 62-111 and Appendix G of the EA discuss direct, indirect, and cumulative effects in sufficient detail to make an accurate determination of effects or impacts from both the proposed project, and cumulatively over time.

While the Oregon Chapter Sierra Club did provide written comments, and offered their cooperation and help in developing the proposed project, it does not appear that they involved themselves in the collaborative efforts of the Forest. The Forest Service afforded the opportunity to participate, and the Sierra Club chose not to until the public scoping and objection period (Letter to public February 23, 2005).

A Forest Service employee returned a phone call from one of the individuals. She asked him to come to the collaboration meetings and expressed surprise that he had not attended any collaboration meetings. He still expressed his desire to be involved with the scoping process, but did not have time to get involved with this project at the time of the call. (Conversation Record, September 6, 2005, Linda Batten). Comments from the scoping letter were considered in developing the proposed action. The responses received are on file in the project record. Similar comments from different responders were combined and are listed in Appendix E of the EA. Included in this list are the different ways that these comments were resolved and/or addressed within the document.

<u>Objection Statement #17:</u> The "EA fails to analyze the effect of continued future grazing which will reduce palatable fine fuels like grasses and shift the plant community toward less palatable shrubs and trees which are more hazardous as ladder fuels" (Objection #007 p. 11).

RESPONSE 17: This will be clarified in the revision of the EA in the cumulative effects section of fuels or range reports.

<u>Objection Statement #18:</u> "The EA analysis of crown base height (EA p 25) fails to disclose and consider that in shelterwood units the average crown base height will decrease significantly" (Objection #007 p. 11).

RESPONSE 18: Chapter 3 of the EA page 22 discusses how a prescribed fire program in the future requires further NEPA documentation. Further treatments will be needed to maintain the desired fuel levels and limit regeneration from becoming a ladder fuel concern as well as a stand density concern.

<u>Objection Statement #19:</u> "The analysis of crown fire initiation potential (EA p 25) fails to disclose how much of the benefit is from treatment of surface and ladder fuels versus canopy fuels" (Objection #007 p. 11).

RESPONSE 19: The EA cites (Graham et al. 2004)(Peterson 2004) & (Agee 2005) in Chapter 3 of the EA page 24 under "Ladder and Crown Fuels" addresses the benefits and the concerns of fuel treatments on surface and ladder fuels and removing canopy level trees which may increase the risk of fire.

<u>Objection Statement #20:</u> The objectors assert that "the EA fails to analyze whether some of the mixed conifer forest might be appropriately retained as part of a mesic mixed conifer landbird conservation effort" (Objection #007 p. 12).

RESPONSE 20: Chapter 3 of the EA pages 99 - 100 discuss landbirds analyzed, and identified that only habitats being effected by the proposed project are being addressed. Since mesic mixed conifer is not addressed, it is not being affected by the proposed project. Throughout the EA, it is identified that Alternative 2 would move stands within the watershed towards historic vegetation conditions, and historically these mesic mixed conifer sites had a limited and patchy distribution across the landscape.

<u>Objection Statement #21:</u> "The FS deferred to the county's general broadbrush plan, failing to conduct NEPA required site-specific analysis and accurately assess actual fuels continuity and potential for fire-spread from upland lightening strikes to residences below" (Objection #008 p. 8).

RESPONSE 21: The Grant County Community Wildfire Protection Plan is the plan that meets the requirements of the HFRA page 34 "Developing Community Wildfire Protection Plans". On page 33 Section 101(3) of the HFRA act describes a Community Wildfire Protection Plan (CWPP) as one that identifies and sets priorities for areas needing hazardous fuels reduction treatment and recommends the types of treatment on Federal and non-Federal lands that will protect one or more communities and their essential infrastructure. This EA is the site specific analysis that accurately assesses actual fuels continuity and potential for fire-spread. This is covered in the fuels report in Chapter 3 of the EA pages 4-28.

<u>Objection Statement #22:</u> The objectors believe that "[b]asal area formulas utilized to determine logging markings are inaccurate for this area" because the "formulas would further reduce mature-sized fire resistant trees" (Objection #008 p. 9). "This commercially motivated reduction of historical stand composition and density violates HFRA provisions" (Objection #008 p. 9). Also this project does not comply with HFRA provisions because it "would leave far too many fire-prone small diameter trees, ladder fuels, and thickets" (Objection #008 p. 9).

RESPONSE 22: The HFRA Interim Field Guide (2/2004) pages 25-29 states that treatments are to focus on small diameter trees. Also stated is direction to maximize the retention of large trees.

However it is emphasized that large tree retention requirements must not prevent agencies from reducing wildland fire risk, etc. Chapter 2 of the EA page 7 explains: 1. Crown or canopy fuels would be reduced primarily by commercial thinning (when too dense) and shelterwood treatments (where tree species are not suitable or sustainable) and 2. Ladder fuels would be reduced by commercial and non-commercial thinning treatments and understory removal. The trees cut would vary in size from medium to smaller diameters. The intent of the thinning is to leave the largest diameter trees. Chapter 2 of the EA page 8 states "This prescription would thin small/medium size trees (7 to 20.9" DBH) in immature forest stands by thinning from below to reduce stocking levels to reduce canopy fuels, enhance individual tree growth, and to allow for the reintroduction of fire. Thinning from below means the majority of the trees to be cut are in the smallest diameter sizes (9 to 13" DBH) and relatively few trees would be cut in the medium diameters (14 to 20.9" DBH)." This alternative description clearly emphasizes the removal of smaller diameter material and thinning of species to sustainable densities or removal when not suitable or sustainable. This meets the direction of the Healthy Forest Restoration Act.

<u>Objection Statement #23</u>: The objectors allege the project violates road management requirements in PACFISH and the forest plan. (Objection #007 p. 8; Objection #008 p. 10).

The roads report does not list the one new segment of road that accesses the private land. A discussion of this road should be included in the roads report. The EA will include a statement that a road management plan as outlined in PACFISH (RF-2) is available for all existing or planned roads.

A roads analysis is required when a permanent road is built. 200 feet of road is proposed to access private land. Chapter 3 of the EA page 208 - 209 details the roads analysis process completed by the Blue Mountain Ranger District staff.

By copy of this letter, I am instructing District Ranger Brooks Smith not to proceed with issuance of a Decision Notice for this project until the issues identified in Objections Statements #2, #15, #17, and #23 are addressed in the EA. There will be no further review of this response by another Forest Service or USDA official.

Sincerely,

/s/*Jim Golden*
JIM GOLDEN
Deputy Regional Forester

cc: Brad Siemens
Carole Holly
Brooks Smith
Gary Benes

Dan Becker <zbeckerd@ortelco.net>
01/24/2006 02:57 PM To
lbatten@fs.fed.us, ewunz@fs.fed.us
cc

bcc

Subject
Canyon Creek WUI Project

My comments
Overall I am pleased to see something actually starting to occur on this project. Many of the treatments will improve overall forest condition. The use of a landscape level project is also encouraging.

I am concerned about the proposed treatment to old growth. Old Growth Trees are not a fire hazard by themselves. A under and midstory component is necessary to initiate a crown fire. A commercial or non commercial thin of trees that were not present prior to forest management would alleviate any fire risk in a old growth stand. Of course some younger trees would be needed for future growth of the stand. I suggest that you run a model like NEXUS that allows manipulation of tree height and crown density to properly manage the stand without removal of healthy old growth stands.

I am also see no "grand plan" for providing a manageable fire program within the area. Large gaps are left between treatments, especially at the main ridges and adjacent to private land. This does not provide for a good place to burn from in the future for fire maintenance of the area. I would like to see shaded fuel breaks tieing the treatment units together.

Past projects in the area and the management of the 1939 Vance Creek fire have contributed to the current condition of the watershed. Managed stands that are not underburned very often have higher fuel loads in the 0-3" class then the stand before management. This is often true after piling and burning. I have done fuels inventories on these type of projects and found fuel loads as high as 35 tons/acre.

My overall preference for this project would be to burn it rather than use harvest. Thinning, handpiling and burning might be appropriate within 300' of private land. I would like to see such a scenario analysed, especially the economics of the various proposals.

Thank you for the opportunity to comment.

Dan Becker
PO Box 726
Prairie City OR 97869

United States Department of Agriculture | Forest Service | Pacific Northwest Region | 333 SW First Avenue (97204)
PO Box 3623
Portland, OR 97208-3623
503-808-2468

File Code: 1570

Date: October 20, 2006

Mr. Dan Becker
P.O. Box 726
Prairie City, OR 97869

Dear Mr. Becker:

This letter is in response to your objection dated September 4, 2006 on the Canyon Creek WUI Fuels Reduction Project. I have read the Environmental Analysis (EA) and reviewed the analysis in the project file, including documents incorporated by reference, and fully understand the environmental effects disclosed within it. I have also considered the comments submitted during the public scoping for this project and the Community Wildfire Protection Plan (CWPP). My review was conducted in accordance with 36 CFR 218 and I also focused on compliance with the Healthy Forest Restoration Act (HFRA).

I reviewed your objections to determine whether you have identified any substantial flaws in the project proposal. These are the key objection issues I was able to identify, and my responses.

Objection Statement #1: The objector requests that his "comments be analyzed in the EA and consideration of a fire alternative be included in the alternatives section" (Objection #006). Failure to do so is "a violation of NEPA" (Objection #006).

RESPONSE 1: The environmental assessment was prepared and provided to the public in accordance with the Healthy Forest Restoration Act (HFRA) (H.R. 1904-12). The objection process has been established for qualifying projects (36 CFR 218.1). Authorized projects processed under the provisions of HFRA are not subject to the notice, comment, and appeal provisions set forth in 36 CFR 215 (36 CFR 218.3). The Forest complied with applicable requirements for public comment.

Mr. Becker's letter is logged in the project file; his comments were similar to others and have been addressed. Chapter 1 of the EA page 13 explains that an HFRA project within a WUI area as defined in the Grant County Community Fire Protection Plan does not require alternatives to the Proposed Action. Chapter 2 of the EA page 2, Alternative B addresses the request for a fire alternative and why the buildup of fuels makes this proposal too risky to implement without pre-treatment. Therefore, the forest has complied with NEPA in responding to public comments on the project. Also see the response to Objection Statement #5 below.

Objection Statement #2: Objectors "did not feel they could safely express their views within the so-called 'collaborative process' for this project" (Objection #008 p. 1). Furthermore, "written concerns…were largely ignored" and "[r]equests by an alliance of

conservation organizations for both a meeting, and a field trip…were denied by the Malheur National Forest" (Objection #008 pp. 1-2).

RESPONSE 2: Section 104(f) of the HFRA encourages meaningful public participation during authorized projects. Chapter 1 of the EA pages 9-12 lists the extensive collaborative process that was followed over a nine-month period. Attempts were made to include the environmental community within the framework of the project collaborative agreement (Personal Communication with Linda Batten 10/3/06). The Forest Service followed the standard scoping process. Collaborator affiliations will be added to the collaborator list in Chapter 4 page 2 of the EA to reflect which groups were represented in the collaboration efforts.

Objection Statement #3: The objector states that he is "concerned about the proposed treatment to old growth" (Objection #006). He states, "Old Growth trees are not a fire hazard by themselves. An under- and midstory component is necessary to initiate crown fire. A commercial [sic] or non commercial [sic] thin of trees that were not present prior to forest management would alleviate any fire risk in a old growth stand" (Objection #006). The objector suggests that the Forest Service run a model like NEXUS to manage the stand without removal of healthy old growth stands (Objection #006).

RESPONSE 3: Old growth is discussed in the Wildlife section of Chapter 3 of the EA pages 65 - 75. Specifically, on page 71, Table WL-2, the EA identifies that there has been a shift over time to Old Forest Multiple Strata from Old Forest Single Stratum. This Table also identifies that following the proposed action, percentages of single stratum trees would increase, and 50 years after proposed action, the percentages of stands in single stratum condition would be within the historic range of variability. Chapter 2 of the EA page 8 identifies that all trees greater than 21" dbh would be retained with minor exceptions. The fuels section in Chapter 3 of the EA page 26 compares current to post treatment crown initiation potential, and does document a decreased potential for crown fires after implementation. The fuels section in Chapter 3 of the EA page 7 identified that the INFORMS program was used for project analysis. The INFORMS program is adequate for the effects analysis conducted here. There is no requirement to run multiple programs. The Forest has conducted an adequate analysis of effects using recognized methods.

Objection Statement #4: The objector asserts that there is "no 'grand plan' for providing a manageable fire program within the area" (Objection #006). For example, "[l]arge gaps are left between treatments, especially at the main ridges and adjacent to private land," which "does not provide for a good place to burn from in the future" (Objection #006). Also, "[m]anaged stands that are not underburned very often have higher fuel loads in the 0-3" class then [sic] the stand before management" (Objection #006).

RESPONSE 4: Chapter 1 of the EA page 2 refers to the Grant County Community Fire Protection Plan, which states on pages 2 and 5 under "Fuels Reduction" that strategies are identified coordinating fuels treatment projects at the landscape level. The 'grand plan' concept is addressed in Chapter 3 of the EA page 21, Alternative-Proposed Action under "Direct and Indirect Effects," which states that the continuity of fuels within the project area is broken up along boundaries, private land, major ridges and wilderness boundaries, thus creating contiguous blocks of treated ground over the landscape. Chapter 2 of the EA page 6 addresses the gap issue in treatments and is clarified by timing of treatments, which is based on low fire hazard acres being treated sooner as opposed to unsuitable conditions on acreage that would need mechanical treatment prior to prescribed burning.

<u>Objection Statement #5:</u> The objector would like this project to be burned rather than harvested (Objection #006). He states that "[t]hinning, handpiling and burning might be appropriate within 300' of private land" (Objection #006). He continues by stating that he would like to this scenario analyzed as well as "the economics of the various proposals" (Objection #006).

RESPONSE 5: An analysis of the economics of the proposal is in Chapter 3 of the EA on pages 214-225.

An all burning alternative was discussed in Chapter 2 of the EA page 2. Since one of the problems identified in the Canyon Creek WUI was the buildup of fuels and tree overstocking due to the lack of periodic burning, one idea was to reintroduce fire across most of the planning area. After consideration, this alternative was dropped from detailed consideration. It was decided that many areas within the WUI are so overstocked with trees, contain ladder fuels, and have enough of a surface fuel buildup that the reintroduction of fire would be risky until these conditions can be modified with mechanical treatment.

<u>Objection Statement #6:</u> Objection points listed below in bold, directly prior to specific responses.

RESPONSE 6:
The objector states that the "project violates the HFRA so the Forest Service must use the regular NEPA process" (Objection #007 p. 3). More specifically, ONRC states, "HFRA was a compromise that only authorizes fuel reduction in limited circumstances, such as when the forest plan does not need to be amended and using approved methods of fuel reduction" (Objection #007 p. 3). However, the objectors assert that "shelterwood logging (page 9) does not even mention fuel reduction or fire hazard reduction" and the "Forest Service cannot stretch the HFRA glossary definition beyond reason to include regen harvest as an appropriate fuel reduction tool" (Objection #007 p. 4; Objection #008 p. 5)).

The HFRA Interim Field Guide (2/2004) states on page 9 that projects must be consistent with the applicable resource management plans and they must be on lands managed by the USDA Forest Service. The guide further states that proposed actions not consistent with the plan must be covered by a plan amendment. This direction is being followed so no violation exists.

The glossary definition of shelterwood logging uses the phrase "various methods" and goes on to state examples. The glossary does not state or imply that these examples are all inclusive.

Reasons why logging methods (such as shelterwood harvest) regen are not an appropriate tool are:
1) "Regen harvest results in forest conditions that are more hazardous than doing nothing. Shelterwood harvest will result in forest conditions that are hotter, dryer, and windier than other treatments or no action" (Objection #007 p. 4; Objection #008 p. 5).

Chapter 3 of the EA page 24 discusses concerns about raised fire risk. Peterson (2004) and Agee (2005) are cited for information on increased surface air movement and drying. With effective post-activity fuel treatment, the thinning provides an overall reduction in fire behavior. Chapter 3 of the EA page 24 describes how benefits of reduced fire severity outweigh increased wind speed.

2) "Regen harvest, with or without replanting, will also result in the establishment of a dense growth of young trees that are one of the most hazardous types of forest structure because they provide a nearly continuous bed of resinous fuel close to the ground" (Objection #007 p. 5; Objection #008 pp. 5-6).

Chapter 2 of the EA page 9, explains that shelterwood harvested areas would be planted in understocked areas. This would be completed using desirable tree species. Chapter 2 of the EA page 6 addresses prescribed burning in the project area, both now and in the future. Chapter 3 of the EA pages 21-22 states that a "prescribed burning program into the future will be needed to maintain the desired fuel levels and limit regeneration from becoming a ladder fuel concern as well as a stand density concern." The Forest Service will address this issue by using prescribed burning to maintain fuels at desired levels.

3) "Regen harvest creates large amounts of hazardous logging slash that is never full [sic] treated" (Objection #007 p. 6; Objection #008 p. 6).

Chapter 2 of the EA pages 6-7, addresses the need for mechanical treatment, pile and burning, and prescribed fire where fuel loadings already permit. As parts of the proposed action, these treatments are fully intended to be implemented. Monitoring (a required component of this project) will determine the success rate of this action (Chapter 2 of the EA pages 32-33).

4) "Opening up closed forests through selective logging can accelerate the spread of fire through them" (Objection #008 p. 5).

Chapter 3 of the EA pages 21-22 explains that a short term increase in fire hazard will exist prior to slash treatment but there will be a long term beneficial effect on altering fuel structure and wildfire behavior.

5) "[Fuel reduction activities…inevitably function to disturb soils and promote the invasion and establishment of non-native species" (Objection #008 p. 5).

Chapter 3 of the EA pages 174 – 180 addresses the existing occurrence of noxious weeds and measures that will be employed to minimize the spread of these populations and the eradication of some populations. Chapter 3 of the EA page 175 addresses the regulatory framework and compliance with the Invasive Species ROD, 2005.

Objectors believe that "[t]o comply with HFRA, the Forest Service can either drop the shelterwood, shift to a more effective thinning treatment…or prepare a new NEPA analysis with a full range of alternatives and a full public involvement process" (Objection #007 p. 6; Objection #008 p. 6). The objectors state that "HFRA only grants authority to remove 'hazardous fuels' (HFRA §6512(a))," therefore, the Forest Service violates HFRA by removing "larger fire resistant trees" (Objection #007 p. 7; Objection #008 p. 6).

HFRA Interim Field Guide (2/2004) pages 28-29 states that treatments are to focus on small diameter trees. Also stated is direction to maximize the retention of large trees. However the Interim Field Guide also emphasizes that large tree retention requirement must not prevent agencies from reducing wildland fire risk. Chapter 2 of the EA page 8, states that all live trees over 21 dbh would be retained, except where removal is necessary for safety or to construct temporary roads and landings. These actions meet the HFRA direction.

The intent of the thinning is to leave the largest diameter trees. Chapter 2 of the EA page 8 states "This prescription would thin small/medium size trees (7 to 20.9" DBH) in immature forest stands by thinning from below to reduce stocking levels to reduce canopy fuels, enhance individual tree growth, and to allow for the reintroduction of fire. Thinning from below means the majority of the trees to be cut are in the smallest diameter sizes (9 to 13" DBH) and relatively few trees would be cut in the medium diameters (14 to 20.9" DBH)."

The objectors state, "The EA failed to disclose consistency with substantive requirements of HFRA" (Objection #007 p. 10).

The finding of consistency with appropriate management direction, laws and regulations will be addressed in the decision document. This is a required element of the decision document, "Findings Required by other Laws and Regulations," and it will address consistency with HFRA. The objector is correct that a Finding of No Significant Impact will have to address "context and intensity" (40 CFR 1508.27) as well as several other appropriate laws and regulations. Findings and Disclosures, Chapter 3, pages 234 to 237 of the EA, responds to the majority of the laws and regulations that need to be carried forward in to the decision notice.

The objectors point out that "HFRA only authorizes projects that are consistent with the forest plan" and "[t]his project calls for four forest plan amendments" (Objection #008 p. 6).

This has been addressed in the opening paragraph of this response.

<u>Objection Statement #7:</u> "The EA admits that home ignition is caused by direct contact with flames, radiant heat, or firebrands. Firebrands are the longest distance threat and they can only go 1 km (EA p 8), so any fuel treatments in this project further than 1 km from homes is not reducing 'hazardous fuels' so the [sic] are not authorized by the HFRA" (Objection #007 p. 7).

RESPONSE 7: In the Healthy Forest Initiative & Healthy Forest Restoration Act (Interim Field Guide) February 2004 page 15 under "Wildland Urban Interfaces Within or Adjacent to At-Risk Communities" the act encourages the development of a community wildfire protection plan under which communities designate their WUI areas, where HFRA projects may take place. Chapter 3 of the EA page 7 and 8, when read in its entirety, addresses the distance and need for treatment. Treatments further than 1 km from structures are effective because fuels reduction and thinning will decrease probability of ignition and fire intensity, thereby increasing the ability of firefighters to protect life and property.

<u>Objection Statement #8:</u> The objectors point out that this project reduces big game cover to below 25% of each subwatershed (Objection #007 p. 7; Objection #008 p. 6). However, "[t]he EA does not disclose which logging units this modification facilitates" (Objection #007 p. 7; Objection #008 p. 6). The objectors also point out that this project "eliminates 2 and 10 acre unit size limitations for regen harvest in foreground and middleground visual corridors respectively" (Objection #007 p. 7; Objection #008 p. 6). They argue, "Waiving big game cover and visual corridor protections will both allow more logging and shift the

balance between fuel reduction objectives and other important resource objectives" (Objection #007 p. 7; Objection #008 p. 6).

RESPONSE 8: The purpose of the proposed project is to protect lives and property. This will be accomplished by moving the vegetation towards historical conditions. Historical vegetation conditions or historical range of variability are desirable objectives, but site specific Forest Plan amendments are needed for this project to also accomplish important fuel reduction goals. Chapter 2 of the EA page 17 discusses the proposed Forest Plan amendment related to reducing satisfactory and total cover below existing Forest Plan Standards and Guidelines. There are many references to modification of the proposed project to protect Big Game and migratory corridors. A Forest Plan amendment is proposed to remove the limitations on harvesting in visual corridors for this project, Chapter 2 of the EA pages 18 - 19. Page 9 of the HFRA Interim Field Guide identifies that if the proposed project is not consistent with current plans that a plan amendment or site specific plan amendment can be used.

Objection Statement #9: The objectors assert that "the Forest Service must explain how they are maintaining and restoring old-growth forests when habitat for old-growth species [such as goshawks, Pileated woodpeckers, and pine marten] is being degraded" (Objection #007 p. 8).

RESPONSE 9: Chapter 3 of the EA page 73 describes that shifting stands from old forest multiple stratum towards old forest single stratum would reduce habitat for old growth canopy dependant species such as pileated woodpeckers, and pine marten, while improving habitat for white-headed woodpeckers and flamulated owls. This shift in species would be consistent with moving stands towards historic vegetation conditions. As described in the EA, the Forest's network of dedicated old growth would continue to maintain populations of marten and pileated woodpeckers. Chapter 3 of the EA pages 95 and 96 discuss effects of the proposed action alternative related to goshawk territories and PFAs. The reduction in goshawk nesting habitat is tied to reducing understory cover and opening up stands, which would shift stands towards historic conditions. Therefore the EA does describe the effects of the project on the old growth network of the Forest.

Objection Statement #10: "It is arbitrary and capricious to shift from older late-seral community to younger early seral community when HFRA requires the Forest Service to fully maintain and restore old-growth" (Objection #007 p. 8).

RESPONSE 10: The HFRA Interim Field Guide (2/2004) page 25-29 states that treatments are to focus on small diameter trees. Also stated is direction to maximize the retention of large trees. However, it is emphasized that large tree retention requirements must not prevent agencies from reducing wildland fire risk, etc. This being stated, Chapter 3 of the EA page 55 explains that the stands dominated by late seral species trees are planned for shelterwood treatments. The shelterwood treatments would remove many of the late-seral species trees from stands, retaining the early-seral species that are there, and reforesting openings with early-seral species. This will shift the species composition closer to the historic composition. Treated stands would be more adapted to the natural disturbances that exist, increasing the overall resiliency to natural disturbances, and thus meeting the direction of the Healthy Forest Restoration Act. The analysis of the effects to old growth offers a reasoned explanation for the shifting seral stages.

<u>Objection Statement #11:</u> The objectors state that the Forest Service must disclose how this project is part of an "Annual Program of Work" (Objection #007 p. 8). They state, "This project is intended to protect only 40 homes within the project area. The same amount of work could protect hundred of homes if conducted in more densely populated and higher priority areas" (Objection #007 p. 8). Additionally, the Grant County Community Wildfire Protection Plan "notes that the Canyon Creek area does not meet HFRA interface or intermix WUI requirements" (Objection #008 p. 7). There is no rationale for choosing this project over other WUI projects (Objection #008 p. 7).

RESPONSE 11: The Canyon Creek Fuels Hazard Reduction is one of three federal projects listed in the Grant County Community Wildfire Protection Plan (page 19). It is a priority 2 project, listed for action in 2005 – 2007. This project does not preclude the Forest Service from proposing projects in the other areas. The highest rated one was not on the Malheur National Forest. The objectors are incorrect in stating that the Grant County Community Wildfire Protection Plan "notes that the Canyon Creek area does not meet HFRA interface or intermix WUI requirements". Rationale for choosing this project is listed in Chapter 3 page 4 of the EA in the fuels report. It discusses already ongoing projects by landowners and the fact that the majority of untreated land within and adjacent to the project is Forest Service and the greatest threat to life and property in on these untreated lands. The Forest Supervisor will document his rationale for a decision when he signs a decision document for this project.

<u>Objection Statement #12:</u> "The failure of Canyon Creek project and Grant County to meaningfully include private lands fuels reduction, including the creation of defensible space around all dwellings and structures, calls into question the legitimacy of the claimed need and landowner interest in this project" (Objection #008 p. 8).

RESPONSE 12: Interim Field Guide, page 9, states in part that all proposed HFRA actions must be on lands managed by the USDA Forest Service. Additionally, Chapter 1 of the EA page 3, states that "a number of private landowners…have already initiated projects…to reduce fuels and overstocked stands." Chapter 2 of the EA page 15 discusses a special use permit that would be issued to a private landowner for road construction. This access would allow the landowner to do vegetation treatments and timber harvest on his property to reduce fire hazards and to improve forest health. These actions would complement treatments on both private and National Forest Lands. These actions show community effort in meeting the HFRA objectives on all lands.

<u>Objection Statement #13:</u> "This project will have significant impacts and requires preparation of an EIS" (Objection #007 p. 8; Objection #008 p. 10). The significant impacts are:

- **habitat manipulation and soil disturbance**
- **complex and conflicting objectives**
- **degradation of roadless values adjacent to the wilderness area**
- **steep slopes**
- **ESA listed steelhead**
- **degrade goshawk habitat**
- **degrade large snag habitat in both the short- and long-term**
- **cumulative effects of roads will likely violate soil standards**
- **amendment to disregard big game cover requirements**
- **violation of road management requirement in PACFISH and the forest plan**

- **maintaining small old-growth allocations is inconsistent with current science that calls for restoring landscape characteristics to within the historic range of variability (Objection #007 p. 9; Objection #008 p. 10).**

RESPONSE 13: The analysis of effects will be considered when the decision maker decides whether to make a finding of no significant impact at the time the decision is made.

Objection Statement #14: **Objection points listed below in bold, directly prior to responses.**

RESPONSE 14:

The objectors argue that the proposed action will "reduce large snag habitat both in the short-term and the long-term," which "violates the east side screens' requirement that all vegetation management projects move toward the historic range of variability" (Objection #007 pp. 7 and 10; Objection #008 p. 11). Additionally, the "EA admits that this project will reduce snag habitat and goshawk habitat (EA pp 35, 36)" (Objection #008 p. 7).

Also, this project violates HRFA because "snags are a critical component of old-growth forests and HFRA authorized projects are required to fully maintain and restore old-growth" (Objection #007 p. 10, also see Objection #008 p. 7).

"The EA also fails to disclose that the federal lands might need to provide more than a proportional number of large snags in order to mitigate for the fact that large snag habitat is not being adequately provided on non-federal lands" (Objection #007 p. 12).

"The EA is inconsistent – admitting on page 35 that biologically valuable large snag habitat will be degraded by the proposed action, while stating on page 55 that 'development of old forest structures will accelerate" (Objection #007 p. 11).

The Eastside screens do not require that "all vegetation management projects move toward historic range of variability". As stated in Scenario A page 9, if one or both of the late and old structural stages falls below HRV in a particular biophysical environment within a watershed, there should be no net loss of Late and Old Structural (LOS) from that biophysical environment. Furthermore, no timber harvest activities should occur within LOS stages that are below Historical Range of Variability (HRV).

Under Scenario B on page 13, within a particular biophysical environment within a watershed, if the single, existing late and old structural stage is within or above HRV or if both types of LOS stages occur and both are within or above HRV, then timber harvest can occur within these stages, as long as LOS conditions do not fall below HRV. It then follows with: Enhance LOS structural conditions and attributes as possible, consistent with other multiple use objectives.

Chapter 3 of the EA pages 90 - 94 discusses snags and primary cavity excavators. Table WL - 6 identifies snag densities post-treatment and in 50 years. It identifies that snags 10-20" dbh would increase by 0.2 snags/acre, and >20" dbh would decrease by 0.1 snags/acre post-treatment. Overall snags would increase by 0.1 snags/acre over current conditions. For long term effects, the same table identifies that snags 10 - 20" dbh would increase by 1.1 snags/acre and snags > 20" dbh would increase by 0.9 snags/acre. This is moving towards forest plan standards, while providing increased assurance that the vegetation and stand components are sustainable and resilient to disturbance.

See objection #9 for a discussion of issues related to goshawk habitat.

"Furthermore, the forest plan snag standards are no longer scientifically defensible and the Forest Service has not yet developed new snag habitat standards pursuant to valid NEPA and NFMA procedures" (Objection #007 p. 10).

"The EA (p 88-89) is inconsistent and misleading because it refers interchangeably to forest plan requirements for snag habitat (which are being met, but the EA fails to disclose that they are outdated) and the snag habitat requirement of the eastside screens (which are not being met). The EA also relies on Matz 1927 as evidence that the current low levels of snags are adequate, but the EA fails to disclose that the Matz data are a mere snapshot in time and do not represent the range of snag habitat conditions that encompass the full range of historic variability" (Objection #007 pp. 11-12).

The Forest Plan snag standards and guidelines as amended by the Eastside Screens are still applicable until modified. Page 11 of the Eastside Screens allows for use of the best available science through models or other documented procedures to provide snags for 100 % potential population levels of primary cavity excavators. DecAID was considered and used in the wildlife specialist's report to determine what tolerance levels of snags were being provided currently and post-implementation, and discussed the historic and current ability of the vegetation to provide snags. All studies and information, including DecAID is a snapshot in time. The data from Matz 1927 was used because of the proximity to the proposed project.

<u>Objection Statement #15:</u> "The EA fails to disclose the cumulative impacts of the alternate snow-mobile routes that will be created when log hauling occurs on snowmobile trails in winter" (Objection #007 p. 11; Objection #008 p. 11).

RESPONSE 15: Chapter 2 of the EA page 29, Design Elements, addresses snowmobile trails that are co-located on haul routes. Plowing and use of these roads for harvest activities during the winter recreational season will be coordinated in advance with the forest recreation specialist, the sale administrator and the local snowmobile club. The objective of coordination will be to ensure safety and provide a continuous alternate route for snowmobile use when possible. The environmental analysis will be edited to expand discussion of snowmobile routes, including alternative routes and potential impacts (direct, indirect, and cumulative).

<u>Objection Statement #16:</u> The objectors believe that "[c]umulative impacts to wildlife species from past logging and road building are extensive and significantly severe across much of the area" (Objection #008 p. 9). They continue, "Our organization provided information during comment periods concerning this, and offered to help develop project design and answer agency questions, however we were never contacted by the agency about these serious issues" (Objection #008 p. 9)

RESPONSE 16: The wildlife section of Chapter 3 of the EA pages 62-111 and Appendix G of the EA discuss direct, indirect, and cumulative effects in sufficient detail to make an accurate determination of effects or impacts from both the proposed project, and cumulatively over time.

While the Oregon Chapter Sierra Club did provide written comments, and offered their cooperation and help in developing the proposed project, it does not appear that they involved themselves in the collaborative efforts of the Forest. The Forest Service afforded the opportunity to participate, and the Sierra Club chose not to until the public scoping and objection period (Letter to public February 23, 2005).

A Forest Service employee returned a phone call from one of the individuals. She asked him to come to the collaboration meetings and expressed surprise that he had not attended any collaboration meetings. He still expressed his desire to be involved with the scoping process, but did not have time to get involved with this project at the time of the call. (Conversation Record, September 6, 2005, Linda Batten). Comments from the scoping letter were considered in developing the proposed action. The responses received are on file in the project record. Similar comments from different responders were combined and are listed in Appendix E of the EA. Included in this list are the different ways that these comments were resolved and/or addressed within the document.

Objection Statement #17: The "EA fails to analyze the effect of continued future grazing which will reduce palatable fine fuels like grasses and shift the plant community toward less palatable shrubs and trees which are more hazardous as ladder fuels" (Objection #007 p. 11).

RESPONSE 17: This will be clarified in the revision of the EA in the cumulative effects section of fuels or range reports.

Objection Statement #18: "The EA analysis of crown base height (EA p 25) fails to disclose and consider that in shelterwood units the average crown base height will decrease significantly" (Objection #007 p. 11).

RESPONSE 18: Chapter 3 of the EA page 22 discusses how a prescribed fire program in the future requires further NEPA documentation. Further treatments will be needed to maintain the desired fuel levels and limit regeneration from becoming a ladder fuel concern as well as a stand density concern.

Objection Statement #19: "The analysis of crown fire initiation potential (EA p 25) fails to disclose how much of the benefit is from treatment of surface and ladder fuels versus canopy fuels" (Objection #007 p. 11).

RESPONSE 19: The EA cites (Graham et al. 2004)(Peterson 2004) & (Agee 2005) in Chapter 3 of the EA page 24 under "Ladder and Crown Fuels" addresses the benefits and the concerns of fuel treatments on surface and ladder fuels and removing canopy level trees which may increase the risk of fire.

Objection Statement #20: The objectors assert that "the EA fails to analyze whether some of the mixed conifer forest might be appropriately retained as part of a mesic mixed conifer landbird conservation effort" (Objection #007 p. 12).

RESPONSE 20: Chapter 3 of the EA pages 99 - 100 discuss landbirds analyzed, and identified that only habitats being effected by the proposed project are being addressed. Since mesic mixed conifer is not addressed, it is not being affected by the proposed project. Throughout the EA, it is identified that Alternative 2 would move stands within the watershed towards historic vegetation conditions, and historically these mesic mixed conifer sites had a limited and patchy distribution across the landscape.

Objection Statement #21: "The FS deferred to the county's general broadbrush plan, failing to conduct NEPA required site-specific analysis and accurately assess actual fuels continuity and potential for fire-spread from upland lightening strikes to residences below" (Objection #008 p. 8).

RESPONSE 21: The Grant County Community Wildfire Protection Plan is the plan that meets the requirements of the HFRA page 34 "Developing Community Wildfire Protection Plans". On page 33 Section 101(3) of the HFRA act describes a Community Wildfire Protection Plan (CWPP) as one that identifies and sets priorities for areas needing hazardous fuels reduction treatment and recommends the types of treatment on Federal and non-Federal lands that will protect one or more communities and their essential infrastructure. This EA is the site specific analysis that accurately assesses actual fuels continuity and potential for fire-spread. This is covered in the fuels report in Chapter 3 of the EA pages 4-28.

Objection Statement #22: The objectors believe that "[b]asal area formulas utilized to determine logging markings are inaccurate for this area" because the "formulas would further reduce mature-sized fire resistant trees" (Objection #008 p. 9). "This commercially motivated reduction of historical stand composition and density violates HFRA provisions" (Objection #008 p. 9). Also this project does not comply with HFRA provisions because it "would leave far too many fire-prone small diameter trees, ladder fuels, and thickets" (Objection #008 p. 9).

RESPONSE 22: The HFRA Interim Field Guide (2/2004) pages 25-29 states that treatments are to focus on small diameter trees. Also stated is direction to maximize the retention of large trees. However it is emphasized that large tree retention requirements must not prevent agencies from reducing wildland fire risk, etc. Chapter 2 of the EA page 7 explains: 1. Crown or canopy fuels would be reduced primarily by commercial thinning (when too dense) and shelterwood treatments (where tree species are not suitable or sustainable) and 2. Ladder fuels would be reduced by commercial and non-commercial thinning treatments and understory removal. The trees cut would vary in size from medium to smaller diameters. The intent of the thinning is to leave the largest diameter trees. Chapter 2 of the EA page 8 states "This prescription would thin small/medium size trees (7 to 20.9" DBH) in immature forest stands by thinning from below to reduce stocking levels to reduce canopy fuels, enhance individual tree growth, and to allow for the reintroduction of fire. Thinning from below means the majority of the trees to be cut are in the smallest diameter sizes (9 to 13" DBH) and relatively few trees would be cut in the medium diameters (14 to 20.9" DBH)." This alternative description clearly emphasizes the removal of smaller diameter material and thinning of species to sustainable densities or removal when not suitable or sustainable. This meets the direction of the Healthy Forest Restoration Act.

Objection Statement #23: The objectors allege the project violates road management requirements in PACFISH and the forest plan. (Objection #007 p. 8; Objection #008 p. 10).

The roads report does not list the one new segment of road that accesses the private land. A discussion of this road should be included in the roads report. The EA will include a statement that a road management plan as outlined in PACFISH (RF-2) is available for all existing or planned roads.

A roads analysis is required when a permanent road is built. 200 feet of road is proposed to access private land. Chapter 3 of the EA page 208 - 209 details the roads analysis process completed by the Blue Mountain Ranger District staff.

By copy of this letter, I am instructing District Ranger Brooks Smith not to proceed with issuance of a Decision Notice for this project until the issues identified in Objections Statements #2, #15, #17, and #23 are addressed in the EA. There will be no further review of this response by another Forest Service or USDA official.

Sincerely,

/s/ Liz Apgaoa (for):
JIM GOLDEN
Deputy Regional Forester

cc: Brad Siemens
Carole Holly
Brooks Smith
Gary Benes

United States Department of Agriculture

Forest Service

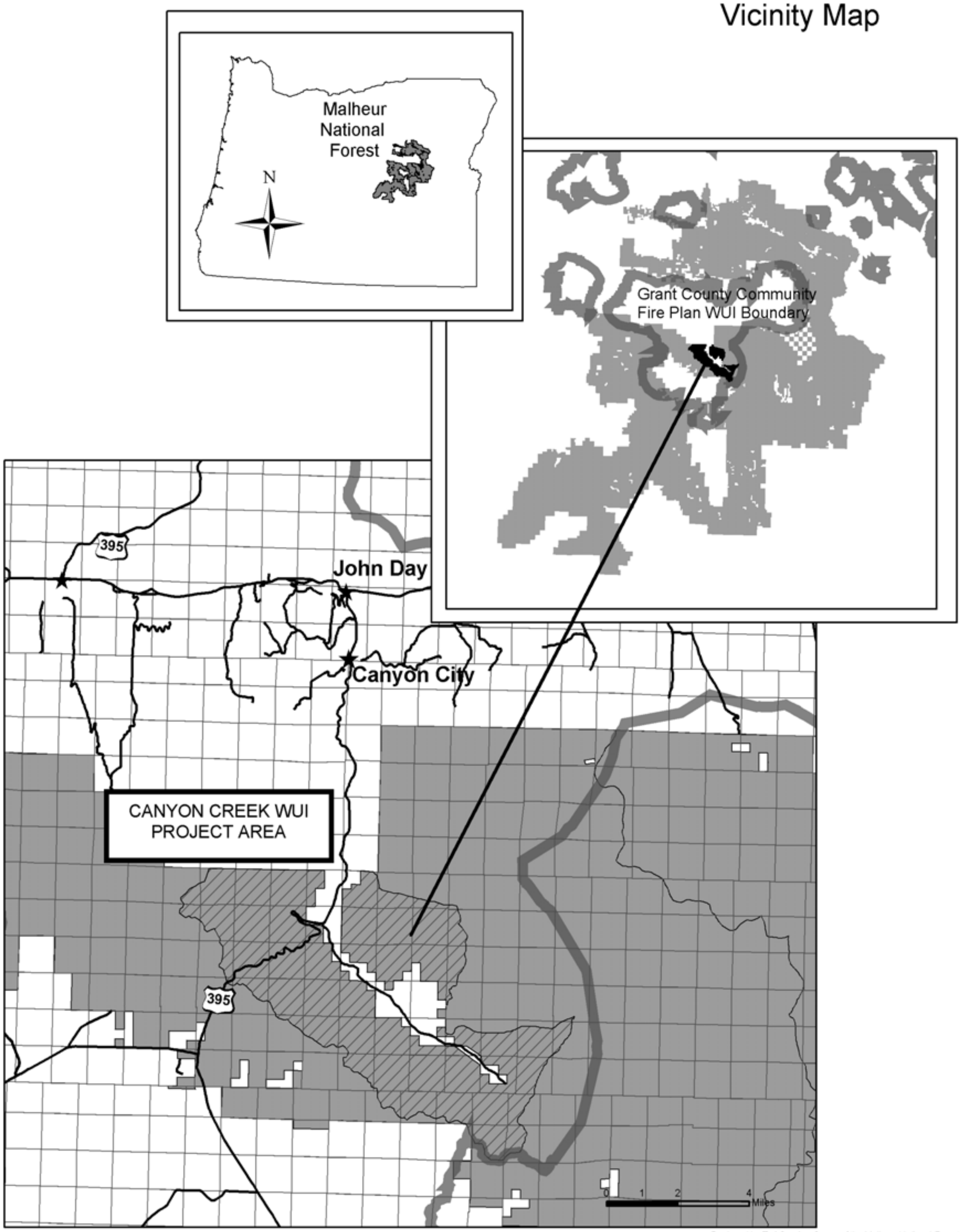
Malheur National Forest
Blue Mountain Ranger District

Canyon Creek WUI Fuels Reduction Project

Environmental Assessment

July 2006

CANYON CREEK WUI
Vicinity Map



Produced by Teri Corning-Sevey of the Malheur National Forest
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TABLE OF CONTENTS

CHAPTER 1 – PURPOSE AND NEED

Introduction

The Canyon Creek Wildland Urban Interface Project is designed to reduce hazardous fuels in a portion of the Wildland Urban Interface (WUI) that was designated by the Grant County Community Fire Protection Plan.

The project area encompasses approximately 22,700 acres 10 miles south of Canyon City, Oregon on the Blue Mountain Ranger District of the Malheur National Forest (see the Vicinity Map located before the Table of Contents and Map 1 in Appendix B.)

Fire suppression, vegetation growth, partial overstory removal harvests, and insect and disease mortality has resulted in an accumulation of fuels and unacceptable fire hazard to private and public lands. This project proposes to reduce these fuels by a combination of thinning, timber harvesting, slash removal treatments, and prescribed burning. This document is the result of local collaboration, public participation, and interdisciplinary design. Mitigation measures are provided for cultural or historical sites, soil, water, fish, wildlife, range, native plants and trees, scenery, and recreation.

This Environmental Assessment (EA) is being prepared under guidelines contained in the Healthy Forests Restoration Act (HFRA). The HFRA directs Federal agencies to prepare EA's utilizing the collaborative process to implement local community fire protection plans.

Relationship to the Forest Plan

This EA tiers to the Malheur National Forest Land and Resource Management Plan Final Environmental Impact Statement and Record of Decision (1990) and incorporates by reference the accompanying Land and Resource Management Plan (LRMP, also called the Forest Plan)(1990), as amended. Amendments include, but are not limited to, the Regional Forester's Forest Plan Amendment No. 2 (USDA 1995a) and the Interim Strategies for Managing Anadromous Fish-producing Watersheds in Eastern Oregon and Washington, Idaho, and Portions of California (PACFISH, USDA 1995b). The project identified in this EA is being proposed to meet appropriate Forest-wide goals and standards (pages IV-1 to IV-45) and to comply with Management Area goals and standards (pages IV-46 to IV-139) of the Forest Plan.

Healthy Forests Restoration Act (HFRA)

The Healthy Forests Restoration Act of 2003 (HFRA) was signed into law on December 3, 2003. The purpose of the Healthy Forest Restoration Act is to improve the capacity on Federal lands to plan and conduct hazardous fuels reduction projects aimed at protecting communities, watersheds, and certain other at-risk lands from catastrophic wildfire, to enhance efforts to protect watersheds and address threats to forest and rangeland health, including catastrophic wildfire, across the landscape. The Canyon Creek WUI Fuels Reduction Project qualifies under *Title 1 - Hazardous Fuel Reduction on Federal Land* of the HFRA. The project is an Authorized Hazardous Fuels Reduction Project as described in Section 102 of the HFRA because it is consistent with the *Implementation Plan for the 10-Year Comprehensive Strategy* and is on Federal lands within a wildland urban interface area identified in a community wildfire protection plan.

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

To expedite authorized projects, HFRA requires collaborative planning. It also contains provisions that streamline the environmental review of a project. These provisions include: limits on appropriate alternatives that may be considered; and internal, administrative review of any objections to a project before a decision is made to approve it or carry it out (as opposed to post-decision appeals).

HFRA, Section 102 (e), states that…"if the management direction in a resource management plan (Forest Plan) for an old growth stand was established before December 15, 1993, that HFRA covered projects shall fully maintain, or contribute toward the restoration of, the structure and composition of old growth stands according to the pre-fire suppression old growth conditions characteristic of the forest type, taking into account the contribution of the stand to landscape fire adaptation and watershed health, and retaining the large trees contributing to old growth structure." And, review management direction for covered HFRA projects, taking into account any relevant scientific information made available since the adoption of the management direction; and amend the management direction to be consistent with pre-fire suppression old growth conditions, if necessary to reflect relevant scientific information. Consistency with this direction is addressed in the Forest Vegetation section of Chapter 3 in this document.

Grant County Community Fire Protection Plan

The Grant County Community Fire Protection Plan was developed by County citizens, fire districts, county staff or elected officials, State Forestry officials, and agency representatives. The Grant County Community Fire Protection Plan's objective is to reduce the risk of forest fire to life, property, and natural resources in the County. The Grant County Court, Fire Defense Board, and Oregon Department of Forestry approved the plan in June and July of 2005.

The Grant County Community Fire Protection Plan Wildland Urban Interface (WUI) boundary is based on the actual distribution of structures and communities adjacent to or intermixed with national forest lands. This project is within the Plan's defined WUI boundary and is displayed on the Vicinity Map. The Canyon Creek WUI project is included in the Grant County Community Fire Protection Plan Action Plan. It is a high priority of the Grant County Court to reduce the fire hazard in this area. The management objectives as stated in the Plan, are to provide a safe and effective area for fire suppression activities as well as enhance fire suppression capabilities by modifying potential fire behavior inside the urban forest intermix zone.

In cooperation with the Oregon Department of Forestry a number of private landowners in the Canyon Creek area have already initiated projects on their lands to reduce fuels and overstocked stands.

Location and Setting

The proposed project is located in Grant County, Oregon, approximately 10 miles south of Canyon City. See the Vicinity Map for the location and extent of the project area. The legal description is:

T.16S. R.32E. Sections 10, 11

T.15S. R.31E. Sections 1-17, 21-27, 36

T.15S. R.32E. Sections 5-9, 15-18, 20-22, 25-35

The project area is part of the Canyon Creek drainage which is a tributary to the John Day River system. There are approximately 40 residences within the project area, primarily in the lower elevations along Canyon Creek. The Strawberry Wilderness lies to the north and east of the project area, large areas on the east end of the wilderness have burned in recent years and the Strawberry Mountains are known for frequent lightning strikes. Every year there are several small wildfires ignited by lightning and are usually rapidly suppressed. Nearby fires in recent history that have escaped initial attack are the 636 acre Scalp Fire in 1986, the 600 acre Table Mtn. Fire in 1988, the 230 acre Cabin Fire in 1994, the 1,100 acre Wildcat Fire in 1996, and the 7,000 acre Flagtail Fire in 2002.

Purpose and Need for Action

Purpose - This project is being proposed to protect lives and property within the rural/urban community interface adjacent to National Forest lands.

Need – To provide protection there is a need to remove hazardous fuels from the area and manage forest vegetation to reduce the risk of uncharacteristic, severe fire moving from the Forest into private property. Decades of management that has included harvest of fire resistant large ponderosa pine and suppression of natural fires has resulted in forest conditions that are unlike historic conditions. Trees are crowded close together, small trees provide fuel ladders into the crowns of larger trees, and woody debris has built up on the forest floor. Unhealthy forest conditions are manifested in numerous bark beetle caused pockets of tree mortality, extensive defoliations by insects in recent decades, and elevated levels of dwarf mistletoe in both Douglas-fir and ponderosa pine.

Extensive local level collaboration was conducted consistent with the Implementation Plan during development of the Proposed Action. Private landowners have already begun the process of treating their adjacent lands to reduce the fire danger and improve forest health in co-operation with the Oregon Department of Forestry. Because of the close proximity of different land ownerships it is important that all parties act together to reduce the fire hazard to homes in the Canyon Creek WUI. This project is designed to complement the treatments that have already been completed and to encourage future projects on private lands.

The vegetation treatments proposed are designed to increase the forest health and reduce the fire hazard (including surface fuels, ladder fuels, and crown fuels) within the wildland and urban interface. Treatments are designed to reduce the chance of surface fire becoming a crown fire and a small fire becoming an uncharacteristic severe wildfire. A mix of commercial cutting treatments to primarily treat crown fuels, precommercial thinning to treat ladder fuels, and piling and burning and/or underburning to treat surface fuels are recommended on a site specific basis depending on the current conditions, the biophysical environment, and location.

Existing Condition

The Canyon Creek Watershed Analysis, 2003, found that the current vegetative conditions are a combined result of management practices, the most important being fire suppression and selective logging. The composition, structure, and functioning of the forest vegetation has changed over the last century.

Private lands within the planning area contain a mix of residential homes, outbuildings, and forestlands. Some of the forestlands serve as wooded reserves and parks near homes; other forestlands are managed for commercial timber products. All have value for the landowners and many of them have taken steps to improve the health and reduce the fire hazard of their holdings by thinning crowded stands and reducing ground fuels. They have expressed concern that the National Forest lands also be similarly managed near their lands to increase public health and safety.

On the National Forest lands, both the tree density and the proportion of fire intolerant fir species have increased from historical conditions. The lack of periodic fire and harvesting of large ponderosa pine has resulted in denser, younger, often multi-layered stands of trees that are composed of more fir trees and fewer pines and larches than historically occurred. Surface fuels have increased and are more continuous at these increased loadings across the landscape than were historical conditions. Increased surface fuel loadings increases the potential flame length of a fire thereby increasing the chance of a surface fire moving into the crowns. The smaller understory trees and the lower branches of larger fir trees to provide "ladder fuels", further enabling wildfire to move into the tree crowns and increasing the probability for an active crown fire.

Surface Fuels

The fuel loading is approximately 16 tons per acre, with half or more of this fuel loading being in the 3"+ DBH size class. Litter and duff accumulations are higher than those which historically accumulated. The fuel loading is not consistent with the forest types and fuel loads of Fire Regime 1, the frequently occurring surface fires that historically maintained low fuel loadings.

Ladder and Crown Fuels

The tree canopy is multi-layered and interlocking in many areas, which is not characteristic of historic conditions in the hot dry and warm dry forests. Canopy base height, canopy bulk density, and canopy continuity are key characteristics of forest structure that affect the initiation and sustainability of crown fire. Crown fires are generally considered the primary threat to ecological and human values. Canopy base height is currently low, with many trees providing fuel ladders into the upper crowns. In an uncontrolled fire situation, crown torching would be frequent in many areas. Crown bulk density, the weight of tree crowns over an area, is currently moderate to high. These conditions could result in fire that is difficult to suppress, and which would pose the greatest threat to life and property.

Expected Fire Behavior

Wildfire would burn as a stand replacing crown fire, with high rates of spread and severity to the vegetation and the soils. The dense stands of trees provide a continuous path for crown fire to spread across long distances. Fires would have long spotting distances and would show high resistance to control. The potential danger to fire fighters would necessitate using indirect methods that would increase the area burned and restrict the ability to safely protect private property, major access routes, and public safety. In most of the project area, natural fire occurrence under these conditions cannot be managed for resource benefit.

Desired Condition

Both private and publics forestlands are in a healthy condition that cumulatively present a low fire hazard to the mixed land ownerships.

The Canyon Creek Watershed Assessment, 2003, made several recommendations for the National Forest lands:

- Minimize risks of catastrophic wildfire and restore fire as a disturbance process.
- Restore stand structure to resemble historical range of variability.
- Minimize conditions that promote uncharacteristically severe insect and disease outbreaks.

Most of the forest stands would have a high proportion of ponderosa pine with lesser amounts of Douglas-fir. Grand fir and western larch would exist on the steeper north faces and be at lower levels elsewhere. Stands would be healthy with low levels of insects and disease such as bark beetles, defoliating insects, and dwarf mistletoe. There would be more single stratum stands and more stands with large trees. These conditions would be characteristic of stands in Fire Regime 1, a low severity, high frequency fire regime. Forested stands are in a condition that allows prescribed and natural fire to be used to maintain condition class 1 or 2 without the need for costly mechanical fuel treatments. Condition class is a classification indicating how much change there has been to vegetation and fuels compared to the historical or reference conditions characteristic of the natural fire regime.

Surface Fuels

The desired fuel loading that is consistent with the hot dry and warm, dry forest types and Fire Regime 1, is approximately 5 to 15 tons per acre, with half or more of this fuel loading being in the 3"+DBH size class of fuels depending on where in the natural fire cycle the area is. Duff accumulations would be relatively low.

Ladder and Crown Fuels

Canopy base height would be maintained at sufficient height from frequent low-intensity fires that only occasional torching would occur. Crown bulk density, the weight of tree crowns over an area, would be sufficiently low that even if surface flame lengths were high enough to reach the crown, fire would not spread in a stand replacing type of crown fire. The canopy would be open, more characteristic of historic densities in the warm dry forests.

Expected Fire Behavior

Fire intensity would be dependant on the fine fuels, grasses, pine needles and small down wood and would vary across the landscape. Fire would remain primarily as a surface fire, with high rates of spread but exhibiting low severity to the larger fire dependent trees and the soils. Fires would have short spotting distances, and would show much less resistance to control compared to a crown fire. Fire could be managed for resource benefit, if desired and appropriate.

Air Quality

Air quality impacts are generally short term from wood burning for home heating, prescribed burning other activities outside the area.

Proposed Action Overview

The Blue Mountain Ranger District of the Malheur National Forest is proposing fuel reduction treatments on approximately 8,000 acres of National Forest System Land in response to the purpose and need for action. Actions included in this proposal are:

- 7,040 acres of mechanical treatment (cutting of trees) and fuel treatment
    - 3,150 acres of commercial thinning and fuel treatment
    - 1,000 acres of understory removal and fuel treatment

- 1,010 acres of shelterwood regeneration and fuel treatment
- 1,880 acres of precommercial thinning and fuel treatment

- 3,000 acres of prescribed burning (there is about 2,000 acres of overlap with the above mechanical treatments)
- 2 miles of temporary road construction
- 86 miles of road maintenance commensurate with logging use
- A non-significant Forest Plan amendment that changes four standards:
  - Adjust MA-4a Boundaries
  - Reduce Satisfactory and Total Cover below Forest Plan Standards
  - Exchange Dedicated Old Growth Area (DOG) 236 and Replacement Old Growth (ROG) 236
  - Remove Limitations on Harvesting in Visual Corridors for this Project
- An alternative snowmobile route, if needed due to winter log haul along the 3925-196 road.
- Permit Mr. John Morris to build 200 ft. of ridge top new road accessing his property to enable him to reduce fuels and improve forest health on his lands.

Chapter 2 contains a complete description of the Proposed Action, specific design elements, monitoring requirements, and the four non-significant Forest plan amendments that are proposed to implement this project.

This Proposed Action was developed by Forest Service personnel in collaboration with interested individuals and groups. The proposal presented here is the final result of the 9 month collaboration process (see pages 7-10 for more information about the collaboration process). All figures are approximate. Note that there may be minor variations throughout this document due to rounding and differences in methodology used to generate maps and tables.

Management Direction and Guidance

Forest Plan Management Areas

The Forest Plan uses management areas to guide management of the lands within the Malheur National Forest. Each management area provides for a unique combination of activities, practices and uses. The goals and objectives and desired condition for each management area are summarized below, and their locations are shown in Map 2 in Appendix B. The Forest Plan (Chapter IV) contains a detailed description of each management area.

Land Allocations and Forest Plan Goals

General Forest-MA 1 and Rangeland-MA 2 (4180 acres) Emphasize timber and forage production on a sustained yield basis while providing for other resources and values.

Old Growth Habitat-MA 13 (600 acres) Provide suitable habitat for old growth dependent wildlife species, ecosystem diversity, and preservation of aesthetic qualities. Dedicated Old Growth (DOG) areas are to be managed to provide old growth characteristics for old growth dependent species. Replacement Old Growth (ROG) areas are to be managed to provide future old growth habitat. Fuels are to be managed to maintain or enhance old-growth habitat, and to protect old-growth from “catastrophic” wildfire.

Visual Corridor Foreground-MA 14F (2640 acres) and Visual Corridor Middleground-MA 14M (5330 acres) Manage corridor view-sheds with primary consideration given to their scenic quality and the growth of large diameter trees. Both the Highway 395 corridor and the Wilderness loop (County road 65 and Forest road 15) are sensitivity level 1 visual corridors. Forest Plan Correction #1 allows commercial thinning in visual corridors without a corridor management plan.

Anadromous Riparian Areas-MA3B/RHCA- (2480 acres) Manage riparian areas to protect and enhance their value for wildlife, anadromous fish habitat, and water quality.

Big Game Winter Range-MA4A (7390 acres) Maintain or enhance the quality of the winter range habitat for deer and elk through timber harvesting, prescribed burning, and other management practices. Manage for elk habitat by balancing cover quality and spacing, forage, and open road densities.

Forest Plan Amendments

Regional Forester Plan Amendment #2 – Revised Riparian, Ecosystem, and Wildlife Standards for Timber Sales – 1995

PACFISH – Interim Strategies for Managing Anadromous Fish-producing Watersheds in Eastern Oregon and Washington, Idaho, and Portions of California – 1995

Other Guidance for Management of the Project Area

This project is within the Grant County Community Fire Protection Plan, signed 2005, defined WUI boundary and is included in the Action Plan. The management objective as stated in the Grant County Community Fire Protection Plan is to enhance fire suppression capabilities by modifying fire behavior inside the zone and providing a safe and effective area for fire suppression activities.

The identification of this project within the Grant County Community Fire Protection Plan, places this project under the authority of the Healthy Forest Restoration Act (HFRA), signed 2003.

Public Involvement and Consultation

Coordination with Agencies, Communities, Native Groups and Others

The Canyon Creek WUI project has been listed on the Malheur National Forest Schedule of Proposed Actions since 2003. The SOPA is distributed to over 200 people, including a wide array of government agencies, interest groups, and interested individuals. The SOPA is also posted on the Malheur National Forest web site (www.fs.fed.us/r6/malheur).

In December, 2003 letters were mailed to the Burns Paiute Tribe, the Confederated Tribes of Warm Springs, and the Confederated Tribes of the Umatilla to inform them of and seek input about the Canyon Creek project. Another letter was mailed in March, 2005, providing information and seeking public collaboration. In November, 2005 the Blue Mountain District Ranger contacted the wildlife biologist for the Confederated Tribes of Warm Springs, who indicated interest in project wildlife issues. The wildlife biologist for the Confederated Tribes of the Umatilla was also contacted in November, 2005 and stated he had no concerns about the proposed project.

Collaboration

The collaboration process for the Canyon Creek WUI project spanned 9 months. In March, 2005, a letter providing information and seeking public collaboration was mailed to approximately 200 individuals and groups. This included federal and state agencies, the Burns Paiute Tribe, the Confederated Tribes of the Umatilla Indian Reservation, the Confederated Tribes of the Warm Springs Reservation, municipal offices, businesses, interest groups, and individuals.

There were three formal indoor meetings and three formal field trips to the project area. In addition there were six field trips with small groups or individuals and a number of additional conversations in the office about specific concerns. There were substantial changes and improvements made to the Proposed Action based on the site specific information and concerns the collaborators brought to these meetings and field trips. The following condensed statements are meant to capture the general discussions that took place; full transcripts of the meetings are on file in the project record.

- A notice was sent out to “the Malheur NF all projects” mailing list on March 3, 2005 announcing the project and informing the public of a collaborative meeting to be held on March 10, 2005. The Blue Mountain Ranger District also issued a statement that was announced on the local radio station and placed an article in the Blue Mountain Eagle. Approximately 40 people attended this first meeting. A wide variety of comments and suggestions were gathered on how the collaborators thought the area should be managed.

- On May 6, 2005 there was a field trip with two interested parties to discuss management trade-offs between elk habitat and fire hazard reduction.

- On May 23, 2005 a field trip to the Canyon Creek area was scheduled and eighteen people attended. Comments and ideas for potential treatments were solicited for a variety of vegetation conditions. Comments included:
  - Would like to see trees over 21” dbh cut.
  - Would like to see a mosaic left for wildlife cover, including untreated patches. Told about deer migration routes and need to leave understory for cover.
  - Not in favor of 40ft^2 basal area thinning, more comfortable with a range from 40-60ft^2 .
  - Prefer utilizing as much material as possible, chipping for hog fuel instead of burning.
  - Prescribed burning needs to be coordinated with grazing; cows need somewhere to go after an area is burned so grass can regrow.

- On October 5, 2005 an additional field trip was conducted in which twelve people attended. Sample treatment options were demonstrated by flagging trees to be left for the various treatment options.
  - Discussed leaving patches of untreated areas for wildlife cover; initial proposed size was increased from 1 to 2 acres to a minimum of 2 acres in size and covering 5-15% of a unit based on discussions and field observations about the effectiveness of cover.

- A second public meeting was held on October 13, 2005 with 19 people attending. This was a working meeting to examine a draft Proposed Action prepared by the FS and discussed suggestions how to improve:
  - Recommended thinning pine stringers along Road Gulch near forest boundary. Also recommended thinning along open roads to increase safer travel routes in case of fire and decrease need to salvage hazard trees in the future.
  - Recommended doing more treatment in the Dedicated Old Growth area located adjacent to landowners’ properties and structures. Also want proposed treatment to leave some wildlife cover areas left unthinned. Scheduled a field trip to discuss further.
  - Recommended harvesting large mistletoe infected pine trees to reduce infection of the younger understory trees.
  - Suggested several selected stands be left untreated for calving and fawning. Had site specific information on historical use. Scheduled a field trip to discuss further.
  - Concern about old thinning slash that hadn’t been treated yet.

    - Suggestion to treat near private lands first, then do the rest of the project. Supports stewardship contracts.

- As a result of discussions during the October, 2005, public meeting, three field trips with individuals were conducted looking at specific areas and concerns, resulting in a number on the ground adjustments to the Proposed Action:
    - Urged thinning in the DOG adjacent to private property, proposed switching the DOG and Replacement Old Growth area (ROG) allowing treatment to reduce risk of fire and to increase the resilience of the area to fire and insect damage.
    - Suggested harvesting large dead ponderosa pine, opportunities will be limited except in areas of excess snag numbers.
    - Added thinning in a specific area next to private property to the proposed action.
    - Expressed some reluctance to burn next to private property, don't like seeing the dead young trees.

- On November 2, 2005 a final collaboration meeting was held to present and work out refinements to the Proposed Action.
    - Pointed out several units in a deer migration route, decision was made to drop the units.
    - Recommended doing more prescribed burning in the Table Mountain area, north of Vance Creek, and in the upper reaches of Wickiup Creek.
    - Do understory thinning in old growth stands to reduce fire hazard and reduce competition and the risk of bark beetles.
    - Need to do more thinning in riparian areas, especially near private lands.
    - Burning should be a last resort; chipping is better to treat fuels.

- Three more field trips with individuals looking at specific areas and concerns were conducted in November, 2005, resulting in additional on the ground modifications to the Proposed Action.
    - Identified calving and fawning areas, dropped proposed thinning to retain hiding cover in these areas.
    - Wanted large mistletoe infected ponderosa pine harvested. Decided to recommend this be considered in a future, unrelated opportunity (see alternatives not considered in detail).
    - Wanted a specific area thinned next to private property, added to the proposed action.
    - Pointed out an elk migration route. Would prefer it not be thinned, but since other landowners are nearby would agree to treatment to reduce fire hazard.

- On November 16, 2005, the District wildlife biologist met with Oregon Department of Fish and Wildlife. Comments are as follows:

  - Design harvest prescriptions to reflect topography and landscape differences.

  - Concerned if big game cover is reduced to 10% of the analysis area. In the final proposal, cover at the landscape level was maintained at 35%. At the subwatershed level, cover was maintained at 19% or greater for each winter/summer range designation.

  - Recommended increasing the size of unthinned patches from 1 to 2 acres to 2 to 5 acres to provide better hiding cover. This proposal was modified to incorporate this recommendation.

  - Agreed with the proposal to precommercial thin 100 acres in Replacement Old Growth (ROG), but recommended no additional treatments in DOG/ROG network.

  - Recommended following PACFISH guidelines including no fire lines in RHCAs. This recommendation was included in proposal.

  - Temporary roads should be ripped or scarified to minimize additional ATV access. This recommendation was included in proposal.

  - Recommended closing additional roads to mitigate cover losses. Proposal is outside the scope of project.

- On November 28, 2005, an individual came in to the office to offer additional site specific suggestions for big game habitat protection. As a result we dropped harvest in a habitat area at the head of Bear Gulch where there are a lot of springs and seeps and adjusted the visual thinning prescription along the lower slopes to provide for wildlife travel corridors.

- On December 13, 2005, the revised Proposed Action was mailed to the collaborators for their final review and suggestions. In general the comments were supportive of the Proposed Action that emerged from the collaboration process. While individuals did not agree with everything that was proposed, most of the collaborators felt that it was a good balance between reducing the fire hazard to an acceptable level while maintaining an adequate level of wildlife habitat.

In all, collaboration resulted in a number of changes to the proposal:

- Total vegetation treatments were reduced from 10,640 acres to 7,040. Shelterwood regeneration was reduced 60%, understory removal by 45%, commercial thinning by 12%, and precommercial thinning by 21%.

- Variable density spacing was proposed initially, and was supported by most collaborators.

- Leave patches within treatment units were added and the size was increased from1-2 acres to 2-5 acres.
- The DOG and ROG would be switched (a Forest Plan amendment) to allow treatment next to private lands.
- Units were dropped in site specific areas to preserve special wildlife habitat; including calving and fawning sites, seasonal migration routes, and areas with concentrations of springs and seeps.

Consultation

Consultation was done with National Marine Fisheries Service and U. S. Fish and Wildlife Service starting in November, 2003, and continuing through April and July, 2006, on the determination of effects on Threatened, Endangered, and Sensitive species. The effects analysis completed and documented in the BE or BA resulted in a call of Not Likely to Adversely Effect (NLAA). This was done under the Section 7 Counterpart Regulations of the Endangered Species Act (Federal Register, December 8, 2003) and is in compliance with those regulations and the March 3, 2004, Alternative Consultation Agreement between the Forest Service, Fish and Wildlife Service, and National Marine Fisheries Service.

Cultural resource surveys of varying intensities have been conducted following inventory protocols approved by the State Historic Preservation Officer SHPO). Native American communities have been contacted and public comment encouraged. The consultation and concurrence process with SHPO has been concluded. No significant effects on known cultural resources are anticipated. The Forest Specialist has certified that for this project the Forest complies with Section 106 of the National Historic Preservation Act, under the terms of the 2004 Programmatic Agreement between Advisory Council on Historic Preservation (ACHP), SHPO, and the United States Forest Service, Region 6.

Scoping

On January 17, 2006, the Proposed Action that was developed through the collaboration process was sent out to the public mailing list. This included Federal, State and local agencies, Grant County Court, Tribes, permittees, property owners, advocacy groups, and the general public.

The responses received are on file in the project record. Similar comments from different responders were combined and are listed below. Included in this list are the different ways that these comments were resolved and/or addressed within the document.

Issues

Issues for the Canyon Creek Wildland Urban Interface project were identified through discussions with collaborators, public scoping, and internal input from project resource specialists. Similar items were combined into one statement where appropriate.

Normally, the issues identified during scoping are addressed by developing alternatives to the Proposed Action. Since this HFRA project falls within the WUI defined in the Grant County Community Fire Protection Plan, no alternatives to the Proposed Action are required. Instead the issues raised by comments received during the scoping and collaborative process were addressed by either modifying the Proposed Action, or by adding design criteria to the Proposed Action.

Below are the issues that surfaced during the collaborative process, the resolution, and the location where they are addressed in this document.

Comment	Resolution
Amount and intensity of the proposed treatments/proposed action could reduce various wildlife habitats.	**Modified Proposed Action (Chapter 2).** Eliminated 3 units in the Bear Creek headwaters. Areas critical for calving and fawning, travel corridors, and cover patches have been designed into the proposed action to maintain habitat wherever possible while reducing the fire hazard.
The proposed action doesn’t fully address the ponderosa pine mistletoe.	**Outside the scope of the Proposed Action.** To fully address the mistletoe in ponderosa pine, harvest of trees greater than 21” would need to be included. The proposed action describes treatment of mistletoe in trees <21”.
The WUI boundary is inappropriate.	**Outside the scope of the proposed project.** The WUI was set by the Grant County Community Fire Protection Plan and is beyond the scope of this project.
Treatments should be limited to trees less than 12”	**Alternative considered but eliminated from detailed study (Chapter 2).** Limiting harvesting to trees <12” would not reduce the crown fire potential and would not meet the objectives of this project.
Proposed treatment won’t reduce the fire hazard and may actually make conditions worse.	**Described in Alternative C (Chapter 2) and Existing Condition and Effects Fire/Fuels (Chapter 3).** Actions in the proposal that will reduce fire hazard include reducing surface, ladder, and crown fuels. Some studies of harvest without fuel treatment have shown

Comment	Resolution
	increased fire intensity. This project includes treatment of activity generated fuels; and other research shows reduced fire intensity when the slash is treated. Local observations have been that thinned stands with fuel treatment have lower fire intensity than untreated areas.
Need to treat logging slash.	**Described in Proposed Action (Chapter 2).** This is an integral part of the proposed action and important to accomplish to achieve fuel hazard reduction.
Ground skidding and grapple piling may increase noxious weed habitat by disturbing soil.	**Modified Proposed Action (Chapter 2).** Design elements have been added to the Proposed Action to identify existing noxious weed sites, to avoid operating through them, and to clean ground based equipment before it is brought into the project area.
Logging that significantly reduces canopy closure may create conditions for future severe fires. Thinning the stands will dry out understory making it more vulnerable. Consider a NEPA alternative that treats only surface and ladder fuels and controls stocking while retaining canopy cover that maintains cool, moist fuels, suppresses future ladder fuels, and provides wildlife habitat.	**Alternative considered but eliminated from detailed study (Chapter 2).** Effects of thinning on drying of the understory are discussed. Studies that best represent the project area show a direct link between crown density and crown fire potential.
Shelterwood cuts may not / or not clear reduce the risk of high intensity fire.	**Described in Existing Condition and Effects Fire / Fuels (Chapter 3).** Post harvest conditions result in a low potential for crown fire initiation and for sustaining a crown fire. On the landscape, these stands contribute to breaking the fuel continuity.
The proposed treatment will reduce value as an unroaded area.	**Described in Existing Condition and Effects (Chapter 3).** One 200 foot road roads will be built to access private land, and several short temporary roads to access skyline landings. The one unroaded and unlogged block of land (the new DOG) does not have any treatments prescribed. The new ROG is also unroaded and only precommercial thinning (cutting of small trees) will be done in that area. The treatments in the ROG are intended to increase the amount of single story old growth conditions.

Comment	Resolution
Re-opening grown-in "healed" roads may cause increase risk of erosion events during gully washers and may cause sedimentation that may affect steelhead spawning habitat in Canyon Creek.	**Described in Appendix F.** The effects of intense storms (gully washers) causing additional sedimentation from closed or grown in roads that are temporarily reopened were evaluated.
Most of the proposed harvest on the northeast side of Canyon Creek is located in uninventoried roadless areas that are contiguous with the Strawberry Mountain Wilderness. This areas has special value for wildlife habitat, water quality, weed free ecosystems, scenery, reference landscapes, etc.	**Described in Existing Condition and Effects Vegetation (Chapter 3).** The only unroaded or unlogged area of land is where the new DOG is proposed. This will not be treated and is to be protected by this project for its old growth and roadless characteristics. It is located next to the Wilderness boundary and will be retained in a condition that would allow it to be added to the Wilderness in the future. The ROG is unroaded and will have only precommercial thinning. The rest of the lands have been previously cat logged.
Silv. RX's were not site specific North vs. South aspects.	**Described in Existing Condition and Effects Vegetation (Chapter 3).** Prescriptions were designed to fit the local, site specific, biophysical environment and have the objective to re-establish tree stand conditions that are more resilient to natural disturbances and present less of a fire hazard.
HTH 50 Rx-Would like a few places where clumps are left-naturally occurring clumps (ie of five trees).	**Described in Existing Condition and Effects Vegetation (Chapter 3).** The thinning and understory removal prescriptions have been designed so that 5 to 15% of the area is left in an unthinned condition to provide wildlife cover.
Shelterwood harvest not authorized by HFRA.	**Described in the Healthy Forest Restoration Act (2003).** HFRA does not restrict actions to reduce hazardous fuels.
Research clearly demonstrates that recently completed fuel reduction projects had no effect on fire severity in the mixed conifer forests during extreme fire weather.	**Described in Existing Condition and Effects Fire / Fuels (Chapter 3).** The Fire / Fuels section acknowledges conflicting science.
The Forest Service should not be so quick to amend the Forest Plan. The Forest Service should adopt a lighter approach to commercial logging in order to comply with big game cover requirements. The Forest Service should at least consider a NEPA alternative that complies with the forest plan and disclose all	**Described in the Healthy Forest Restoration Act (2003).** The Forest Plan amendments are considered necessary to reduce the fire hazard in this area. HFRA does not require additional alternatives; rather the Proposed Action is modified through the collaboration process as concerns are voiced.

Comment	Resolution
the complementary benefits of retaining more canopy cover in terms of habitat, fire microclimate, soil and water quality, weeds, scenic values, roadless values, reduced slash creation, etc.	
Large snags are well below historic range of variability, so the Forest Service must strive to manage for decadence.	**Described in Existing Condition and Effects Wildlife (Chapter 3).** Snags would not be targeted for removal, although incidental snags may be lost during logging to meet operational/safety needs. Prescribed fire would likely increase snags. Project design criteria would be included to minimize losses. Retention of untreated patches of trees would continue to provide avenues for snag creation.
This project has significant impacts and requires an EIS.	**Described in Decision Notice and Finding of No Significant Impact.** Based on site specific analysis, the action will not have a significant effect on the quality of the human environment.
The historic range of variability is still a useful point of reference but may be an unattainable goal. How should the agency respond? We suggest that the agency needs to tolerate more dense stands while maintaining enough variability so that disturbances are controlled by discontinuities (e.g. disturbance is not overly contagious), then make sure that post-disturbance landscapes retain structural legacies and are allowed to recover their complexity.	**Described in Purpose and Need (Chapter 1).** The historic range of variability (HRV) represents conditions that are thought to be more sustainable and resilient. The objective is to move towards the HRV from the current situation, but does not seek to attain full HRV in the near future. One of the objectives of the Proposed Action is to arrange the treatments in a pattern across the landscape that will reduce the chances of a fire becoming large and destructive. Treatments have been focused near private lands, on ridge tops, and main along travel corridors.
Manage within the historic range of variability with restoration efforts that increase under-represented elements and reduce over-represented elements.	**Described in Purpose and Need (Chapter 1).** One of the ways to reduce the fire hazard and improve forest health is to return to more historical stand densities and species composition.
The ingrowth must be treated in order to retain the fuel reduction benefits of the original thinning.	**Described in Proposed Action (Chapter 2).** Future maintenance burning is expected to be necessary to maintain the ground fuel accumulation and ingrowth of ladder fuels at acceptable levels. This burning is not covered in this EA as would be after the generally accepted NEPA document life of 10-15 years.

Comment	Resolution
Higher foliar moisture of broad-leaved species could have dampened fire behavior, inhibiting rather than aiding crown fire initiation.”	**Described in Proposed Action (Chapter 2).** This project doesn’t propose any treatment that would reduce broad-leaved species.
Livestock grazing has a direct influence on the vegetation structure that this project is designed to address. Livestock grazing probably contributes to the spread of juniper, and it probably also contributed to the development of plant communities where grass and forbs are underrepresented and conifers are over-represented. Future livestock grazing will tend to cause these same trends, so the NEPA analysis must consider the connected and cumulative impacts of livestock grazing.	**Described in Existing Condition and Effects Fire / Fuels (Chapter 3).** The impacts of this project on grazing and the cumulative effects of grazing and the Propose Action have been analyzed in Chapter 3.
Grazing reduces the density and vigor of grasses which usually out-compete tree seedlings, leading to dense stands of fire-prone small trees. Cows also decrease the abundance of fine fuels which are necessary to carry periodic, low intensity surface fires. This reduces the frequency of fires, but increases their severity. .	**Described in Existing Condition and Effects Vegetation (Chapter 3).** Opening up the stands and allowing more sunlight to reach the forest floor is expected to increase the establishment of tree seedlings and would be controlled by future maintenance burning. Any added influence by grazing on tree establishment would be treated by the same prescribed burning; the impacts would be negligible.
We object to the removal of trees over 21 inches in diameter.	**Described in Proposed Action (Chapter 2).** No live trees over 21” are planned to be cut, except where necessary for road building, landings, and where required for safety.
The NEPA analysis must take a hard look at the habitat needs of primary cavity excavators over the long term. It is not enough to meet the needs of woodpeckers for a few years after harvest. Maintaining viable populations of primary cavity excavators will require retention of virtually all the overstory trees so that there is a long-term supply of snags and dead wood.	**Described in Existing Condition and Effects Wildlife (Chapter 3).** Effects of the Proposed Action on dead wood habitats were analyzed. Snag levels are predicted post-treatment and projected out over time. Green tree replacements will be retained for future snag recruitment.

Objectives

The objectives for the Canyon Creek WUI are presented below along with the measures that will be used to evaluate how well the two alternatives rate in meeting them.

Reduce Risk of Uncharacteristic Wildfire - The fuel (surface accumulations and stand structure) situation in portions of the Canyon Creek Wildland Urban Interface (WUI) presents a fire hazard/risk to rural homes and people, public and private land resources, and visitors. Fire has been excluded for approximately 100 years in the project area. This is in contrast to the historical situation where frequent fires, both natural and human-caused, created the pre-settlement forest landscape. Consequently stands have become overstocked, with several vertical layers of vegetation. The result is "fuel ladders" which allow fire to progress into the upper tree canopy layers. The continuity of the canopies increases the potential for an active crown fire. Historically tree canopies were single-storied, with mostly large fire resistant species. This open park-like configuration rarely allowed fire into the tree canopy.

Fire exclusion has changed the forest landscape so that it has become a significant fire hazard, where the extent, amount and structure of fuels greatly increase the risk of crown fires (fires which spread through the tree canopy layer). Protecting life and property and reducing the risk of uncharacteristic wildfire may be accomplished by treating the hazardous fuels. Various vegetative treatments may be used to reduce the amount of fuel, vertical structure of fuel, and the extent of contiguous fuel on the landscape.

Measurements

- Percent of area in fuel loadings representative of Fuel Models 2 & 9.
- Percent change in crown fire initiation potential.
- Change in crown base height.

Improve Forest Health - Forests with overstocked stands of trees are susceptible to damage by insects and disease, have increased risk of uncharacteristically severe wildfire, and generally decline in health over time. Forests with good structure and species composition are more resilient and sustainable, and are able to withstand periodic natural disturbance. Recent stand examination plot data shows that a large portion of the Canyon Creek watershed WUI is overstocked and does not fall within the historic range of variability for species and stand structure. Stand health is linked with resiliency and the susceptibility of the project area as a whole to potential uncharacteristically severe fire events.

Measurement:

- Percent of acres of forest stands in the project area that are being treated to move toward the species and structure associated with the historic range of variability.

Balance Project Activities with Wildlife Habitat Needs - Vegetation management affects wildlife habitat in many ways. Habitat requirements vary by species; changes in habitat may have positive effects on some species and negative effects on other species. In the Canyon Creek area, proposed timber harvest, precommercial thinning and prescribed burning would open up stand conditions to the benefit of some species such as the white-headed woodpecker and flammulated owl. Conversely, harvest and burning may adversely affect some wildlife species, particularly those that rely on higher levels of vegetation for cover. Cover-dependent species include elk and deer, old growth species such as pileated woodpecker, pine marten and northern goshawk, and various landbird species. Vegetation management can degrade cover for dispersal of wildlife across the landscape. Proposed treatments may also adversely affect snags and down log habitats and the species that use them.

Measurements:

- Old growth – Conversion of Old Forest Multiple Strata (OFMS) to Old Forest Single Stratum (OFSS), development of OFMS and OFSS in 50 years, acres of Replacement Old growth (ROG) treated, acres/percent of connectivity corridor treated
- Big game - Habitat Effectiveness Index (HEI), satisfactory and marginal cover percentages, and open road density
- Primary cavity nesters (such as woodpeckers) - Snag densities and wildlife tolerance levels
- Goshawks - acres of primary and secondary goshawk habitat treated and acres of Post-fledging Area (PFA) treated
- Landbirds – Priority habitats treated - old growth dry forest, riparian woodlands and shrublands, shrub-steppe habitats

Consider Social and Economic Implications – Unemployment levels are high in the surrounding communities. Economically viable timber sales are important to local communities. The wood fiber present on the Canyon Creek watershed WUI represents an economic opportunity. In addition, non-commercial treatments such as small diameter tree thinning and fuel treatments are opportunities for local workers to gain employment.

Measurements:

- Value of commercial harvest (dollars)
- Jobs from commercial or non-commercial project activities
- Volume of economically viable timber harvest (thousand board feet)

Limit Road Construction and Opening and Reclosing of Closed Roads - With the exception of a special use permit to allow John Morris to construct a 200 foot long ridgetop road to access private lands, no permanent road construction is anticipated in the Canyon Creek Watershed WUI. However, some temporary roads are needed to implement project activities. Construction of temporary roads, use during project activities, and ensuing closure and rehabilitation may result in some effects on other values such as wildlife habitat, water quality, and visual quality. In addition some closed roads will need to be temporarily reopened to enable project access. Roads affect many aspects of project area environmental components and can affect soils, hydrological function, wildlife (by increasing public access), fisheries.

Measurement:

- Miles of temporary roads constructed to implement project activities.
- Miles of closed roads temporarily reopened for use.

Project Record Availability

This EA hereby incorporates by reference the Project Record. The Project Record contains Specialist Reports and other technical documentation used to support the analysis and conclusions in this EA. These Specialist Reports are for Soils, Watershed, Fisheries, Wildlife, Vegetation, Fire and Fuels, Economics, Botany, Recreation, Visuals, Heritage, Range and Invasive Plants for the Canyon Creek Wildland Urban Interface Project. Relying on Specialist Reports and the Project Record helps implement the CEQ Regulations' provision that agencies should reduce NEPA paperwork (40 CFR 1500.4). The objective is to furnish enough site-specific information to demonstrate a reasoned consideration of the environmental impacts of the Proposed Action and how these impacts can be mitigated, without repeating detailed analysis and background information available elsewhere.

The Project Record is available for review at the Blue Mountain District, John Day, Oregon. Portions of the Project Record such as the Environmental Analysis, Appendices, and maps can be found on the website www.fs.fed.us/r6/malheur.

CHAPTER 2 – ALTERNATIVES

This chapter describes the alternatives considered by the Forest Service for the Canyon Creek Wildland Urban Interface Project. It includes alternatives considered and eliminated from detailed study, a discussion of how the Proposed Action was developed, a description of the activities, design elements, and monitoring for the Proposed Action. The No Action Alternative will be presented and compared to the Proposed Action to showcase the probable results of not implementing the Proposed Action as well as the reasonably expected outcome from implementation.

Chapter 3 contains the detailed scientific basis for establishing baselines and measuring the potential environmental consequences of each of the alternatives.

Alternative Development Process

This chapter describes in detail the Proposed Action that was developed with extensive collaboration under Healthy Forests Restoration Act (HFRA) authorities to meet the purpose and need to protect lives and property, as stated in Chapter 1 of this EA. Since this project is being prepared under HFRA authorities and is wholly within the Wildland Urban Interface described in the Grant County Community Fire Protection Plan, no alternatives to the Proposed Action are required.

Rather than develop additional alternatives, the Proposed Action was substantially modified during the collaboration process using site-specific public input, including on-site visits with private landowners and interested members of the public, discussions with elected county officials, and interdisciplinary team knowledge of the planning area. The Proposed Action that emerged from the nine month long collaboration process was primarily shaped by two main concerns; reducing the fire hazard and maintaining wildlife habitat. In some areas these two concerns could be reasonably met by minor design changes to the Proposed Action alternative. In others, it became obvious that fully meeting both concerns was not possible. Even then, a compromise was sought that would still provide some wildlife habitat while meeting the need to reduce fire hazard.

Alternatives and Treatments Considered but Eliminated from Detailed Study

Several alternatives and treatment strategies were considered during the planning process, but have not been included in the EA for detailed study. These are briefly described, along with the reasons for not considering them further.

Alternative A – Harvest Large Mistletoe Infested Trees

Several individuals were concerned about the high levels of dwarf mistletoe in large ponderosa pine in several locations. In order to reduce the infestation levels in the younger pine trees growing under these larger trees they suggested removing the overstory trees with high levels of mistletoe. Many of these are over 21"DBH and can be cut only in extreme cases, as directed by Regional Forest Plan Amendment #2.

After consideration, it was decided that the spread of dwarf mistletoe is a slow moving disease and that the primary focus of this project is to reduce the fire hazard and secondarily to improve the forest health. Mistletoe infected trees less than 21"DBH may still be cut in the project and a follow-up project proposal is recommended to analyze the problem in the trees over 21"DBH.

Alternative B – Prescribed Burn Instead of Thinning

Since one of the problems identified in the Canyon Creek WUI was the buildup of fuels and tree overstocking due to the lack of periodic burning, one idea was to reintroduce fire across most of the planning area. After consideration, it was decided that many areas within the WUI are so overstocked with trees, contain ladder fuels, and have enough of a surface fuel buildup that the reintroduction of fire would be risky until these conditions can be modified with mechanical treatment (thinning, piling and burning of slash, etc).

The decision was made to only include those areas that are currently judged safe to underburn in this project proposal. The remaining areas will need some type of mechanical treatment first. A new analysis will need to be prepared for future mechanical treatment and underburning in those areas.

Alternative C - A Fuels Treatment Strategy excluding Canopy Treatments or Removal of Any Trees Over 12" DBH

An individual was concerned that fire hazard would be increased by the removal of trees that form the canopy. It was proposed that fire risk can be reduced by treating surface fuels, brush and small diameter trees and retaining the overstory canopy to maintain a more fire resistant microclimate. Literature citations (Mason,et al. 2003, Carey and Shuman 2003,and others) were used to support the contention that fire hazard can be lowered by treating only surface fuels and small diameter ladder fuels.

A number of other studies (see citations below) were found that show that treating the crown fuels is an important tool to reduce the fire hazard and especially to reduce the potential for crown fires. While acknowledging that there is some conflicting scientific literature, we feel that the studies that showed a direct link between crown density and crown fire potential are felt to best represent the situation in the Canyon Creek WUI project area.

It is important to note that studies showing an increase in fire behavior after logging often do not include logging slash treatment. These studies show that to effectively reduce fire hazard the slash created by logging and precommercial thinning need to be treated. The fuels created by activities in this project are planned to be treated, therefore, the studies that incorporate slash treatment are more representative of the type of treatments in the proposed action.

We feel that the strategy of no canopy treatments does not meet the purpose and need to protect life and property because it will not reduce crown density and thus reduce the potential for crown fire spread. Therefore, it will not be pursued in detail, leaving a full array of treatment options so the proposed action can be best tailored to on the ground conditions.

In support of the proposal that fire risk can be reduced by treating only the surface fuels, brush, and small diameter trees, *Rural Technology Initiative - Investigation of Alternative Strategies for Design, Layout, and Administration of Fuel Removal Projects* (Mason et al. 2003) has been cited. This study modeled fire hazard reduction, economic cost, habitat protection and carbon sequestration for wildfires and for fuel reduction treatments. Using inventory plots, four thinning regimes were modeled:

- Removal of all trees 9 inches DBH and smaller (9 & Under)
- Thin from below removing 50% of the existing basal area per acre (Half BA)
- Thin from below with a residual BA of 45 square feet per acre favoring ponderosa pine and western larch (BA 45)
- Removal of all trees 12 inches DBH and larger (12 & Over)
- In addition, a control was modeled (No Action), as was a crown fire representative of each forest (Wildfire)

The study simulated treatments in the year 2000 and modeled stand vegetation and fuel recovery through 2030. The simulations were modeled with periodic maintenance underburning or other treatments to remove ingrowth and fuels (Without Regeneration) and without further treatments (With Regeneration). The most effective thinning treatment modeled for fire hazard reduction in the study was the BA 45 without regeneration treatment, a thinning followed by periodic underburning to maintain the fuel reduction. The next best was Half BA without regeneration, followed by 9 & Under without regeneration. The 12 & Over regime, which simulates an overstory removal or economic harvest, did little to reduce fire hazard. The reason that few trees were removed that were larger than 12 inches in diameter in the most effective BA 45 thinning regime appears to be because few plots used in the study had substantial numbers of trees larger than 12 to 14 inches in diameter.

Also cited was Modifying Wildfire Behavior-The Effectiveness of Fuel Treatments-The Status of Our Knowledge by Carey and Schumann (2003) of the organization The Forest Trust. The review by Carey and Schumann listed literature that explored the reduction in fire behavior accomplished by prescribed burning alone, mechanical thinning, combined thinning and burning, and commercial timber harvest alone. The study reviewed several papers that supported the fuel reduction effectiveness of thinning, to remove trees from below and reduce crown density, reduce fuel ladders, and raise crown base height. Many of the papers reviewed as negative toward thinning were on studies that left thinning slash in place. There were also supporting papers that described wildfires that dropped from the crowns to the ground and causing less mortality in thinned stands than in unthinned areas. Carey and Schumann found few studies relating fire reduction strictly to commercial timber harvest. Most concerned the effects of treating vs. not treating created logging slash, with lower fire severity when slash is treated.

There are many sources to support fuels reduction to modify fire behavior. In The Effects of Thinning and Similar Stand Treatments on Fire Behavior (Graham et al. 1999), the authors reviewed numerous studies and concluded that the best general approach for lowering wildfire intensities, damage, and mortality was combining a mix of thinning (managing tree density by thinning from below and altering species composition), surface fuel treatment, and use of prescribed fire at a landscape scale.

In Science Basis for Changing Forest Structure to Modify Wildfire Behavior and Severity (USDA Forest Service 2004), thinning is noted as an important element of a forest fuel reduction strategy. The report states that the most appropriate fuel treatment strategy is often thinning (removing ladder fuels and decreasing tree crown density) followed by prescribed fire, piling and burning of fuels, or other mechanical treatments that reduce surface fuel amounts. This approach reduces all three fuel layers (canopy, ladder, and surface), thereby reducing both the intensity and severity of potential wildfires

The study Final Report: Effect of Fuels Treatment on Wildfire Severity (Omi and Martinson 2002) investigated the severity of wildfires that burned into existing fuel treatments areas. Treatments included repeated use of prescribed fire, single prescribed fires, debris/slash removal, and mechanical thinning with and without slash removal. All of the reduction treatments had been conducted less than ten years prior to being burned in wildfires. The authors concluded that treated stands burned less severely than untreated areas, and that it was important to treat the entire fuel profile, including thinning of the canopy. Crown density, which is reduced through thinning, significantly affected the stand damage rating in the study.

Thinning and prescribed fire can be useful tools to mitigate fire hazard in dry forests. In Basic Principles of Forest Fuel Reduction Treatment (Agee and Skinner 2005) the authors reviewed numerous studies, modeled effects of fire behavior, and evaluated the effects of fuel reduction projects on five empirical examples. The article “summarized a set of simple principles to address in fuel reduction treatments: reduction of surface fuels, increasing the height to live crowns, decreasing crown density, and retaining large trees of fire resistant species.”

Cram et al (2006) examined whether forest stands in New Mexico and Arizona treated recently using silvicultural practices would be less susceptible to stand-replacing crown fires, and more ecologically and functionally resilient compared to untreated stands following extreme wildland fire. Results indicated fire severity in pine-grassland forests was lowered when surface and aerial fuel loads were reduced. Specifically, as density (stems/ac) and basal area (ft^2/ac) decreased and mean tree diameter (in) increased, fire severity and fireline intensity decreased. The more aggressive the treatment (i.e., where the canopy bulk density was reduced), the less susceptible forest stands were to crown fire. However, mechanical treatments where slash was scattered rendered stands susceptible to near stand-replacement type damage when wildfire occurred within 4 years of treatment. On their study sites, mechanical treatment followed by prescribed fire had the greatest impact toward mitigating fire severity (i.e., both aerial and surface fuels were reduced).

Alternatives Considered in Detail

No-Action (Alternative 1) allows the current situation to continue and the forest would remain subject to natural or ongoing changes. The project area would receive no fuels reduction treatments at this time.

The Proposed Action (Alternative 2) was developed using a collaborative process with local residents and other interested parties to meet the Purpose and Need and other multiple resource needs.

Maps of the existing condition and the Proposed Action Alternative are provided in Appendix B. Additional maps are included that display the anticipated effects of both No-Action and the Proposed Action alternatives. Larger-scale maps of the alternatives are contained in the project planning record.

Alternative 1 (No Action)

This alternative proposes no timber harvesting, precommercial thinning, or fuels reduction treatments in the Canyon Creek Wildland Urban Interface Project Area at this time. It does not preclude activities in other areas at this time or from the Canyon Creek Wildland Urban Interface Project Area at some time in the future.

This No Action alternative represents the existing and projected future conditions that would develop if the current management situation continues. The maps for Alternative 1 show the current distribution of stand structure and crown fire initiation potential (see Maps 5 and 7 in Appendix B) and the expected conditions in 50 years with no treatment (see Maps 6 and 8 in Appendix B).

The No Action Alternative would have no outputs, provide no opportunities for employment, and does not meet the purpose and need for the proposed action. The No Action Alternative does not move the project area towards the desired condition and does nothing to reduce the fire hazard in the wildland urban interface. Existing fuels conditions would worsen over time as more fuel builds up in both the understory and in the canopy.

Alt 1 would respond to the concern of smoke from prescribed burning by not proposing any burning in the area at this time. It also retains existing wildlife cover habitat, until such time as it no longer meets cover requirements (loss by insect or disease or shading by the dense overstory) or is destroyed by wildfire (though fire is not predictable).

Alternative 2 (Proposed Action)

The Proposed Action was developed as an iterative process involving National Forest staff, the collaborators, and comments from the public scoping process. As stated in Chapter 1, the purpose of this project is to protect lives and property within the wildland-urban interface. The two main tools that are available to accomplish the objective are prescribed burning and mechanical treatment (thinning, slash piling, etc.). Since most of the project area has not burned in the last 50-100 years, the accumulation of ground fuels and growth of numerous small trees has created conditions where the re-introduction of fire would likely be too damaging and be hard to control. To be able to safely burn, a number of mechanical treatments need to be completed before either prescribed fire or naturally occurring fires can be allowed to burn.

The first step was to determine which stands were in a healthy condition and a low fire hazard and which needed treatment to bring them into the desired condition. This process identified 10,650 acres that were in an unsuitable condition and in need of mechanical treatment, approximately 2/3 of the forested area. An overall strategy was developed that focused the mechanical treatments in the following priority areas:

- Near private lands, to protect lives and homes.
- Along main travel routes, to maintain access along major highways in and out of the county.
- On ridgetops, where there are better opportunities to safely control fires.

At the same time, a network of wildlife connectivity corridors was designed to connect the late and old forest stands to meet Forest Plan Amendment #2 standards (see Map 9 in Appendix B). A number of collaborators expressed interest in maintaining connectivity for deer and elk movement and recommended additional corridors based on local knowledge. Throughout the process the connectivity corridors were located to minimize conflicts with fuels reduction needs along the public/private boundary.

Approximately 3,000 acres of prescribed burning were identified in areas that are predominately ponderosa pine, where there is little to no regeneration harvest proposed and where current conditions allow prescribed fire to be used to reduce the ground fuels, and to some extent, also the ladder fuels. These have been included in the Proposed Action and are planned to be done within the next ten years. Multiple entries may be required to reach the desired results and these may occur within the same ten years.

In the rest of the project area burning is not planned to start until the mechanical treatments are completed. Once fuel loads are reduced, the long-term desire is to keep fire risk low in the wildland-urban interface. Since the generally accepted life of a NEPA document is approximately 10-15 years, the anticipated follow-up long-term maintenance burning (greater than 10 years) proposed for the Canyon Creek WUI is not included in this document. An additional NEPA document would be prepared for the burning that would be necessary to maintain the stands treated by the proposed action in a healthy and low fire hazard condition.

Throughout the collaboration process, a number of refinements based on site specific knowledge of fuel conditions, proximity to private lands, and wildlife use patterns were made to the general plan to balance the objective to reduce the fire hazard while still providing for wildlife habitat. See Chapter 1, pages 7-10, for a more in-depth discussion of the collaboration process and an overview of the various decisions involved in developing the proposed action alternative.

The proposed action is designed to reduce the fire hazard and improve forest health in the Canyon Creek WUI project area by reducing fuels and modifying the spatial distribution of the fuels in the three fuel layers:

- Crown or canopy fuels would be reduced primarily by commercial thinning (when too dense) and shelterwood treatments (where tree species are not suitable or sustainable). The trees to be cut are often large enough to be utilized for commercial products.
- Ladder fuels would be reduced by commercial and non-commercial thinning treatments and understory removal. The trees cut would vary in size from medium to smaller diameters and some of the smaller sizes may be difficult to economically utilize for products, utilization will be pursued if the opportunity exists.
- Surface fuels would be reduced by one or more of the following methods:
  - Yarding tops to landings for utilization or disposal by burning
  - Hand piling of natural and project generated fuels and burning the piles
  - Grapple piling of natural and project generated fuels and burning the piles
  - Underburning with hand fireline construction as needed.

Approximately 8,000 acres would receive treatment, including 5,140 acres of commercial timber harvest fuel reduction, 1,900 acres of non-commercial fuel reduction, 7,040 acres of surface fuel treatment by piling and burning, and 3,000 acres of fuel treatment by underburning (2,050 acres in harvest and thinning units and 950 outside of treatment units).

Treatments would occur on about $^{1}/_{3}$ of the project area, combined with past harvesting the total area treated is approaching ½ of the project area. Current thinking is that you need to treat a minimum of ¼ of the area to have an effect on fire behavior. Therefore this amount of treatment is expected to be enough to make a positive improvement in protecting lives and property. It is felt that more treatment would begin to adversely impact other resources, like wildlife habitat, while less treatment would not be sufficient to reduce the fire hazard to an acceptable level.

Commercial fuel reduction treatments would be accomplished by generally thinning the smaller diameter trees and retaining the larger trees at a variable spacing. There would also be some species conversion from fire and insect prone late seral species to more resistant early seral species both by selective thinning and by regeneration harvesting. The focus of the thinning would be largely on smaller diameter trees found either below the main forest canopy or within the canopy where tree crown density would allow the spread of crown fire. Mechanical treatments would remove ladder fuels that carry fire into the tree crowns.

All live trees over 21” diameter at breast height would be retained, except where removal is necessary for safety or to construct temporary roads and landings. Material to be removed for utilization would be brought to the road system by either helicopters, skyline cable yarding, or ground based equipment. The objective of this proposal is to use the existing transportation system and maintain it as necessary. This would reduce the potential negative impacts to water and wildlife habitat but will increase the need for more helicopter logging.

Non-commercial falling and removal (through piling/burning or removal from site) of small diameter trees would also reduce ladder fuels and the continuity of the tree crowns. This is proposed both within the areas treated by the commercial fuel reduction treatments and in areas where there is little commercial material but there is still a need to remove the smaller trees.

Activity Descriptions

Pre-commercial and Commercial Harvest

A variety of mechanical vegetation treatments are prescribed to reduce the fire hazard and to promote forest health. (Table in Appendix A and Map 10 in Appendix B)

- Commercial Thinning – 3150 acres
- Understory Removal (Thinning from below in multi-story stands) – 1000 acres
- Shelterwood Harvest (Regeneration to early seral species) – 1010 acres
- Precommercial Thinning to 9” DBH – 1830 acres
- Precommercial Thinning to 7” DBH (in existing plantations) – 50 acres

Treatment prescriptions were determined on a site specific basis considering the biophysical environment, current condition of the stand, other resource concerns, and the location. All trees 21” dbh and larger, except hazard trees, in all commercial and pre-commercial treatment areas, would be retained to keep a varied stand structure (multiple age classes) across the landscape to mimic a more natural appearing forest.

The commercial thinning reduces ladder and canopy fuels and promotes ecologically appropriate species composition and structural conditions in order to increase resiliency currently lacking across the planning area. This prescription would thin small/medium size trees (7 to 20.9” DBH) in immature forest stands by thinning from below to reduce stocking levels to reduce canopy fuels, enhance individual tree growth, and to allow for the reintroduction of fire. Thinning from below means the majority of the trees to be cut are in the smallest diameter sizes (9 to 13” DBH) and relatively few trees would be cut in the medium diameters (14 to 20.9” DBH). An additional objective in mixed species stands would be to select for retention of ponderosa pine and western larch and reduce the proportion of Douglas-fir and grand fir. Commercial thinning would reduce the competition among trees for sunlight, water, and nutrients resulting in more vigorous, healthier forest stands.

The shelterwood harvest would remove undesirable trees from the middle and understory, thin desirable trees where they are over stocked, and reforest any resulting understocked areas. Where suitable trees are available, a minimum of 20 trees per acre would be left to provide structural variety and future large snag recruitment.

Understory removal is basically a thinning that removes both commercial and precommercial sized trees (1" to 20.9" DBH) from multi-storied stands. The result is a thinning from below to reduce ladder and canopy fuels and to enhance the survivability of the larger trees in the stand from fire and insect attack.

The precommercial thinning prescription is recommended where the small trees to be cut (1" to 9" DBH) are not merchantable saw log sized material. The objective is to reduce ladder fuels, reduce the amount of live and dead fuels, and increase tree growth. Units 128, 130, 132, 305, 355, and 558 (approximately 61 acres) are wholly or partially within Riparian Habitat Conservation Areas (RHCAs) that are near private lands or along road corridors. They are being thinned with the primary objectives of reducing the fire hazard and improving the health and resiliency of the riparian stands. All thinning and fuel treatment would be by hand, with no ground disturbing machinery permitted in the RHCAs.

There may be utilization of the small diameter material that is cut for products such as posts and poles, firewood, and biomass fueled co-generation of electricity. Likewise, the tops, branches, and other woody biomass that are yarded into landings for fuel reduction in harvest units will also be made available for utilization. Local markets are limited and hampered by marginal economics, but efforts will be made to utilize the woody biomass generated by this project rather than dispose of it by burning.

Variable Spacing in Understory Removal/Commercial Thinning

To enhance structural diversity for wildlife and visuals while reducing fuel loadings, trees would be left at a varied spacing, as opposed to even spacing, with the density varying as much as 50% across the stands. Higher tree density and unthinned areas should provide higher levels of security/hiding cover in the short-term. Lower density areas will open up forest stands, breaking up the fuel continuity. In stands prescribed for an average density of 50 ft^2 of basal area/acre, the following range of densities would be used:

Basal Area (ft^2/acre)	Percentage of Stand
25	10%
40	15%
50	50%
60	15%
Unthinned	5-15%

The spacing of leave trees in the areas to be precommercial thinned would also be varied by as much as 50% to provide a variety of habitats and visual diversity. Unthinned areas are to be left for wildlife habitat that are 2 to 5 acres in size and cover 5 to 15% of the area to be treated. In goshawk post fledging areas and old growth connectivity corridors, retain unthinned patches at the 15% level where possible. In units immediately adjacent to the public/private boundary, retain unthinned patches at the 5% level.

Commercial Thinning in Wildlife Connectivity Corridors

Approximately 364 acres of connectivity corridors (10%) are in treatment units. About 260 acres (7% of the corridors) would be thinned with the objective to reduce stocking in these stands while still retaining sufficient trees per acre, compared to that of the standard commercial thinning described above, to provide denser forest stands for security. Specifically, the canopy cover is to be left in the upper 1/3 of the site potential.

Approximately 104 acres (3% of the corridors) are located close to private lands. Units 62, 90, 95, and 536 would be treated to reduce the fire hazard under the public health and safety provision in Forest Plan Amendment #2. These units are within ¼ mile of the public/private boundary and are considered high priority for treatment. Amendment #2 gives the Forest Service flexibility to modify or forgo connectivity direction for projects that address safety and health concerns.

Therefore, the wildlife corridor standards to leave the canopy cover within the upper 1/3 of the site potential would not apply in these units.

Retention of Medium Sized Older Trees

Occasionally trees are found that are less than but are obviously older than the second growth trees in the rest of the stand. Often they are growing near old growth trees that are over 21” DBH and would normally be removed during thinning and understory removal treatments to reduce competition with the larger trees. Several comments were received that stated these trees were valued highly by the respondents as trees that could soon grow into trees over 21”. These medium sized trees generally lack lower branches and do not pose a ladder fuel risk, and they comprise a relatively minor component of the forest. Therefore, they are not considered much of a fire hazard and most are to be retained.

Logging Systems

In keeping with the objective to keep road construction to a minimum, logging systems had to be designed to the existing road network. In a number of cases the existing roads are poorly located for skyline yarding, so helicopter was the only other option. This has raised the logging costs as well as the fuel treatment costs. (Table in Appendix A and Map 11 in Appendix B)

- Helicopter - 2240 acres
- Skyline – 520 acres
- Tractor – 2400 acres

Road Construction and Maintenance for Proposed Action

- Commensurate use road maintenance – 86 miles
- Installation of 5 temporary culverts
- Temporary road construction and rehabilitation after use - There are 11 short temporary roads (200 yd to ½ mile long) being planned to access skyline landings that total approximately 2 miles in length. These are to be rehabilitated after this project.
- Opening of closed roads (to be re-closed) – 46 miles

To accomplish timber harvest activities, temporary road construction and commensurate use road maintenance would occur to provide adequate access for harvest and fuel treatment. The roads planned to be maintained are shown on Map 12 in Appendix B. Commensurate use road maintenance means the amount and type of road maintenance performed will depend on the existing road condition, the season of use, and other factors.

The following work is classified as maintenance under the definition listed in the Federal Register but will be listed as reconstruction in any timber sale contracts: construct new drainage dips, construct new waterbars, construct new outlet ditches, place geotextile on existing road surface, place fill material in ruts in road, repair or replace existing cattle guards, removal of small trees and stumps

Typical road maintenance could include: blade and shape roadbed, construct or reshape drain dips or grade sags, construct waterbars/cross ditches, spot rocking in roadbed, brushing, remove hazard trees, minor realigning of road junctions, cleaning culverts, seeding, and remove excess material from roadbed.

These maintenance actions would be done on both open and closed roads as needed for harvest activities and fuel treatments. Roads that are currently closed but needed for proposed actions (approximately 46 miles of road) would be opened temporarily and reclosed after project activities are concluded.

Temporary roads would also be needed to support timber harvest. All temporary roads would be rehabilitated after use. Rehabilitation would eliminate future use of the road with the objective of restoring hydrological function. This will include subsoiling and seeding as necessary and discouraging continued use by constructing an earth berm or placing large rocks at the entrance.

Post Harvest Treatments

Shelterwood Harvest Areas

Following the shelterwood timber harvest, there would be small Douglas-fir and grand fir trees remaining that are undesirable for future management. Trees would need to be removed up to the lower diameter limit in the timber sale, this is anticipated to be 9" DBH, but may be larger in some units depending on the economics at the time of logging. These small trees would be removed, the existing, logging, and undesirable tree removal fuels reduced to target levels, and the non-stocked areas greater than ½ acre in size would be reforested with early seral species such as ponderosa pine and western larch tree seedlings. Planted areas would be monitored for growth and survival and additional measures to achieve acceptable reforestation may be necessary.

- Undesirable Tree Removal and Fuel Treatment– 1,010 acres
- Planting – 1,010 acres

Understory Removal/Commercial Thinning Areas

Following these thinning treatments of commercial sized trees, there is expected to be a number of stands with an understory of non-commercial trees that would need to be removed to meet the fuels and ladder fuels objectives. Actual need for treatment would be evaluated after the commercial harvesting is complete and only those areas in need of further treatment will be thinned.

- Precommercial Thinning and Fuel Treatment – 3,610 acres

Activity Fuels Treatments

There are several methods proposed to treat the logging and precommercial thinning wood residue (see Table in Appendix A):

- Whole Tree Yarding – 3,010 acres
- Whole Tree Yarding/Grapple Piling – 2,030 acres
- Yard Tops Attached/Hand Pile – 125 acres
- Grapple Pile – 550 acres
- Grapple Pile/Hand Pile – 230 acres
- Hand Pile – 3,750 acres

Yard tops attached and whole tree yarding are done during the logging operations. Both methods bring the top and limbs to a landing, where it may be utilized commercially as chip or firewood, or if there is no market it is piled and burned. Grapple piling is done with a grapple mounted on a low ground pressure (<8 psi) track excavator and is restricted to slopes less than 35%. Grapple piling is used in areas with moderate to high fuel loads. Hand piling is primarily used on slopes greater than 35% with moderate to high fuel loads. Piles from both methods are burned in the late fall after sufficient moisture has fallen to minimize fire spread.

Prescribed Fire

Prescribed burning would be done to reduce surface fuels, reduce litter and duff depth, and increase canopy base height. Prescribed burning is best used in areas with lighter fuel loads and is done over relatively large areas to reduce the need for constructed fire lines. An estimated 3,000 acres has been identified in the 22,700 acre project area where burning can be done within the next ten years. Due to the buildup of both live and dead fuels, approximately 1,800 of the 3,000 acres would need mechanical treatments before burning can be done.

- Prescribed burning – 3,000 acres

Future maintenance burning would be needed to limit regeneration and maintain low levels of surface fuels. Burning additional areas (outside of the 3,000 identified acres) would be desired in the future and has been identified for Cumulative Effects in Appendix C.

The 3,000 acres of prescribed burning was identified in areas that are predominately ponderosa pine and where there is little to no regeneration harvest proposed. On 2,050 acres, implementation could occur soon after the mechanical work. On the remaining 950 acres, mechanical treatment is unnecessary and burning could occur at any time. The burning would be accomplished in the spring and fall times of year when weather and moisture conditions are appropriate. Ignition would be by hand or by using ATVs. Prescribed burning occurs in a mosaic fashion and not all acres are blacked at one time. Multiple prescribed burning entries over the next 10 years may be needed to reduce the fuels to the desired fuel composition, and towards conditions for maintenance burning.

Burning would occur in three allotments; Sugarloaf, Fawn Springs, and Seneca and would be coordinated with permittees. The recovery of vegetation, including forage production and species diversity, would be monitored after prescribed burning to ensure the areas are ready to support livestock grazing on a sustainable level.

The varied spacing proposed for the commercial thinning, understory removals, and precommercial thinning would leave up to 15% of a unit unthinned in patches that are 2 to 5 acres to provide security/hiding cover. The objective is to avoid using prescribed fire in these identified patches. The method to minimize fire in these patches would be determined by the burn boss at the time of implementation.

Ignition may occur within RHCAs in burn units 2, 3, 4, 5, 6, 7, and 8. Within these RHCA's lighting would not occur within 25 feet of live or intermittent streams, in riparian vegetation, or within lower benches adjacent to stream channels. By utilizing different lighting patterns, prescriptions within the RHCAs would minimize consumption of coarse wood greater than 4 inches at the small end especially where adjacent to stream channels and would maintain ¼ inch of duff.

Approximately 90 acres of late and old structure are within the 3,000 acres. Underburning in these areas would be low intensity with the objective of reducing surface fuels while minimizing tree mortality, especially in the larger trees. Methods to protect large trees can include raking the litter and bark accumulation away from the base of the tree, not burning areas where concentrations of large trees exist, burning when duff moistures under the larger trees is 120% or greater which has been determined to not cause damage to the base of the tree (Scott, 2005).

Ignition would not occur within the RCHA's in burn units 1 and 9. Past district experience has shown that when fire is allowed to back into RHCAs the effects are dependent on the existing vegetation. As soon as vegetative species and moisture regimes within the RHCA change and become more shaded with more moisture and higher humidity, the fire would not burn, so riparian vegetation is rarely affected. Shrubs and conifers providing streamside shade and riparian vegetation are rarely affected because they do not burn with enough intensity to cause mortality.

Ignition would not occur within the 10 mapped aspen stands and any others discovered during implementation within the burn boundary. Most of these stands are within RHCA boundaries and generally are more shaded with higher humidities and not expected to carry fire through the stand. Ignition would also not occur in approximately 115 acres within stands identified as satisfactory cover that are not being mechanically treated. It is acceptable for fire to back into these stands as long as tree mortality is not more than 5%. The objective is to maintain these stands as satisfactory cover with minimal effects to the hiding cover within these stands.

Prescribed fire is not proposed in any of the DOGs, ROGs, or PWFAs within the project area.

The objectives of utilizing prescribed fire are to reduce surface fuels, reduce litter and duff depth, and increase canopy base height. Prescribed fire is not being utilized to change the structural stage of any the stands. Some tree mortality is expected and acceptable in forested stands. Acceptable mortality ranges are as follows:

- Trees 0-5" dbh, tree mortality is expected to range from 5 to 15%.
- Trees 5-10" dbh, tree mortality is expected to range from 5 to 10%.
- Trees 10-20"+ dbh, tree mortality is expected to range from 1 to 5%.

These mortality levels are based on averages over the whole burning areas and recognize the fact that fire is a relatively inexact tool and that there would be some localized areas where mortality reaches 100%. These patches should be kept to less than 2 acres wherever possible and preferably to the ¼ to ½ acre size that was thought to exist under historic conditions (Agee, 1993).

Control lines for prescribed burning would include existing roads whenever possible. Approximately 5 miles of hand line may also be constructed for control lines adjacent to private lands and to tie one road to another. Most of this is along fence lines where a control line already exists and only improving the line would occur. Black lining, (creating a wide black line by burning along the boundary when there is higher moisture content) to safely burn the remainder of the unit later may also be used for approximately 4 miles.

During project implementation, burning would adhere to the Oregon Smoke Management Plan and the State implementation Plan of the Clean Air Act.

Alternate Snowmobile Route

The snowmobile route on the 3925 and 3925-196 roads along Starr Ridge may be needed for log haul during the winter. If that happens, an alternate route has been identified to replace the 3925-196 road portion. It follows the -033, -920, -041, -032, -011, and -162 roads to tie the Starr Ridge snowpark in with the west end of the 3925 road. There is no good alternate route for the 3925 on the east end of the ridge, so use would be suspended during log haul.

Associated Actions Included In Alternative 2

Road Construction to Access Private Lands

A new road approximate 200 feet long on a ridge top near Unit 570 across National Forest Lands to provide access to private property is planned. This road would be constructed by the landowner at his own expense under a special use permit. This access would allow the landowner (Morris) to do vegetation treatments and timber harvest on his property to reduce fire hazards and to improve forest health. These actions would compliment treatments on both private and National Forest Lands.

Alternative access routes wholly on his property would be near the Canyon Creek riparian area with the potential to cause sedimentation and other adverse impacts. It is felt that the road on the ridge top within Forest lands is a preferable location.

Project Schedule

Depending on which alternative is decided upon by the Responsible Official, activities included in the decision would occur in approximately the following timescale.

Table 2-1: Timeframe for Canyon Creek WUI Project Treatments

Activity	2006	2007	2008	2009	2010
Timber harvest		X	X		
Precommercial Thinning	X	X	X		
Post Harvest Treatments		X	X	X	
Fuel treatment	X	X	X	X	
Tree planting			X	X	X
Temp./new road building		X	X		
Road maintenance		X	X		
Road decommissioning		X	X	X	
DOG/ROG relocation	X				
Reestablishing Road closures		X	X	X	X
Prescribed Burning		X	X	X	X
Management requirements/mitigation measures	X	X	X	X	X
Monitoring	X	X	X	X	X

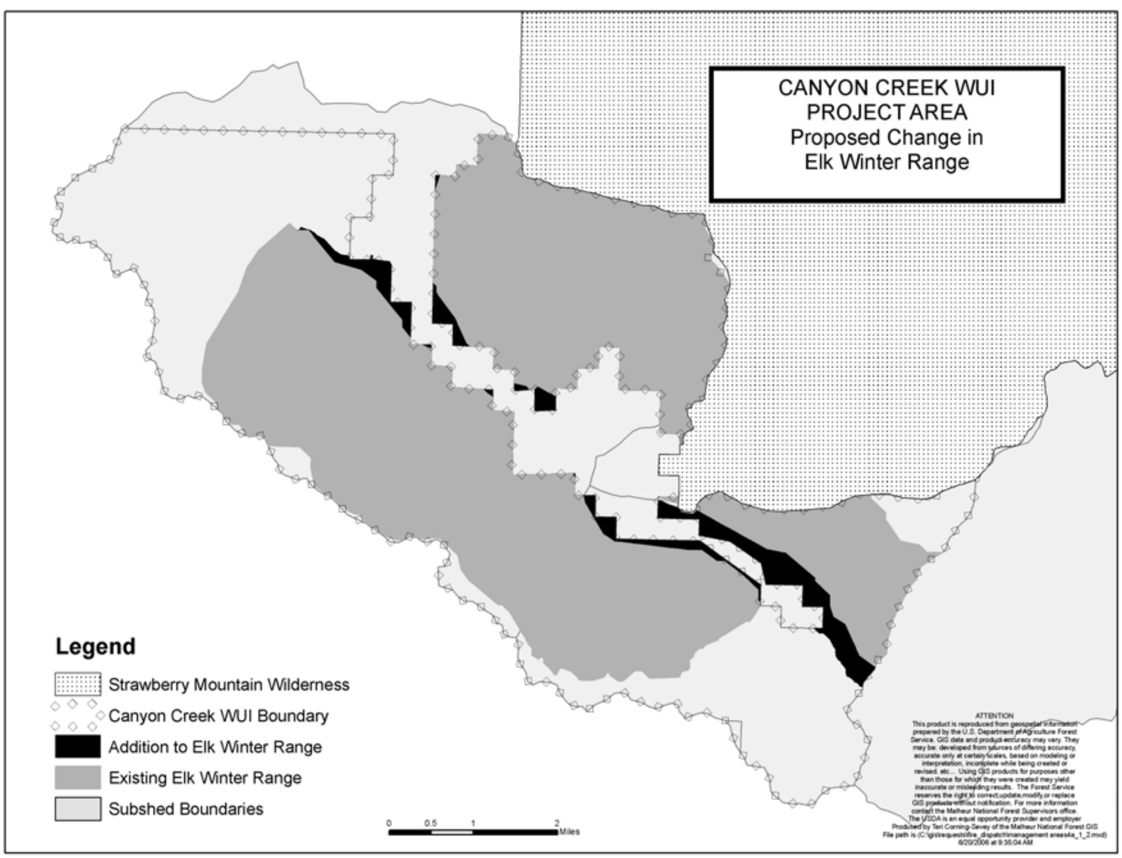
Forest Plan Amendments

Adjust MA-4a Boundaries

The Big Game Winter Range (MA-4a) boundaries would be adjusted, tying the management area to the National Forest boundary either side of Canyon Creek (see map below). A non-significant Forest Plan amendment is required to expand MA-4a.

The MA-4a adjustments are proposed because:

- The proposed mapping refines the original mapping in the Forest Plan to tie winter and summer range to logical boundaries. Management Area 4a, Standard #8 (LRMP, page IV-71) directs the Forest Service to adjust winter range boundaries as necessary.
- The MA-4a additions better reflect how big game species use this area; i.e., lower elevations along Canyon Creek are primarily being used as winter range rather than summer range.
- Proposed changes permit a more accurate analysis of the effects of commercial thinning, precommercial thinning and prescribed fire on big game habitat.



Boundary adjustments would increase MA-4a designation on approximately 875 acres. About 140 of the 875 acres would be converted from General Forest (MA-1). The remaining acres would overlap with Anadromous Riparian (MA-3a), Old Growth (MA-13), and Visual Corridors (MA-14). MA-4 standards and guidelines would apply to the additions. Standards and guidelines for MA-3a, MA-13 and MA-14 would also apply where they overlap with MA-4a.

Reduce Satisfactory and Total Cover below Forest Plan Standards

The Proposed Action would reduce satisfactory cover below Forest Plan Standards in the Vance Creek, East Fork Canyon Creek and Upper Canyon Creek subwatersheds. In Vance Creek and Upper Canyon Creek winter range, total cover is reduced below the 25% standard. Not all cover would be treated; at least 19% of each subwatershed would be retained as satisfactory/marginal cover. Cover is reduced to meet the purpose and need of reducing fire risk in the Canyon Creek Wildland Urban Interface. Hiding/security cover patches would be maintained in all proposed units to mitigate effects. Five to15% of each unit would be retained in untreated patches ranging in size from 2 acres to 5 acres. A non-significant Forest Plan amendment is required to reduce cover below standards.

Most of the treatments would occur in Dry Forest types. These stands are considered outside the historic range of variation (HRV), i.e., overstocked and likely unsustainable given the high risk of uncharacteristically severe fire and insect epidemics. Most of these stands would likely fall out of cover within the next 25 years if not treated. In a 2003 letter to the Eastside Forests, the Regional Office provided direction encouraging Forests to use site specific Forest Plan amendments to move the landscape towards HRV (USDA FS June 11, 2003).

Cover would be converted to lower quality cover habitat or forage depending on the treatment. In shelterwood harvest, understory removal, and commercial thin units, canopy cover would drop below 40% and be classified as forage. In precommercial thinning units, only smaller trees would be removed; post-treatment classification varies by unit. Some units drop from satisfactory to marginal cover while other stands would fall out of cover.

Exchange Dedicated Old Growth Area (DOG) 236 and Replacement Old Growth (ROG) 236 (see Map 9 in Appendix B)

The existing DOG is located immediately adjacent to the National Forest boundary. Private homes are located immediately adjacent to the Forest boundary and the landowners have expressed interest in treating stands in the DOG to reduce fire risk. The DOG is overstocked with trees and is high risk to wildfire and insect epidemics. The “Healthy Forests Initiative and Healthy Forests Restoration Act, Interim Field Guide, February 2004, states “One of the keys to effective fire management is treating fuels adjacent to structures and on private and Federal land throughout the wildland-urban interface (page 34, caption to figure 19). The existing ROG is located one half mile or more from the Forest Boundary and therefore exchanging the current Dedicated Old Growth Area, for the Replacement Old Growth Area reduces fire risk to private land and structures (Map 9 shows the new designations).

In their current condition, the existing ROG provides better old growth than the DOG. MA-13 direction permits exchanging the status of DOGs and ROGs. A non-significant Forest Plan amendment is required to exchange DOG 236 for ROG 236. There would be no net loss of old growth acres. The new designations meet Forest Plan standards for DOG and ROG sizes.

Management Area (MA-13) direction for old growth prescribes management to reduce residues and to maintain or enhance old growth and to protect old-growth from catastrophic wildfires. In a 2003 letter to the Eastside Forests, the Regional Office provided direction encouraging Forests to use site-specific Forest Plan amendments to move the landscape towards HRV (USDA FS June 11, 2003).

About 125 acres of the newly classified ROG (which is adjacent to private lands and structures) would be precommercially thinned by cutting trees up to 9 inches dbh (Units 352, 354, 355, 358, 364, and 366). Only those stands immediately adjacent to the public/private boundary would be treated. Precommercial thinning would reduce the risk of uncharacteristically severe fires and insect epidemics, and increase the growth rates on the remaining trees. These stands are expected to develop into old growth more quickly than if left untreated. Precommercial thinning helps meet the purpose and need for reducing fire risk in the Canyon Wildland Urban Interface while managing the ROG for future old growth.

Remove Limitations on Harvesting in Visual Corridors for this Project

The Proposed Amendment would allow shelterwood harvest without the limitations on unit size and eliminate the requirement to meet partial retention in the foreground and modification in the middle ground along the Wilderness Loop (County Road 65 and Forest Road 15) and Highway 395 visual corridors for this project. There are stands along the two corridors that are in poor shape due to over-stocking, disease and high fuel loadings that are a high fire hazard. These stands would contribute to extreme fire behavior and put other resources as well as personal dwellings at risk in the event of a fire.

The most effective way to return these sites to a healthy condition and a low fire hazard is with regeneration harvesting and in some cases the unit sizes would exceed current Forest Plan standards. Treating at the scale directed by the Forest Plan, up to two acres in foreground and 10 acres in middle ground, would not be effective. The Proposed Action would also lift the restriction on harvesting in the foreground of sensitivity level 1 corridors until a corridor plan is completed. A non-significant Forest Plan amendment is required to deviate from the standards set forth for these areas.

Most of the treatments would occur in Douglas-fir stands that are composed of sapling to medium sized saw log material. Douglas-fir mistletoe contributes significantly to fuel loading conditions and occurs in all size classes. It is desirable to convert these stands to predominantly ponderosa pine that is more in character with the historic composition of these sites. The units being treated are not totally out of scale or unrepresentative of the surrounding landscape. In addition, desirable trees would be retained in these units to maintain as much of the structure as possible, giving the appearance of an uneven aged landscape pattern in the future. These elements, while not enough to limit impacts to the partial retention or modification level, would help to create a natural appearing landscape.

Proposed units impacted by this amendment include 48, 52, 62, and 90 along the Highway 395 corridor. It also includes 140, 152, 166, 176, 178, 180, 182, 200, 202, 218, 228, 246, 504, 582, and 583 along the Wilderness Loop. The visual quality levels attained by this harvesting pattern and combination of marking guides would be modification.

Design Elements

Wildlife		
Design Elements	**Objective**	**Responsible Person**
From December 1st to April 1st, management activities will be restricted within big game winter range (MA4a). Restricted management activities include all Forest Service and contracted activities, including but not limited to, such activities as timber harvest, precommercial thinning, fuel treatment, prescribed fire, and roadwork. This EA permits waiver or adjustments to seasonal restrictions if recommended by the District wildlife biologist and approved by the District Ranger.	Restrict activities that disturb wintering deer and elk.	Sale Administrator, District Wildlife Biologist, Engineering Representative
In known calving/fawning areas, timber harvest, precommercial thinning and road work will be prohibited from May 1st to June 30th. For prescribed burning activities, burning crews will avoid known calving/fawning areas from May 1st to June 30. In areas not specifically identified for calving and fawning, burning crews will watch for lone elk or deer. If crews see lone animals, they will search the immediate area for calves and fawns and avoid igniting fire where young animals are discovered. Burning crews do not need to monitor elk and deer outside the May 1st to June 30th window. This EA permits waiver or adjustments to seasonal restrictions if recommended by the District wildlife biologist and approved by the District Ranger.	Restrict activities that disturb deer and elk during the birthing season.	Sale Administrator, District Wildlife Biologist
In treatment units, maintain security cover/hiding cover patch for big game by using the variable tree density strategy described in the Activity Descriptions section above. Untreated patches should provide higher levels of security/hiding cover in the short-term. Lower tree density areas will open up portions of forest stands, permitting natural regeneration to occur; which in turn should provide cover patches in about 20 years.	Maintain security/hiding cover for deer and elk.	District Silviculturist, COR, District Wildlife Biologist , Burn Boss
Closed roads that are re-opened for this timber sale will be closed again following use. This will ensure that open road density is not increased with this project	Protect elk and deer habitat, maintain adequate buck and bull escapement, and promote quality hunting.	Maintenance Engineering Representative, Sales Administrator, District Wildlife Biologist

Retain wildlife snags (dead trees) at levels to provide for 100% population levels of primary cavity excavators. Within the ponderosa pine, mixed conifer, and true fir communities, retain a minimum of 2.39 snags per acre, 21 inches dbh or greater. If 21-inch dbh snags are not available, retain 2.39 snags per acre of the largest representative diameter. To help protect snags 12 inches dbh and greater, take advantage of variable spacing in thinning units to retain more live trees around the snags. Retain trees damaged during logging operations in harvest areas lacking in snag habitat, unless determined to be a safety hazard. Apply these guidelines unless snags are considered to be a safety hazard during logging operations or if they need to be removed for roadwork or landings.	Retain dead wood habitats for species such as woodpeckers.	Sale Administrator, District Wildlife Biologist
To help retain wildlife snags during prescribed burning operations, there will be no ignition within 50 feet of standing dead trees > 12" dbh. Larger snags can be of greater value to some primary cavity excavators and less easily replaced if destroyed.	Protect dead wood habitats for species such as woodpeckers.	Burn Boss
Within shelterwood (HSH) units retain a minimum of 15 to 20 trees per acre, 12 inches dbh or greater for green tree replacements. More than a sufficient number of green tree replacements are expected to be retained in all other harvest, precommercial thinning and prescribed burning activities.	Retain sufficient green tree replacements for future wildlife snags.	Sale Administrator, District Wildlife Biologist, District Silviculturist
Maintain down logs for wildlife habitat and long-term site productivity by maintaining Forest Plan standard levels indicated where they currently exist (see Table 2-2 below). Fire prescription parameters will strive for less than 3 inches total diameter reduction on the required large logs.	Provide wildlife habitat and long-term productivity.	Sale Administrator, Burn Boss
No treatments in Dedicated Old Growth (DOG) #236. No treatments in Dedicated Old Growth (DOG) #241, Replacement Old Growth (ROG) #241 and Pileated Woodpecker Feeding Area (PWFA) #241.	Maintain wildlife habitat for old growth species.	District Silviculturist, District Wildlife Biologist.
In the Fawn Goshawk post fledging area (PFA), treatment is prescribed on about 100 acres- Units 314, 316 and 328. Proposed treatment is a combination of commercial and precommercial thinning. Develop structural diversity for wildlife habitat by varying tree density up to 50%. Retain a minimum 15% of the stands, if available, in untreated patches ranging in sizes from 2 acres to 5 acres.	Maintain structural diversity goshawk prey species.	District Silviculturist, COR, District Wildlife Biologist, Burn Boss

In Forest Plan Amendment 2 connectivity corridors, manage canopy closure at the upper 1/3 of site potential. Retain 15% of the stands in the denser patches where available, in untreated patches ranging in size from 2 acres to 5 acres. Corridors must be at least 400 feet wide. This prescription will be applied to harvest and burning treatments.	Maintain dispersal/travel habitat between late and old structured stands.	Sale Administrator, District Silviculturist, District Wildlife Biologist, COR, Burn Boss
Raptors are particularly sensitive to disturbance during the reproduction season. See Table 2-3 below which displays seasonal restriction and nest protection standards for known raptor nests. District wildlife personnel will be contacted for up-to-date raptor nest locations and activity status before implementation of management activities. Unoccupied sites require no timing restrictions. Only those raptor species with known nests sites in or adjacent to the project are listed in the table. If new nests or different raptor species are discovered during project implementation, nest protection and disturbance standards will be applied. Prohibited management activities include all Forest Service and contracted activities, including but not limited to, such activities as timber harvest, precommercial thinning, prescribed fire, and roadwork. Effects to raptors can vary depending on the loudness and duration of the management activity and the topographical or vegetation screening between the management activity and the nest tree. This EA permits waiver or adjustments to seasonal restrictions if recommended by the District wildlife biologist and approved by the District Ranger.	Protect existing and new raptor nests from alteration and disturbance.	Sale Administrator, Engineering Representative, District Wildlife Biologist
To provide blue grouse winter roosts, retain large mistletoe infected or "wolfy" Douglas-fir trees along ridge tops and large scab openings, where available.	Protect Blue Grouse Winter Roosts	Sale Administrator, District Silviculturist, District Wildlife Biologist

Table 2-2 - Forest Plan Standards for Down Woody Debris

Species	Pieces per acre	Minimum Diameter at Small End (inches)	Minimum Piece Length	Total Length feet/acre
Ponderosa Pine	3-6	12"	>6 feet	20-40-ft.
Mixed Conifer	15-20	12"	>6 feet	100-140-ft
Lodge pole Pine	15-20	8"	>8 feet	120-160-ft.

Table 2-3 - Summary of Raptor Timing Restrictions

Description	Timing- Activities Prohibited	Buffer for Timing- Activities Permitted	Timing – Activities Permitted	Management Restrictions At All Times
Occupied goshawk nest sites	Activities are prohibited: April 1-September 30	Within PFA or within ½ mile of nest sites	Activities can occur: October 1- March 31	No management within 30 acre nest stands
Occupied red-tailed hawk nest sites	Activities are prohibited: March 1 – July 31	Within 660 feet	Activities can occur: August 1- February 28	No management within 100 feet of nest tree

Soils		
Design Elements	**Objective**	**Responsible Person**
Unit 662 shall be logged only with a helicopter to avoid exceeding the compaction limit.	Avoid increasing detrimental impacts.	IDT
Grapple piling shall be done with low ground pressure (< 8.5 psi) on dry, frozen, or snow covered soil, and machinery will stay on existing skidtrails where possible. “Dry” means July through September, or obviously dry during other months. “Frozen” means frozen to a depth of 4 inches or more. “Snow covered” means sufficient snow depth to prevent soil disturbance and compaction.	Keep soil impacts as small as practical, especially long-lasting impacts; and keep detrimental soil impacts from this project to less than 20% of the area of each unit. Limit soil damage	COR
Skid trail locations shall be designated and approved prior to logging. On areas where existing skidtrails spaced 100-140 feet apart can be reused, reuse the old skidtrails. Otherwise, space skidtrails about 120 feet apart (except where they converge at landings and junctions), using existing skidtrails where possible and appropriate. Draw bottoms are not appropriate.	Limit soil damage	Sale Administrator, Soils Specialist

Avoid skidding on slopes steeper than 35%, where feasible, using directional felling and tractor winching. There shall be no skidding on slopes from 35 to 45% except for short pitches and none on slopes steeper than 45%. Tractor units with portions on slopes steeper than 35% are as follows: 012, 036, 052, 089, 095, 115, 157, 196, 198, 230, 240, 317, 318, 323, 324, 348, 386, 404, 518, 520, 545, 583, 584, 586, 604, 646 and 654. Tractor units with portions of slopes steeper than 45% are: 016, 018, 058, 082, 084, 112, 192, 304, 344, 388, 514, 521,and 708	Limit soil damage.	Sale Administrator, Soils Specialist
No skidding will be done under wet soil conditions, when ruts six inches or deeper would form on a continuous 50 feet or more of skid trails.	Limit soil damage.	Sale Administrator, Soils Specialist
Re-use existing landings where feasible and where they are away from shallow soil areas and ephemeral draws unless approved by the hydrologist, soil scientist or fisheries biologist.	Limit soil damage.	Sale Administrator, Soils Specialist
Skidders shall not be allowed off skidtrails. Directional felling and/or winching shall be used when necessary. Low ground-pressure equipment (<8.5 psi) can be allowed off of skidtrails under, dry, frozen, or snow covered conditions.	Limit soil damage.	Sale Administrator, Soils Specialist
Establish 50-foot no-equipment zone below shallow soil grasslands or shrublands. Skidtrails down slope from shallow soil areas shall be seeded. These mitigations apply to units 88, 338, 340, 342, 521, 604, 644, and 646.	Avoid concentrating water and causing erosion/sedimentation.	Sale Administrator, Soils Specialist
Skidding on units 012, 058, 112, 115, and 514 is limited to conditions when the soil is frozen or snow covered.	Keep detrimental soil impacts below 20%.	Sale Administrator, Soils Specialist
The purchaser shall subsoil skid trails in part of units 230, 504, and 510 where the soil is suitable and where subsoiling would not spread noxious weeds. Subsoiling need not be done if the unit is logged under frozen or snow covered conditions.	Keep detrimental soil impacts below 20%.	Sale Administrator, Soils Specialist
Skidding on units 302, 369, 371, and 373 is limited to conditions when the soil is dry. For some of these units subsoiling could be substituted for this requirement, upon approval of a soil scientist.	Keep detrimental soil impacts below 20%.	Sale Administrator, Soils Specialist
Where both seeding and subsoiling are required, sow grass seed after subsoiling to keep the seed from being buried too deep for good germination.	Prevent erosion. Promote successful grass germination.	Sale Administrator, Engineering Representative

The purchaser shall subsoil all landings (helicopter, tractor, and skyline) and revegetate (plant trees or seed grass) except where soils are not suitable for subsoiling, such as in rock pits.	Speed recovery of damaged soil.	Sale Administrator, Soils Specialist
Erosion from subsoiling skidtrails shall be controlled by subsoiling in a “J” pattern, by water bars, or by comparable measures. If runoff cannot be diverted out of the furrows (such as in draw bottoms), do not subsoil. Skidtrails on slopes steeper than 28% should not be subsoiled. Do not subsoil sections of skidtrails where excessive rock will be pulled to the surface.	Limit soil damage.	Sale Administrator, Soils Specialist
Runoff and erosion from skidtrails, skyline corridors, and tractor-winch furrows shall be controlled by the use of cross drains or comparable measures. Outfalls of the cross drains shall be clear and located on soil where water will infiltrate, not on shallow or impermeable soil. Cross drains on skidtrails should be spaced appropriately for the terrain.	Limit long-lasting soil damage.	Sale Administrator, Soils Specialist
Skid trails and disturbed soil shall be seeded as specified in Forest Plan Forest-Wide Standards 128 & 129.	Limit long-lasting soil damage. Seeding is necessary to supplement other erosion control measures	Sale Administrator, Soils Specialist
In unit 058, no skidding will be allowed in the area with rilling near the northern tip of the unit. No skidding will occur across the draw bottoms into the area north of the 832 road. The drainage bottom that has been used as a skidtrail in the past, which goes down to the landing at the western point of the unit, above the 3920 road, will not be used for machine traffic, and skidders will not cross it.	Avoid accelerating erosion and thus limit long-lasting soil damage.	Sale Administrator, Soils Specialist
In units 018, 084, 112, 644, and other units as found, the seeps will be treated as Category 4 wetlands protected by a no entry 100ft RHCA.	Comply with Pacfish	Layout
Seed sites which require erosion control measures with local native seed or non-persistent, certified weed-free seed mixture (Botany Specialists Report). Seed will be sown in the fall onto “loose” soil. If necessary disturb soil enough to allow seed to be secured by soil surface to assure seed remains on site. (Contract Provision CT 6.6) If the same areas are to be reforested, the botanist will specify an appropriate sowing density to assure conifer seedling survival.	Prevent erosion. Avoid retarding recovery of native plants.	Sale Administrator, Botanist
Meet Forest Plan ground cover standards when conducting prescribed burning.	Meet Forest Plan Standards	Burning Boss

Watershed		
Design Elements	**Objective**	**Responsible Person**
RHCAs for Category 1, 2 and 4 streams and for Category 3 and 4 wetlands shall be consistent with PACFISH. (100-300')	Protect fishbearing, perennial, and intermittent streams with PACFISH buffers.	Fisheries Biologist, Hydrologist
Ephemeral draws will have site specific, no-cut buffers (10-50' on each side).	Protect ephemeral draws	Timber Layout Forester, Sales Administrator
Equipment will be permitted in ephemeral draw buffers only at designated crossings. If skidding across draw bottoms that show signs of water flow, (as in units 642, 644, 646, 650 and others as found), skid only when the soil in the draw is dry or frozen, and place slash or other ground cover on the skidtrail after use with approval of aquatic specialist.	Protect ephemeral draws/Reduce erosion- sediment transport	Sale Administrator, Aquatic Specialist
Activities associated with removal, replacement, improvement or addition of culverts in RHCAs and ephemeral draws will be completed during dry conditions or after consultation with fish biologist and hydrologist or their designate. Cease all work if storm events occur and increase stream flows. During installation, efforts are taken to prevent the escapement of soil into streams.	Reduce sediments; protect perennial and fish-bearing streams	Fisheries Biologist, Hydrologist, Engineering Representative
Use erosion control measures (i.e., sediment filters, straw bales) to protect streams from construction sediment, where needed.	Reduce sediment transport to streams.	Sale Administrator, Maintenance Engineering Representative
Cross drains and other drainage structures should be spaced appropriately for the terrain	Reduce erosion and sedimentation	Sale Administrator, Engineering Representative
For roadwork, operate machinery only on road prism.	Reduce erosion and sedimentation	Engineering Representative
Temporary roads will be located outside of sediment delivery zones (as determined by soil type, ground vegetation, and slope), will meet Best Management Practices for controlling surface run-off and erosion, and will be hydrologically closed. Machinery used to build temporary roads shall remain within approved roadway..	Reduce erosion/sedimentatio n potential	Sale Administrator, Engineering Representative

Decommission/obliterate temporary roads by some combination of the following: recontouring slopes; subsoiling compacted soils to a depth of 16 inches (unless prevented by bedrock or rock content of soil);pulling berm; pulling slash (where available); planting or seeding disturbed areas to achieve a minimum of 35% ground cover; restoring natural drainage patterns (may include pulling waterbars) and waterbarring as needed; and /or disguising the first hundred yards of travel way with large pieces or organic material such as cull logs and tops of trees. Methods for individual roads will be determined in consultation with the District Hydrologist, Fisheries Biologist, or Soil Scientist.	Reestablishment of natural drainage. Decompaction of travel way. Restoration of ground cover. Preventing access to decommissioned road. Prevent/reduce potential for erosion/sedimentatio n.	Sale Administrator, Hydrologist, Fisheries Biologist, Soil Scientist, Silviculturist.
The Forest Service will require a Hazardous Substances Plan and a Prevention of Oil Spill Plan from contractor to be reviewed and approved prior to implementation of activities including prescribed fire.	Prevent petroleum products or other deleterious materials from entering stream systems.	Sale Administrator, Project Engineer, Burn Boss, COR
Treat fuels in RHCAs and ephemeral draw buffers by hand. Avoid placing hand piles in RHCAs except when fuels treatments (eg precommercial thinning) are implemented in RHCA's (units 128, 130, 132, 305, 355, and 558). Hand piles in RHCA's shall be located at least 50 feet away from live and intermittent stream channels and not in riparian vegetation. Distribute ignition of closely spaced piles (less than 75 ft. apart) in RHCA's over a minimum of two years; an alternative schedule of ignition may be implemented after consulting with soil scientist, hydrologist, or fish biologist.	Reduce erosion/sedimentatio n transport.	Sale Administrator, COR
Avoid precommercial thinning within 30 feet of the intermittent stream channel in Unit 128, 130, 355 or within 60 feet of the live stream channel in Unit 132, 305, and 558. Do not directionally fall trees into the no cut zone.	To maintain stream bank stability during high water events.	COR
Fisheries		
Design Elements	**Objective**	**Responsible Person**
Need pump containment kit and to screen water pump intakes with appropriate size mesh (3/32") to prevent entrapping fish	To prevent fuel and oil spills and avoid entrapping fish in pumps.	Engineering Representative
Keep refueling and fuel storage at least 150 feet away from live streams.	To prevent fuel and oil spills.	Engineering Representative

Avoid fire lines within RHCAs. This will ensure that there is a vegetated area where sediment and water can settle prior to entering a live or intermittent stream channel. Properly rehab hand fire lines i.e., waterbar, scatter woody debris, etc.	Control amount of sediment entering streams.	Burn Boss, Fish Biologist
Minimize consumption of >4"dbh course wood near stream channels.	Protect and maintain stream channels during high water or floods.	Burn Boss, Fish Biologist
Heritage		
Design Elements	**Objective**	**Responsible Person**
All NRHP eligible and potentially eligible (unevaluated) sites will be avoided/protected from any ground disturbing impacts during all timber harvest activities.	Site Protection	Sale Administrator, Contracting Officer, Zone Archaeologist
There will be no piling, hand or with ground-based-based machines (i.e., grapple), within the boundaries of a NRHP eligible or potentially eligible (unevaluated) site; all hand and grapple piling and burning of slash or fuel concentrations will take place outside of the site boundaries.	Site Protection	Sale Administrator, Contracting Officer, Zone Archaeologist
All NRHP eligible and potentially eligible (unevaluated) historic properties with structural remains or other wooden feature types, and/or can and bottle refuse areas will be avoided/protected during all burning activities. Eligible historic remains will be identified on the ground and proper protection measures will be conducted during the burning activities. There will be no hand lines constructed through the boundaries of NRHP eligible or potentially eligible (unevaluated) sites. Under the terms of the Management Strategy for the Treatment of Lithic Scatter Sites (Keyser et al. 1988), low intensity burning (<300° C.) will have no effect on the prehistoric lithic assemblages.	Site Protection	Burn Boss, Zone Archaeologist
If cultural resources are encountered during project implementation, all ground-disturbing activities will cease until the Archaeologist is contacted, assesses the situation, and recommends appropriate action.	Site Recording and Protection	Sale Administrator and/or Contracting Officer, Zone Archaeologist

Visual		
Design Elements	**Objective**	**Responsible Person**
Trees cut within a 200' wide swath along the 6510, 6510-812, and1500-651 roads that lead up to wilderness trailheads should be cut as low to the ground as possible. Clean up slash along these roads and near the trailheads as soon as possible.	Reduce visual impact of stumps and slash.	Contracting Officer, Sale Administrator
Layout units 142-151 so that there is no harvest within 200' of the main ephemeral draws.	Retain big game travel corridors.	Presale
Regeneration pockets in units 142-151 will not exceed two acres in size and will be limited to 10% of the foreground area.	Create more age classes.	Silviculturist
Recreation		
Design Elements	**Objective**	**Responsible Person**
Snowmobile trails are co-located (share the roadway) with proposed haul routes on the following roads: 15, 1519, 3925, 3925-196, 3900-987, 1520, and 1530. Plowing and use of these roads for harvest activities during the winter recreational season, generally December 15th through April 15th (though timing varies with snow conditions), will be coordinated in advance with the forest recreation specialist and the local snowmobile club. The objective of coordination will be to ensure safety and provide a continuous alternate route for snowmobile use when possible. Harvest activity use will take precedence over recreational use.	Reduce conflict with Recreationist	Recreation Specialist, Sale Administrator
East Fork Canyon Trailhead – Log truck turnaround in the trailhead will not be allowed. Obliterate the temp. road by subsoiling and pulling back the berm of temp road leading to landing. Waterbar and place sufficient boulders to effectively restrict access to the temp. road. Burn or remove slash piles (if size is too big).	Protection of Developed Facility	Recreation Specialist, Sale Administrator
Wickiup Campground – Haul road goes through the campground. Avoid log haul on week-end, rest of week the road will be posted "Log Haul" for safety.	Public Safety	Recreation Specialist/Sale Administrator, Engineering Representative
Wickiup Campground – The water source in Canyon Creek near Wickiup Campground can be used only on week days, Monday thru Friday. .	Reduce conflict with Recreationist	Recreation Specialist, Sale Administrator, Engineering Representative

Protect trailhead structures	Developed Facilities	Sale Administrator
While harvest activities are occurring, FS roads 6510, 6510-812, and 1500-651 will be signed on the ground for public safety reasons advising visitors going to the trailheads of the presence of log truck haul, tree felling operations, and short-term delays.	Recreating Public Experience	Recreation Specialist, Sale Administrator, Maintenance Engineering Representative
Trees that border the wilderness boundary will be felled away from the wilderness, trees that do fall across the wilderness boundary will be left lying on the ground. Helicopter flights will be directed away from the wilderness boundary.	Wilderness Integrity	Recreation Specialist, Sale Administrator
Range		
Design Elements	**Objective**	**Responsible Person**
All existing structural range improvements (fences, gates, spring developments, etc.) and permanent ecological plots will be contractually protected (ATPs).	Protect government and permittee investments	Sale Administrator
If structural improvements are damaged during project operations they will be repaired to Forest Service standards prior to livestock scheduled use. This will be accomplished by whoever caused the damage. Repairs will be required of purchaser if damage was done during timber sale operations, by thinning or fuel treatment contractors, or by force account where appropriate.	Protect government and permittee investments	Sale Administrator
If livestock are present on either side of a fence, means will be taken to protect the integrity of the grazing schedule. This could include contractual requirement to assure gates are kept closed, placement of temporary cattle guard or presence of a “gate keeper”. If no livestock are present, gates and fences shall be operable prior to logging activities proceeding to the next subdivision.	Prevent the movement of livestock to other pastures.	Sale Administrator
Fence right of ways, trails, other developments and access to them will be cleared of slash produced by logging or post sale activities.	Protect government and permittee investments	Sale Administrator

Noxious Weeds		
Design Elements	**Objective**	**Responsible Person**
Conduct road blading, brushing and ditch cleaning in areas with high concentrations of invasive plants in consultation with District or Forest-level invasive plant specialists, incorporate invasive plant prevention practices as appropriate.	Prevent the introduction, establishment and spread of invasive plants.	Engineering Representative
Actions conducted or authorized by written permit by the Forest Service that will operate outside the limits of the road prism (including public works and service contracts) require the cleaning of all heavy equipment (bulldozers, skidders, graders, backhoes, dump trucks, etc.) prior to entering National Forest System Lands.	Prevent the introduction, establishment and spread of invasive plants.	Sale Administrator, Engineer Representative
Inspect active gravel pits, quarry sites, and borrow areas for invasive plants before use and transport. Require treatment of infested sources before any use of pit material. Use only gravel and rock that are judged to be weed free by USFS weed specialists.	Prevent the introduction, establishment and spread of invasive plants.	Engineer Representative

Monitoring

1. Vegetation Monitoring (Silviculturist)

Tree marking will be monitored to ensure compliance with the silvicultural prescription and marking guide. Monitoring will check for correct selection and designation of trees expected to live and snags to be left for wildlife habitat and resource protection.

After harvest, a post sale examination will be done to determine the actual need for precommercial thinning, fuel treatment, and reforestation. Plans will be adjusted to the actual post harvest conditions and need for further treatment.

All areas planned for tree planting will be examined prior to planting. Exams will assess levels of competing vegetation, pocket gopher and other animal activity, and other environmental conditions. Seedling species and stock type will be prescribed as well as site preparation, planting, and protection methods. Any changes from methods prescribed in this document will require additional NEPA analysis.

Planted and natural regeneration areas will be monitored for seedling survival, growth, and damaging agents. Stocking surveys will occur periodically until planting areas are certified adequately stocked and “free to grow”. Deficient areas will be replanted to at least minimum stocking. Protection measures may be implemented to increase tree survival; this would require additional NEPA analysis.

2. Watershed and Fisheries (District Hydrologist and Fisheries Biologist)

Monitor Best Management Practices (BMPs): Three to five percent of tractor yarded units and smaller amounts of skyline and helicopter yarded units will be monitored to ensure BMP implementation and effectiveness. Monitoring would be done by the District hydrologist, fisheries biologist, soil scientist, or trained technicians, and the Sale Administrator and would occur during project implementation and after completion of the project.

Monitor Unit Boundaries along RHCAs: Monitor three to five percent of units adjacent to RHCAs to ensure adequate buffering of mechanized harvest/fuels reduction activities.

3. Fire and Fuels Monitoring (Fuels Specialist)

Monitoring of work conducted under thinning, grapple and handpiling contracts would consist of periodic inspections while work is in progress and after completion to determine compliance with contract standards.

Prescribed burning implementation monitoring includes burn day monitoring to ensure burning is conducted within the parameters stated in the Burn Plan. This monitoring is completed by fire personnel. Weather, flame length, and smoke dispersal would be a minimum of what is recorded. Fuel reduction will be monitored through fuels plots and would be conducted by fire personnel.

Prescribed burns are to be monitored during and after the burn for the amount of effective ground cover remaining after the burn, the amount of fuel reduction, and post burn mortality and crown scorch.

Burning in RHCAs will monitored for the amount of ground cover that is exposed and the mortality levels of riparian shrubs and trees.

4. Monitor Forage Recovery (Range Specialist)

Monitor vegetation recovery after prescribed burning to determine when grazing may resume. Rangeland conditions including forage production and species diversity will be monitored after burning to ensure the areas are ready to support livestock grazing on a sustainable level.

5. Monitor Noxious Weeds (Range Specialist)

Disturbed areas within the project area will be periodically monitored to identify the establishment of noxious weed species. New infestations will be included in the Forest weed database and will be treated using appropriate methods.

Comparison of Alternatives

This section normally includes a comparison of alternatives. HFRA does not require alternatives other than the Proposed Action if the project is within a WUI, however, a comparison is included below to summarize the effects by the issues.

<table>
<tr><th>Issues</th><th>Measure</th><th colspan="2">Existing Condition
(No Action)</th><th colspan="2">Proposed Action</th></tr>
<tr><td rowspan="4">Reduce Risk of Uncharacteristic Wildfire</td><td>Area in Fuel Models
2 & 9</td><td colspan="2">54%</td><td colspan="2">65%</td></tr>
<tr><td>Change in Crown Fire Initiation Potential</td><td colspan="2">Low to Medium- 59%
High to Very High 30%</td><td colspan="2">Low to Medium 72%
High to Very High 17%</td></tr>
<tr><td>Change in Crown Base Height and Crown Bulk Density</td><td colspan="2">Average Crown Base Height - 15 feet
Average Crown Bulk Density - .05 lb/ft/^{3}</td><td colspan="2">Average Crown Base Height - 15 feet, a 13 ft increase
Average Crown Bulk Density - .05 lb/ft/^{3} – a .02 lb/ft/^{3} decrease</td></tr>
<tr><td>Condition Classes in FR 1 within treated areas</td><td colspan="2">FR1CC1 = 0%
FR1CC2 = 34%
FR1CC3 = 66%</td><td colspan="2">FR1CC1 = 23%
FR1CC2 = 77%
FR1CC3 = 0%</td></tr>
<tr><td>Improve Forest Health</td><td>Percentage of Unhealthy Forest Stands Treated</td><td colspan="2">0%</td><td colspan="2">66%</td></tr>
<tr><td colspan="6">Balance Project Activities with Wildlife Habitat Needs</td></tr>
<tr><td rowspan="7">Old Growth Habitat</td><td>Effects on Old Growth habitat</td><td colspan="2">Old growth remains the same, multi-storied and dense. Alternative favors canopy-dependent species such as pileated woodpecker and pine marten. High tree stocking and fuel loads make old growth stands subject to stand-replacement fire.</td><td colspan="2">500 acres of OFMS treated, converted to OFSS. Younger stands (about 6,500) are treated to accelerate old growth development. Species that prefer open stand conditions, such as white-headed woodpecker, benefit.</td></tr>
<tr><td>Warm Dry
<u>Forest Types</u></td><td><u>OFMS</u></td><td><u>OFSS</u></td><td><u>OFMS</u></td><td><u>OFSS</u></td></tr>
<tr><td>% Post-Treatment</td><td>20%</td><td>1%</td><td>19%</td><td>3%</td></tr>
<tr><td>% In 50 Years</td><td>48%</td><td>9%</td><td>42%</td><td>16%</td></tr>
<tr><td>Hot Dry
<u>Forest Types</u></td><td><u>OFMS</u></td><td><u>OFSS</u></td><td><u>OFMS</u></td><td><u>OFSS</u></td></tr>
<tr><td>% Post-Treatment</td><td>36%</td><td>1%</td><td>36%</td><td>6%</td></tr>
<tr><td>% In 50 Years</td><td>56%</td><td>15%</td><td>44%</td><td>25%</td></tr>
</table>

Issues	Measure	Existing Condition (No Action)			Proposed Action		
	# Acres Of Replacement Old Growth (ROG) Treated	0			100		
	Old growth Connectivity Corridors Treated	0 acres (0%)			364 acres (10%)		
Big Game Habitat	Habitat Effectiveness Index (HEI)	HEI exceeds FP standards for winter range (0.5) and summer range (0.4). In winter range, values range from .57 to .66. In summer range, values range from .53 to 57.			Reduces HEI, but values still exceed FP standards. In winter range vales range from .55 to .66. In summer range, values range from .50 to .57.		
	Effects on Big Game Habitat	Total cover (41% of project area) exceeds FP standards. Satisfactory cover is below standards. Cover will continue to increase at the expense of forage. High tree stocking and fuel loads make cover stands subject to stand-replacement fire.			Reduces total cover from 41% to 35%. In Vance Creek and Upper Canyon winter range, total cover drops below FP standards. Satisfactory cover, already below FP standards, is reduced further. Cover reductions requires a non-significant FP amendment. Treatment improves forage on about 8,000 acres.		
	Cover %	Marginal 28%	Satisfactory 13%	Total 41%	Marginal 24%	Satisfactory 11%	Total 35%
	Open Road Densities	1.83 miles of open road per square mile. Open road densities meet or exceed FP standards except in Vance Creek Summer Range.			1.83 miles of open road per square mile. Open road densities meet or exceed FP standards except in Vance Creek Summer Range.		
Dead Wood Habitats	Effects on Snag Habitats	In the short-term, maintains existing snag and down log levels. In the long-term snag levels are expected to increase due to insect, disease and wildfire.			Harvest removes incidental levels of snags; prescribed fire increases snags. In the long-term, snags increase but not at the same rate as No Action alternative. More large trees available for snag recruitment.		
	Snag Densities	Snags 10"-20" dbh	Snags 20"+ dbh		Snags 10"-20" dbh	Snags 20"+ dbh	
	Post-treatment Snags	6.4	1.4		6.6	1.3	
	Snags in 50 Years	9.0	2.6		7.5	2.3	
	DecAID Wildlife Tolerance Levels	1-50%			1-50%		

<table>
<tr><th>Issues</th><th>Measure</th><th colspan="2">Existing Condition (No Action)</th><th colspan="2">Proposed Action</th></tr>
<tr><td rowspan="3">Northern Goshawks</td><td>Effects to Northern Goshawk</td><td colspan="2">Nesting habitat increases as stand density and canopy cover increases. High tree stocking and fuel loads make habitat subject to stand-replacement fire.</td><td colspan="2">Treatment reduces nesting habitat for goshawks. Nest stands in 3 known goshawk territories are protected. Seasonal restrictions applied to management activities to minimize disturbance.</td></tr>
<tr><td>Northern Goshawk Habitat Treated Acres (% Treated)</td><td>Primary <u>Habitat</u>

0 Acres (0%)</td><td>Secondary <u>Habitat</u>

0 Acres (0%)</td><td>Primary <u>Habitat</u>

0 Acres (0%)</td><td>Secondary <u>Habitat</u>

300 Acres (13%)</td></tr>
<tr><td>Fawn Post-Fledging Area (PFA) Acres (% Treated)</td><td colspan="2">0 Acres (0%)</td><td colspan="2">95 Acres (22%)</td></tr>
<tr><td rowspan="3">Landbirds - Priority Habitats</td><td>Old Growth Dry Forest</td><td colspan="2">Habitats favor canopy-dependent species. OFSS habitat remains very limited.</td><td colspan="2">500 acres of OFMS treated, converted to OFSS. Younger stands (about 6,500) are treated to accelerate old growth development. Species that prefer open stand conditions, such as white-headed woodpecker, benefit (see old growth section above).</td></tr>
<tr><td>Riparian Woodlands and Shrublands</td><td colspan="2">No direct effects to riparian bird species. Several RHCAs high risk for stand-replacement fire. Aspen would continue to decline.</td><td colspan="2">RHCA's - precommercial thinning on 61 acres and prescribed fire on 251 acres. Reduces risk of stand-replacement fire. Low intensity, mosaic burns have minimal short-term impacts on landbirds and positive long-term benefits because of shrub development. Aspens will continue to decline.</td></tr>
<tr><td>Shrub-Steppe Habitats</td><td colspan="2">No direct effects to shrub-steppe bird species. Indirectly, no treatment would continue to allow conifers to encroach on habitats.</td><td colspan="2">Treatments not prescribed in any large expanses of open shrublands or grasslands. Prescribe burning may occur in fringe habitats and in small inclusions in forested stands. Scattered loss of shrubs would have minimal effects to species that use them.</td></tr>
</table>

Issues	Measure	Existing Condition (No Action)	Proposed Action
Consider Social and Economic Implications	Value of Commercial Harvest	$0	$2,140,000
	Jobs	0	135
	Volume of Commercial Products	0 CCF	28.6 CCF
Amount of Road Construction and Opening and Reclosing of Closed Roads	Miles of Temp. Roads Constructed	0 miles	2 miles
	Miles of Closed Roads Temporarily Reopened	0 miles	46 miles

CHAPTER 3 – AFFECTED ENVIRONMENT AND ENVIRONMENTAL EFFECTS

Introduction

This chapter provides information concerning the affected environment of the Canyon Creek Wildland Urban Interface project area, and potential consequences to that environment from the Proposed Action (Alternative 2) or the likely results of taking No Action (Alternative 1). All types of effects, including direct, indirect and cumulative effects, are disclosed. Effects are quantified where possible, or discussed qualitatively. The means by which potential adverse effects will be reduced are described (see also Chapter 2).

The discussions of resources and potential effects take advantage of existing information included in the Malheur National Forest Plan's FEIS, the Canyon Creek Watershed Analysis, other project EA's or EIS's, project-specific resource reports and related information, and other sources as indicated. Where applicable, such information is briefly summarized and referenced to minimize duplication.

Specialist Reports and Project Record

This Environmental Assessment hereby incorporates by reference the Forest Vegetation, Fire and Fuels, Roads, Wildlife, Soil, Water, Fisheries, Scenery, Recreation, Range, Heritage, and Socio-Economics Specialist Reports in the Canyon Creek Wildland Urban Interface Project Record (40 CFR 1502.21). These Specialist Reports are located in each specialist's section of the Project Record and contain the detailed data, methodologies, analyses, conclusions, maps, references, and technical documentation that the resource specialists relied upon to reach the conclusions in this environmental assessment.

The Project Record for the Canyon Creek Wildland Urban Interface Project includes all project-specific information, including resource reports, the watershed analysis, and other results of field investigations. The record also contains information resulting from public involvement efforts. The planning record is located at the Blue Mountain Ranger District Office in John Day, Oregon, and is available for review during regular business hours.

Analyzing Effects

Direct, Indirect and Cumulative Effects

Direct environmental effects are those occurring at the same time and place as the initial cause or action.

Indirect effects are those that occur later in time or are spatially removed from the activity.

Cumulative effects are those effects that result from the incremental impact of the action when added to other past, present or reasonably foreseeable future actions regardless of the agency or person that undertakes such other actions (40 CFR 1508.7). Cumulative effects can result from individually minor, but collectively significant actions taking place over a period of time. These "related actions" may be influencing current conditions. If so, their current (or foreseeable) effects are relevant to considerations of whether the proposed action would add to their effects.

In the descriptions of cumulative effects of the proposed action, relevant related actions that are known are identified and discussed. (A full listing of relevant related actions is provided in Appendix C.) Each cumulative effects analysis, for each environmental component, is guided by and consistent with the Council on Environmental Quality letter, "Guidance on the Consideration of Past Actions in Cumulative Effects Analysis" of June 24, 2005.

Irreversible and Irretrievable Commitments

NEPA regulations also state that the Forest Service must show any irreversible or irretrievable commitments of resources that may result from the alternatives. An irreversible commitment is a permanent resource loss including the loss of future options. It usually applies to nonrenewable resources, such as minerals or cultural resources, or to factors that are renewable only over long periods, such as soil productivity. Such commitments are considered irreversible because the resource has deteriorated to the point that renewal can occur only over a long period of time, at a great expense or because the resource has been permanently destroyed or removed. An irretrievable commitment is the loss of use or production of a natural resource for some time. One example is when suitable timberland being used for a winter sport site. Timber growth on the land is irretrievably lost during the time the land is used as the winter sport site, however, if the use changed, timber growth could be resumed. The growth lost is irretrievable, but the timber resource is not irreversibly lost because the land could grow trees again in the future. This analysis determined there are no irreversible or irretrievable commitments of resources due to this project.

Forest Plan Consistency

The proposed action is consistent with the Malheur National Forest Land and Resource Management Plan (Forest Plan - USDA Forest Service 1990) and its amendments. Applicable forest-wide and land use designation standards and guidelines have been incorporated. The Forest Service uses design measures in the planning and implementation of land management activities. The application of these measures begins during the planning and design phases of a project.

Plans of Other Agencies

The CEQ regulation implementing NEPA requires a determination of possible conflicts between the proposed action and the objectives of Federal, State, and Local land use plans, policies, and controls for the area. The major land use regulation of concern is the Oregon Smoke Management Plan. See the “Findings and Disclosures” section at the end of this chapter for a discussion of compliance with this and other laws.

Existing Conditions and Analysis of Effects

The following sections contain information on the existing condition of individual resources and the reasonably likely outcome of taking No Action - Alternative 1 at this time. The effects (direct, indirect, and cumulative) of the Proposed Action - Alternative 2 on those resources and reasonably likely outcome of project implementation are also disclosed. More detailed discussions on methodology, analytical arguments, and further scientific discussions are contained within the various specialists’ reports in the project files. These are available upon request.

Analysis of effects considers the cumulative effects of future maintenance burning since we are managing a wildland-urban interface and we desire to continue maintaining the reduced risk to homes and other property that this project is designed to provide . Prescribed burning is one of the best tools to maintain the forest in a healthy and fire safe condition and is a general goal of forest management throughout the Blue Mountains.

The INFORMS modeling incorporated the 3,000 acres of burning that is included in the Proposed Action for the next ten years, but did not incorporate any future burning nor any future mechanical treatments. This is because the model is only to be used as a comparative tool between alternatives of various treatments and is not intended to accurately predict the end results at specific times. Since the timing and location of future activities would be speculative, they are not included in the INFORMS modeling.

Fuels

Introduction

This project is identified in the Grant County Community Fire Protection Plan (GCCFPP) as a priority project. The GCCFPP is the result of a county wide effort initiated to reduce forest fire risk to citizens, the environment, and quality of life within Grant County. Citizens, fire districts, county staff or elected officials, and agency representatives have worked together to create a plan that would be successful in implementing fuels reduction projects, fire prevention education campaigns, and other fire-related programs. The objective, as stated in the Plan, is to enhance fire suppression capabilities by modifying fire behavior and providing a safe and effective area for fire suppression activities. In addition, the Canyon Creek Watershed Analysis (2003) recommends minimizing the risks of catastrophic wildfire and restore fire as a disturbance process.

A general principal goal of fuel-reduction treatments is to reduce fireline intensities, reduce the potential for crown fires, improve opportunities for successful fire suppression, and improve the ability of forest stands to survive wildfire (Peterson et al.). To accomplish fuel reduction, canopy, ladder, and surface fuels can be manipulated in several different ways to affect their size, arrangement, density, and loading to then affect fire behavior. This section of the EA summarizes the existing fuel conditions and the effects of treating and not treating crown or canopy fuels, ladder fuels, and surface fuels.

Many of the landowners within and adjacent to the project area, some utilizing grants through the Oregon Department of Forestry, have treated their lands to reduce fuels. The BLM manages approximately 2500 acres of forest land in the Little Canyon Mountain Area situated between the city limits of Canyon City to the north, Little Pine Creek to the east, Canyon Creek to the west and the Strawberry Mountain Wilderness on which fuel reduction has occurred under the Little Canyon Mountain Fuels Reduction EA. The majority of untreated land within and adjacent to the project is Forest Service. The greatest threat to life and property is on these untreated lands.

Definition of Terms

Canopy base height – The lowest height above the ground at which there is a sufficient amount of canopy fuel to propagate fire vertically into the canopy.

Canopy bulk density – The mass of available canopy fuel per unit of canopy volume. It is stand characteristic as opposed to a tree characteristic.

Condition Class – (fire regime condition class) a classification of the amount of departure from the natural regime (Hann and Bunnell 2001). There are three condition classes for each fire regime. The classification is based on a relative measure describing the degree of departure from the historical natural fire regime. This departure results in changes to one (or more) of the following ecological components: vegetation characteristics (species composition, structural stages, stand age, canopy closure, and mosaic pattern); fuel composition; fire frequency, severity, and pattern; and other associated disturbances (e.g. insect and diseased mortality, grazing, and drought).

Crowning Index – an indicator of crown fire hazard, it is the 20-foot wind speed needed to support an active or running crown fire dependent on canopy bulk density, slope steepness, and surface fuel moisture content. As a stand becomes denser, active crowning occurs at lower wind speeds, so crown fire hazard is greater at lower index values. The crowning index from the Forest Vegetation Simulator (FVS) (see Analysis Methods) is used to create a crown code in INFORMS.

Fire regime – A natural fire regime is a general classification of the role fire would play across a landscape in the absence of modern human intervention, but including the influence of aboriginal burning (Agee 1993, Brown 1995). Coarse scale definitions for natural (historical) fire regimes have been developed by Hardy et al. (2001) and Schmidt et al. (2002) and interpreted for fire and fuels management by Hann and Bunnell (2001). The five natural (historical) fire regimes are classified based on average number of years between fires (fire frequency) combined with the severity (amount of replacement) of the fire on the dominant overstory vegetation.

Fire risk – the chance of a fire starting from any ignition source, determined by using the frequency of past fire starts.

Fire hazard – the potential magnitude of fire behavior and effects as a function of fuel conditions for any particular forest stand or landscape.

Torching Index – an indicator of crown fire hazard, it is the 20-foot wind speed in miles per hour at which a surface fire is expected to ignite the crown layer dependent on surface fuels, surface fuel moisture, canopy base height, slope steepness, and wind reduction by the canopy. As surface fire intensity increases (with increasing fuel loads, drier fuels, or steeper slopes), or canopy base height decreases, it takes less wind to cause a surface fire to become a crown fire.

Regulatory Framework

Malheur Forest Management Plan and the Malheur National Forest Fire Management Plan

The Malheur National Forest Land and Resource Management Plan (Forest Plan), (USDA 1990) includes Forest-wide fire management direction consistent with other resource goals. The goals for fire management are to: 1) initiate initial management action that provides for the most reasonable probability of minimizing fire suppression costs and resource damage, consistent with probable fire behavior, resource impacts, safety, and smoke management and 2) identify, develop, and maintain fuel profiles that contribute to the most cost-efficient fire protection program consistent with management direction (Forest Plan IV-4).

The Malheur National Forest Fire Management Plan (FMP), (USDA 2006) is an annually updated operational guide that defines how the Fire Management Program will be implemented on the Malheur National Forest. Additional Forest wide fire management direction is in the Fuels Specialist Report located in the project record.

The suppression activities in these areas will primarily be full control. In the visual corridors the method used to suppress wildland fires should have the least impact on vegetation and soils possible. Apply “Minimum Impact Suppression Tactics” to the extent possible.

Healthy Forest Restoration Act

The Healthy Forest Restoration Act (HFRA) of 2003 is designed to expedite hazardous-fuel reduction and forest-restoration projects on specific types of Federal land that are at risk of wildland fire or insect and disease epidemics. All proposed HFRA actions must be consistent with the applicable resource management plans and they must be on lands managed by the USDA Forest Service or DOI BLM. For a project to meet the requirements of HFRA, the actions must occur in one of four areas. The area that this project is proposed is within a Wildland Urban Interface.

Grant County Community Fire Protection Plan

The Grant County Community Fire Protection Plan (GCCFPP) was developed by County citizens, fire districts, county staff or elected officials and agency representatives. The GCCFPP’s mission is to reduce the risk of forest fire to life, property, and natural resources in the County. This project is within the GCCFPP defined WUI boundary and included in the GCCFPP Action Plan. The management objective as stated in the GCCFPP is to enhance fire suppression capabilities by modifying fire behavior inside the zone and providing a safe and effective area for fire suppression activities.

The GCCFPP’s assessment for this project area determined that Risk Factor 1: Fire Behavior Potential was a 2 indicating there are moderate slopes, broken moderate fuels, and some ladder fuels. The composition of the surrounding fuels is conducive to torching and spotting. These conditions may lead to moderate fire fighting effectiveness. Risk Factor 2: Values at Risk was a 2 indicating an intermix or occluded setting, with a scattered areas of high-density homes, summer homes, camps, or campgrounds that are less than a mile apart. Risk Factor 3: Infrastructure was a 2 indicating limited access routes, moderate grades, limited water supply, and limited fire fighting capability in an area surrounded by scattered fire conducive landscape.

The Clean Air Act

The Clean Air Act (as amended in 1990) is establishes certain minimum requirements which must be met nationwide, but states may be able to establish additional requirements. Users of prescribed fire must comply with all applicable federal, state and local air quality regulations. The Clean Air Act establishes major air quality goals, and provides means and measures to attain those goals by addressing existing and potential air pollution problems. The major air quality goals include attaining National

Ambient Air Quality Standards (NAAQS), preventing significant deterioration of air quality in areas cleaner than the NAAQS

Analysis Methods

The INtegrated FOrest Resource Management System (INFORMS) software program was used for project analysis. INFORMS was designed for project level analysis and provides an interface to a variety of analysis tools such as the Most Similar Neighbor (MSN), Forest Vegetation Simulator (FVS), and the Fuels and Fire Extension for FVS (FFE-FVS). More information on this software and the analysis methods for the fire and fuels analysis can be found in the Fuels Specialist report. Prescribed burning is applied only once and in the first decade in the INFORMS model. Maintenance burning was not modeled during this analysis.

Existing Condition

Weather and Topography

Average annual precipitation ranges from approximately 13 inches near John Day to 39 inches in the higher elevations of the Strawberry Mountains. The mean monthly precipitation is highest in November and December occurring mostly as snowfall and the lowest precipitation is in July. More information is in Chapter 1 of the WA.

Topography influences fire behavior at different spatial scales. Rate of spread doubles from 0 to 30 percent slope, and doubles again from 30 to 60 percent slope. Local discontinuities such as ridges can create turbulence that affects rate of spread and energy release. Topography in conjunction with general direction of fire spread and wind also affects fireline intensity and effects.

Topography of the project area is mountainous with gentle to moderately steep slopes resulting from sedimentation, past volcanic activity, and subsequent weathering/erosion processes. The project area north of Canyon Creek has more moderate slopes while the area south of Canyon Creek has steeper slopes and is more dissected with ridges.

Suppression/Protection

There are approximately 40 homes within the project area. John Day/Canyon City Rural fire protection responds to fires on private lands along Canyon Creek for about .5 mile past it’s confluence with Vance Creek (just past the J Bar L Guest Ranch). Beyond that point, the State and Forest Service respond to fire reports in the project area. Response times would be variable depending on resource locations and availability at the time of the report. The primary lookout for fire detection is Dry Soda.

Wildland fire threatens structures in three ways: direct exposure from flames, radiated heat, and airborne firebrands. The proposed treatments are meant to decrease the probability of wildland fire threatening structures in the immediate area of the project from all three means. Creating “defensible space” implies that the vegetation in the area between a structure and an oncoming wildland fire has been modified to reduce the wildland fire threat and to provide an opportunity for firefighters to effectively and safely defend the structure. Fuels can be treated in a relatively small area immediately adjacent to structures to reduce exposure to flames and radiant heat. Evidence suggests that fuel reduction within 40 meters of a structure can substantially reduce ignitions from direct exposure to flames or their radiant heat (Cohen 1995 and Alexander et. al. 1998). Although Cohen’s research advocates that the fuel profile only needs treatment within 40 meters of residences, it is reasonable to assume that fuels reduction and thinning outside of this perimeter will decrease fire intensity, thereby increasing the ability of firefighters to protect life and property.

Structures at risk in the project area are on private land, adjacent to National Forest land. Many landowners have already treated their property, and some are currently in the process of creating defensible space. Reducing the fuel loadings, fuel continuity, and the availability of ladder fuels keeps fire confined to the ground, reduces fire intensity, and reduces firebrands, all of which increase the ability to control fires. Reducing the threat of ignition from firebrands requires reducing fuels both near and at some distance from the structure. Ignitions may result from firebrands originating as far away as 1 kilometer or more (Cohen 2000). Threat from firebrands, however, becomes greater the closer the fire moves to structures.

Local fire personnel concerns regarding suppression within the project area include existing fuel levels across the area, access (more so on the south side of Canyon Creek than the north) due to closed roads and many earth berm closures, and the turn around time for water with ground suppression.

Fire Risk

Fire risk is the chance of a fire starting from any ignition source, and is determined by using the frequency of past fire starts. Included in calculating fire risk are the number of fire starts, number of years of data, and number of acres involved. The value derived corresponds to a likelihood of a fire starts per 1,000 acres. The Canyon Creek watershed is at high risk indicating at least one fire expected in 0 to 10 years per thousand acres. The predominate fire ignition source in the southern Blue Mountains is lightning. Lightning ignitions vary by elevation, aspect, and fuel type.

Fire Hazard

Fire hazard for any particular forest stand or landscape is the potential magnitude of fire behavior and effects as a function of fuel conditions (Peterson et al. 2004). Fire hazard most commonly refers to the difficulty of controlling potential wildfire. Fire behavior characteristics such as rate-of-spread, intensity, torching, crowning, spotting, fire persistence, or resistance to control are generally used to determine and describe fire hazard. As Brown et al (2003) indicated, fire severity can be considered an element of fire hazard. Fire hazard must be reduced in order to protect life and property.

Large wildfire events burn quickly across the landscape and can consume hundreds to even thousands of acres in a single day. During extreme weather events, downhill fire runs of up to 5 miles during one burning period are not uncommon on the Malheur National Forest. Suppression resources contain over 95% of fires to less than 10 acres. Those fires that escape initial containment usually are ignitions that occur when fuel moistures and atmospheric conditions allow for extreme fire behavior, fires are in areas of high contiguous fuel loads, fires are not quickly or easily accessible, fires are in areas that don't allow suppression resources to safely work in close proximity to the fire (no escape route and/or safely zone), or a combination of the above.

Escape routes and safety zones are critical for firefighter safety allowing for suppression efforts that protect life and proptery. An escape route is an easily negotiated path to a safe area or safety zone where the fire would not post a threat to firefighters. In frequent fire regimes where fuels are light, fire burns quickly leaving behind a blackened area. Without the presence of other hazards, this area can provide an accessible safety zone for firefighters working directly on the fires edge.

Fire behavior and severity depend on the properties of the various fuel strata and the continuity of those fuel strata. The fire hazard can be characterized by the potential for fuels to cause specific types of behavior and effects. Fuelbeds can be classified into 6 strata:

- tree canopy,
- shrubs/small trees
- low vegetation,
- woody fuels
- moss, lichens, and litter, and
- ground fuels (duff) (Graham et al. 2004).

The influences of fine fuels such as litter, duff, grasses and small woody fuels (less than 3 inches diameter) have the most affect on spread rate and intensity of fires. These fuels are used in fire behavior models developed for predicting the fire behavior of the initiating fire (Rothermel 1983). Coarse Woody Debris (>3 inches) have little influence on spread and intensity of the initiating fire; however, they can contribute to development of large fires and high fire severity. Fire persistence, resistance-to-control, and burnout time (affects to fire fighter and public safety, soil heating and tree mortality) are significantly influenced by loading, size, and decay state of large woody fuel. Torching, crowning, and spotting contribute to large fire growth and are greater where large woody fuels have accumulated under a forest canopy. Large woody fuel, especially containing large decayed pieces, are a suitable fuelbed for firebrands and can hold smoldering fire for extended periods of time (Brown et al 2003). Spot fires can also be started in rot pockets of standing snags. The distance firebrands travel is dependent of size of the firebrand, wind speed, and height above ground of the source.

Crown fires are generally considered the primary threat to life, property, and ecological and human values. Crown fires occur when surface fires create enough energy to preheat and combust fuels well above the surface (Agee 2002). Crown fires pose the greatest threat to fire fighter safety from increased fire line intensities and long distance spotting. These risks force the fire fighter to an indirect suppression strategy, which increases acres burned and thus increases fire severity on the landscape.

Existing fuel conditions are a result of effective fire suppression for the past 75 to 100 years, timber harvest, and livestock grazing. There has been an increase in understory vegetation and surface fuels, a change in species composition, and an increase in the continuity of vertical and horizontal stand structure. As a result, the potential for crown fire has increased. Historic stand structure played an important role in maintaining fire-dependent forest types, such as ponderosa pine (Graham, et al, 2004). Throughout much of the lower elevation grassland, woodland, and forest, grasses are one of the primary fine fuels that allow fire to spread. Livestock grazing has had an effect on the availability of these fuels since European settlement began (around 1850).

Surface Fuels

Fuel models (FM), are used to help describe and quantify surface fuel situations and estimate fire behavior. Criteria for choosing a fuel model involve assessing the fuel strata that will support the fire as it spreads and generates heat intensity. Where fuel beds are fairly continuous with similar fuel characteristics, one model can provide a realistic representation of expected fire behavior. A brief description of the FM characteristics that are located in the project area and their representation follows:

FM 2 includes open shrub lands and ponderosa pine stands. Grasslands being encroached by conifers, as well as light understory development is typical. These stands may include clumps of fuels or small concentrations of dead down material that could generate higher intensity fire and may produce firebrands. Fire spread is primarily through the fine curing grass, dead herbaceous fuels, and litter. Grazing can reduce grasses, decreasing the potential fire spread where grass is the primary carrier.

FM 8 represents a closed canopy of short-needle conifers with a compact surface-fuel litter layer. Representative vegetation types are mixed conifers of lodgepole, Douglas fir, subalpine fir, white fir, and larch. The surface-fuel layer is mainly needles and occasional twigs with very little undergrowth. Fires are typically slow burning with low flame lengths. An occasional heavy fuel concentration may cause a flare up, but the chance of any erratic fire behavior is small. Only under severe weather conditions with high temperatures, extremely low relative humidity, and high wind speeds does this fuel bed pose a high fire hazard.

FM 9 areas have mature stands with small amounts of understory development. Fires spread through surface litter that has accumulated under more dense stands of ponderosa pine. Concentrations of dead-down woody material will contribute to possible torching of overstory trees.

FM 10 represents an area in which there is a moderate loading of larger size fuel at the surface layer. In this model, fires burn in the surface and ground fuels with greater fire intensity than the other fuel models. The fuel bed contains a moderate loading of large size fuels from insect/disease, wind damage, or natural mortality. High heat intensity, torching, spotting, and crowning may be expected during wildfire events; resistance to control is high.

FM12 is similar to FM 10 in that the primary fire carrier is larger woody debris but it has heavier loadings than FM10. High heat intensity, torching, spotting, and crowning may be expected during wildfire events and resistance to control is high.

Within the project area, many stands identified as fuel model 2 have a component of fuel model 10. This is due to insect and disease mortality or density induced mortality. Forty-four percent of the area is in a Fuel Model 2/10 and 14% in a Fuel Model 10 as displayed in Table F-1.

In addition, duff levels over much of the project area range from .25” to 1” in depth. The exception is directly under the larger ponderosa pine trees. Bark from ponderosa pine constantly flakes off and accumulates within the first few feet of the bole of the tree. With the exclusion of fire over the past century these bark flakes have reached depths of up to 12” under much of the larger ponderosa pine. When these duff mounds burn completely, under low moisture conditions, high stress can be placed on the tree, often causing mortality.

Table F-1 Fuel Model Percent across project area

Fuel Model	Percent of Project Area
2/10	44%
3	7%
5	4%
8	19%
9	10%
10	14%
12	<1%

An average fuel loading for each fuel model was obtained. As stated above, for fuel model 2, the loading does not take into account the pockets of insect, disease, or density caused mortality. This increases the loading to what is at least indicated for fuel model 10 in the following table. These areas of higher fuel loading would have increased fire intensities, torching, spotting, and crowning during wildfire events.

Increased resistance to control during wildfire suppression efforts means protection of life and property is more difficult.

Table F-2 Existing Fuel Loadings by Fuel Model

Size Class	Loading for Areas Identified as FM2 (Approximate)	Loading for Areas Identified as FM8 in Tons/Acre (Approximate)	Loading for Areas Identified as FM9 in Tons/Acre (Approximate)	Loading for Areas Identified as FM10 in Tons/Acre (Approximate)
0”-0.25”	0.3 Tons per Acre	0.4 Tons per Acre	0.6 Tons per Acre	1.0 Tons per Acre
0.26” – 1”	0.5 Tons per Acre	0.6 Tons per Acre	0.8 Tons per Acre	1.8 Tons per Acre
1.1” – 3”	2.2 Tons per Acre	3.3 Tons per Acre	3.4 Tons per Acre	2.8 Tons per Acre
3” +	6.0 Tons per Acre	7.0 Tons per Acre	8.0 Tons per Acre	13.5 Tons per Acre
Duff	1.2 Tons per Acre	1.6 Tons per Acre	2.2 Tons per Acre	1.4 Tons per Acre
Total	10.2 Tons per Acre	12.9 Tons per Acre	15.0 Tons per Acre	20.5 Tons per Acre

The Blue Mountains Entomologist and Pathologist reviewed the area in 2004 with an overall finding that almost all insects and diseases found in the Blue Mountains are found within the project area, emphasizing the need to treat the area for fuels and forest health. This area suffered severe western spruce budworm defoliation during the outbreak between 1985 and 1992. As a result, high levels of mortality especially in understory trees occurred and these trees are now on the ground contributing to the surface fuel loadings, increasing it substantially in places. Douglas-fir dwarf mistletoe is prevalent in most of the Douglas-fir trees, many with moderate to severe infestations. The mistletoe generated broom and branch breakage and mistletoe caused tree mortality which has fallen to the ground are also contributing to the surface fuel loading. Breakage and mortality will continue to add to surface fuel loads as long as the high levels of mistletoe infection are present in the Douglas-fir.

Ponderosa pine mistletoe is also present in the project area at varying levels of infestation. Primary impacts to dwarf mistletoe-infected ponderosa pine are reduced growth and vigor, and increased mortality rates. These infected trees also have increased susceptibility to torching, since brooming is often low and persist in the lower crowns. These are resinous and often have accumulations of needles and debris, increasing their flammability.

Fir engraver-caused mortality in the grand fir is also very high in some locations within the project area. They are currently large numbers of fading red trees. Higher populations of this beetle occur during prolonged dry periods or when stands are overstocked, and are both currently contributing factors.

Bark beetle populations in the project area are high as they are throughout the Blue Mountains. Ponderosa pine mortality is evident in all sizes of trees, with one or several beetle species responsible for causing mortality. Trees stressed from overstocking and droughty conditions are susceptible to attack. The pockets of mortality are contributing to increased fuel levels in the project area.

Ladder and Crown Fuels

Crown fires are generally considered the primary threat to life, property, ecological and human values. They occur when surface fires create enough energy to preheat and combust fuels well above the surface (Agee, 2002). Crown fires are typically faster moving than surface fires, more difficult to suppress, and pose the greatest threat to fire fighter safety from increased fire line intensities and long distance spotting. These risks force an indirect suppression strategy, which increases acres burned, and thus increases fire severity on the landscape result in more tree mortality, and smoke production. The continuity and density of tree canopies in combination with wind and physical setting provide conditions required for rapidly moving crown fire. Canopy base height, canopy bulk density, and canopy continuity are key characteristics of forest structure that affect the initiation and propagation of crown fire. Reducing canopy bulk density by thinning is a means to minimize crown fire hazard. As surface fire intensity increases, or canopy base height decreases, it takes less wind to cause a surface fire to become a crown fire. As a stand becomes denser, active crowning occurs at lower wind speeds and the stand in more vulnerable to crown fire (Reinhardt, et al, 2003).

As stated above, canopy bulk density and crown base height are factors contributing to crown fire. The average canopy base height (the lowest height above the ground at which there is a sufficient amount of canopy fuel to propagate fire vertically into the canopy) within the project area is 15 ft. The average crown bulk density (the mass of available stand canopy fuel per unit of canopy volume) is .05 $lb/ft/^3$.

Crown Fire Initiation Potential

Currently, 30% of the project area or approximately 6,800 acres have a high or greater potential for crown fire based on surface fuels, canopy bulk density, canopy base height, slope steepness, surface fuel moisture, and wind reduction by the canopy as described previously. Approximately, 60% of the project area has a low to moderate crown fire initiation potential with only 7% being low, which is far from the desired condition of mostly low with some areas of medium depending on where in the natural fire cycle the area is (see Map 7 in Appendix B).

Table F-3 Existing Crown Fire Initiation Potential

Crown Fire Initiation Potential	% of project area
Extreme	0%
Very-High	6%
High	24%
Medium	52%
Low	7%

In this fire regime 1 dominated project area, an uncharacteristic high intensity fire can be expected with passive or active crown fires and long range spotting. Flame lengths will exceed capability for suppression forces to use a direct attack strategy. Fire severity is expected to be high with damage to soils and mortality in all size classes of trees.

Fire Regime Condition Class

A natural fire regime is a general classification of the role fire would play across a landscape in the absence of modern human intervention, but including the influence of aboriginal burning (Agee 1993, Brown 1995). Coarse scale definitions for natural (historical) fire regimes have been developed by Hardy et al. (2001) and Schmidt et al. (2002) and interpreted for fire and fuels management by Hann and Bunnell (2001). The five natural (historical) fire regimes are classified based on average number of years between fires (fire frequency) combined with the severity (amount of replacement) of the fire on the dominant overstory vegetation. The five regimes include:

- I – 0-35 year frequency and low (surface fires most common) to mixed severity (less than 75% of the dominant overstory vegetation replaced);
- II – 0-35 year frequency and high (stand replacement) severity (greater than 75% of the dominant overstory vegetation replaced);
- III – 35-100+ year frequency and mixed severity (less than 75% of the dominant overstory vegetation replaced);
- IV – 35-100+ year frequency and high (stand replacement) severity (greater than 75% of the dominant overstory vegetation replaced);
- V – 200+ year frequency and high (stand replacement) severity.

Fire regimes have been identified for all plant associations occurring across the Blue Mountains. In addition, fire frequency with the percent of any fire that may be mixed severity or stand replacing has been identified for all plant associations in the Blue Mountains. Within the project area, approximately 82% has been identified as plant associations within the warm dry plant association group and in Fire Regime 1 with an average fire frequency of 22 years and 24% of any fire potentially being stand replacing. Approximately 6% of the area has been identified as plant associations within the hot dry plant association group and in Fire Regime 1, with an average fire frequency of 15 years and 10% of any fire potentially being stand replacing.

A fire regime condition class (FRCC) is a classification of the amount of departure from the natural regime (Hann and Bunnell 2001). Coarse-scale FRCC classes have been defined and mapped by Hardy et al. (2001) and Schmidt et al. (2001). They include three condition classes for each fire regime. The classification is based on a relative measure describing the degree of departure from the historical natural fire regime. This departure results in changes to one (or more) of the following ecological components: vegetation characteristics (species composition, structural stages, stand age, canopy closure, and mosaic pattern); fuel composition; fire frequency, severity, and pattern; and other associated disturbances (e.g. insect and diseased mortality, grazing, and drought). All wildland vegetation and fuel conditions or wildland fire situations fit within one of the three classes. The three classes are based on low (FRCC 1), moderate (FRCC 2), and high (FRCC 3) departure from the central tendency of the natural (historic) regime (Hann and Bunnell 2001, Hardy et al. 2001, Schmidt et al. 2002). The central tendency is a composite estimate of vegetation characteristics (species composition, structural stages, stand age, canopy closure, and mosaic pattern); fuel composition; fire frequency, severity, and pattern; and other associated natural disturbances. Low departure is considered to be within the natural (historic) range of variability, while moderate and high departures are outside.

Characteristic vegetation and fuel conditions are considered to be those that occurred within the natural (historic) fire regime. Uncharacteristic conditions are considered to be those that did not occur within the natural (historic) fire regime, such as invasive species (e.g. weeds, insects, and diseases), “high graded” forest composition and structure (e.g. large trees removed in a frequent surface fire regime), or repeated annual grazing that maintains grassy fuels across relatively large areas at levels that will not carry a surface fire.

Determination of amount of departure is based on comparison of a composite measure of fire regime attributes (vegetation characteristics; fuel composition; fire frequency, severity and pattern) to the central tendency of the natural (historical) fire regime. The amount of departure is then classified to determine the fire regime condition class.

A fire under current conditions would not burn as a low severity surface fire. Fires would be mixed severity to stand replacing with detrimental effects to other resources that did not historically occur. Another ecological component that has changed and is contributing to the departure from the natural fire regime includes the vegetation condition. Tree densities are much higher, and species composition has shifted to have a higher proportion of shade tolerant, fire susceptible fir. Insect and disease are contributing to tree mortality in the area that then contributes to surface fuel loading as trees fall to the ground.

At the landscape scale, the appropriate scale at which to evaluate fire regimes and ecological departure for FRCC determination (Hann et al 2003), the current condition is FR1CC2 at 57% departure. The percentage range defining moderate departure is 33% to 66%.

Air Quality

The prevailing winds are from the up-canyon winds. During the day, diurnal heating forces air up valley and up slope out of the area. During the night, air follows the drainages in the area downstream. Inversions affect air quality the most during the winter months, but during the rest of the year inversions sometimes develop in the morning hours and dissipate by noon.

The Strawberry Mountain Wilderness is a Class I airshed and is adjacent to the project area. In class I areas, only very small increments of new pollution above already existing air pollution levels are allowed. The State has designated visibility protection periods for class 1 airsheds from July 1st to September 15th for Central Oregon and the Cascades. At this time these protection periods have not been set for Class 1 airsheds in Eastern Oregon. Monitoring has not shown that visibility within the area is degraded, so the state does not list the Strawberry Mountain in the short-term or long-term strategy.

Smoke Sensitive areas have been identified and the La Grande Basin is the closest listed non-attainment area (PM 10). It is approximately 45 air miles to the northeast of the project area. Ada County, Idaho (includes Boise and the north half of the county) is a non-attainment area (carbon monoxide). It is 150 air miles southeast of the project area.

Currently, air quality in surrounding sensitive areas is limited to short term impacts. These impacts result from wood burning for home heating, prescribed burning, and field burning to the west and from the Boardman coal fire power plant and the Three Mile Canyon Farm in Boardman to the north. Air quality can be reduced from smoke produced by wildfires burning many miles from the project area. The impact to the Class I airshed is from field burning in the Willamette Valley and Central Oregon. Haziness can last for several days in the spring and summer. The visibility impairment from the north is primarily a winter time occurrence.

Burning will follow the guidance provided by the Oregon Smoke Management Plan and specifically, Directive 1-4-1-601, the Operational Guidance for the Oregon Smoke Management Program. This agreement is between the NE Oregon federal land management agencies and Oregon ODF. It limits smoke emissions to 17,000 tons of particulate a year. It is assumed that 2,000 tons is produced from wildland fires, with 15,000 tons allowed for prescribed burning. It is agreed that this level of activity will not degrade regional air quality. ODF monitors activity, and if the 15,000 ton limit is reached will shut down prescribed fire activity.

Each state, including Oregon, has a State Implementation Plan (SIP) which provides the means by which these goals are to be attained. The SIP may contain measures such as emission standards for air pollution sources, air quality permit programs, and regulations controlling specific air pollutant sources such as mobile sources, wood-burning stoves and slash burning.

Environmental Consequences

Alternative 1 - No Action

This alternative does not reduce or increase fuels by commercial harvest, pre-commercial thinning, mechanical surface fuel treatment, or prescribed fire. The effect of no action would be more difficult and less successful protection of life and property because of increased potential for uncharacteristic, crown fire behavior. Fire severity with detrimental effects to vegetation and soils would be high.

Direct and Indirect Effects

Fire Hazard

The effect of no action would be to see increased potential for uncharacteristic, crown fire behavior. With increases in ladder fuels from the high stocking levels in the understory, low canopy base height, and high canopy bulk density, the expected fire behavior for much of the project area is not of low severity surface fires, as it was historically but has the potential for high severity effects to the vegetation and soils.

If a wildfire occurs, the hazard of erosion would greatly increase on severely burned areas due to inadequate ground cover and possibly hydrophobic soil. In addition nutrients and organic matter would be lost.

Large ponderosa pines would continue to be vulnerable to mortality from wildfires due to deep accumulations of duff that has built up and would continue to build around the base of the boles and due to ladder fuels. They are also threatened by the current overstocking. This overstocking would increase under this Alternative. Forested areas on Douglas-fir and grand fir sites that historically were dominated by ponderosa pine would continue toward their climax vegetation. Conifers would continue a slow encroachment into small meadows in the project area, resulting in an overall loss of dry meadows as an ecosystem component. Native shrubs and other native ground vegetation in the project area are adapted to low severity fire. The absence of low severity fire has had adverse effects on these plants that have also been adversely impacted by the shading and competition from conifers. When wildfires occur, the severity would be greater with this alternative, possibly killing plants that would otherwise have the ability to sprout after a low severity fire.

Surface Fuels

If no action is taken, the project area would increase in the potential for stand replacing fire rather than the low-intensity-and-severity fires that historically occurred. Surface fuels including downed-woody material, needle litter, and duff accumulation would increase from current levels, contributing to the potential for stand replacing fire.

In 50 years, there would be a 32% increase in Fuel model 10 indicates more area with larger size down woody material comprising the surface fuels. Forty-six percent of the project area would be in a Fuel model 10 where fire would burn with higher intensities and crowning and spotting would occur. These departures from the existing condition and from the desired condition to models with heavier fuel loadings indicate fires would burn with high intensity and severity. High heat intensity, torching, spotting, and crowning may be expected during wildfire events and resistance to control would be high. This makes protection of life and property more difficult and chances for successful suppression less.

Table F-4 Fuel Models in 50 years without treatment

Fuel Model	Current Percent of the Project area	Percent of Project Area in 50 years	Percent Change from Existing Condition
2/10	**44%**	27%	-17%
3	**7%**	7%	0%
5	**4%**	3%	+1%
8	**19%**	9%	+10%
9	**10%**	5%	+5%
10	**14%**	46%	+32%
12	**<1%**	2%	+1%

Table F-5 Fuel Loadings in tons per acre by Fuel Model within 50 year with no treatment

Size Class	Loading for Areas Identified as FM2 (Approx)	Loading for Areas Identified as FM8 (Approx)	Loading for Areas Identified as FM9 (Approx)	Loading for Areas Identified as FM10 (Approx)	Loading for Areas Identified as FM12 (Approx)
0”- 0.25”	0.3 tons per acre	.6 Tons per Acre	0.6 Tons per Acre	0.7 Tons per Acre	1.1 Tons per Acre
0.26” – 1”	1.4 Tons per Acre	1.4 Tons per Acre	1.6 Tons per Acre	2.3 Tons per Acre	3.6 Tons per Acre
1.1” – 3”	1.8 Tons per Acre	1.6 Tons per Acre	1.6 Tons per Acre	2.7 Tons per Acre	4.6 Tons per Acre
3” +	7.2 Tons per Acre	8.4 Tons per Acre	7.7 Tons per Acre	15.0 Tons per Acre	32.3 Tons per Acre
Duff	1.2 Tons per Acre	1.6 Tons per Acre	1.7 Tons per Acre	1.8 Tons per Acre	2.7 Tons per Acre
Total	11.8 Tons per Acre	13.5 Tons per Acre	13.2 Tons per Acre	22.4 Tons per Acre	44.3 Tons per Acre

Ladder and Crown Fuels

The continuity and density of tree canopies would provide conditions that enable rapidly moving crown fire. Overstocked stands would continue to slow in growth. Stand density would increase and tree vigor would decrease. The overall resiliency to withstand natural disturbances would continue to decrease. Late seral species would continue to increase in mixed species stands

As stated above, canopy bulk density and crown base height are factors contributing to crown fire. The crown bulk density increases to .07 and the crown base height increases by approximately three feet. This is likely due to increased density causing mortality of understory or smaller trees in the main canopy that raises the crown base height a few feet.

Crown Fire Initiation Potential

This area historically had rather short fire free periods that prevented high fuel loads to accumulate and limited the layers within the stand. There is a 4% increase in area with high to extreme crown fire initiation potential. Overall, there is at least 34% of the project area that has higher potential for crown fire than would have occurred under conditions characteristic of Fire regime 1 (see Map 8 in Appendix B).

Table F-6 Crown Fire Potential in 50 years with no treatments

Crown Fire Potential	Existing Crown Fire Potential - % of the project are	Crown Fire Potential in 50 years - % of project area	Percent Change from Existing Condition
Extreme	0%	1%	+1%
Very-High	6%	6%	0%
High	24%	27%	+3%
Medium	52%	43%	-9%
Low	7%	14%	+7%

Fire Regime Condition Class

As stated earlier, fire regime 1 represents the dry upland forest such as the ponderosa pine and the Douglas-fir plant associations or the warm dry plant association group (PAG) and comprises approximately 88% of the project area. A fire under current conditions would not burn as a low severity surface fire. Fires would be mixed severity to stand replacing with detrimental effects to other resources that did not historically occur.

The vegetation condition is another ecological component that would continue to contribute to the departure from the natural fire regime. Tree densities would continue to increase and species would continue the shift to having higher proportions of shade tolerant, fire susceptible fir. Stand conditions would increase susceptibility to insect and disease effects at levels that are highly departed from the natural fire regime. The Fire Regime Condition Class for the project area would continue to increase showing the increasing departure from the natural fire regime.

Air Quality

No action would have the least immediate impact on air quality, as there is no prescribed burning or pile burning. All biomass does remain available for consumption by wildfires and it would continue to accumulate, increasing the potential for large amounts of smoke during the summer months, when diurnal inversions can concentrate smoke at low elevations. Because wildfires tend to occur at the driest time of the year, fuels are more completely consumed and typically produce three to five times more emissions than early or late season prescribed fires. There is a potential during a wildfire for approximately 440 pounds per acre of PM2.5 emissions. These smoke concentrations can have high particulate levels that can cause health problems, or violate summertime Class I air quality visibility standards for Wilderness areas. The residences along Canyon Creek and the communities of Canyon City and John Day would be impacted by smoke from a wildfire in this area.

Cumulative Effects

All activities in Appendix C have been considered for their cumulative effects on fire and fuels. The following discussion focuses on those past, ongoing, and foreseeable activities that may contribute effects to fire or fuels. The area considered for cumulative effects is the Canyon Creek Watershed. The time period considered for cumulative effects begins with the initial operations and continues for 50 years.

Past actions including fire suppression, timber harvest, and grazing have contributed to the current conditions of fuels and the departure from the natural disturbance regime. These actions have resulted in increases in understory vegetation and surface fuels, changes in species composition and vegetative continuity. Some of the 177 miles of road construction enabled fire suppression personnel to more easily access fire starts and contributed to successful fire suppression. A portion of the 768 acres of commercial thinning and 3,606 acres of precommercial thinning reduced canopy and ladder fuels but many acres are still overstocked needing additional fuel reductions treatments. Fire suppression would continue as an ongoing activity but would get increasingly more difficult as fuels increase.

The fuel treatments on other ownerships reduce the chance of a severe wildfire on those ownerships. Not treating this area doesn’t contribute to landscape fuel reduction with those adjacent and nearby lands. No action of this project effects other present and ongoing actions described in Appendix C in that the potential for high intensity and high severity wildfire increases and would effect all action if one were to occur. The future treatments around the lookout and along Hwy 395 aren’t sufficiently large enough to modify fire behavior within the project area. The future prescribed burning would not likely occur with No Action under this proposal, as the heavy fuel loadings would make it difficult to control.

Alternative 2 - Proposed Action

The proposed action is designed to reduce fuel loading in the Canyon Creek WUI project area by reducing fuels in three fuel layers: Crown or canopy fuels and ladder fuels would be reduced by commercial and precommercial treatments. Surface fuels would be reduced through hand or grapple piling and burning the piles, and/or underburning. To best protect lives and property by modifying fire behavior, fuel reduction treatments were emphasized adjacent to private owned lands, along the major ridge that is the southern project boundary, and along the Wilderness boundary.

The proposed action addresses the risk factors of the Grant County Community Fire Protection Plan's as described in the Regulatory Framework in the Fuels section. This proposal reduces fuels addressing the risk factors thereby improving fire fighting effectiveness to protect life and property.

Commercial fuel reduction treatments would be accomplished by generally thinning the smaller diameter trees and retaining the larger trees at a variable spacing. There would also be some species conversion from fire and insect prone late seral species to more resistant early seral species both by selective thinning and by regeneration harvesting. The focus of the thinning would be largely on smaller diameter trees found either below the main forest canopy or within the canopy where tree crown density would allow the spread of crown fire. Mechanical treatments would remove ladder fuels that carry fire into the tree crowns.

Non-commercial falling of small diameter trees would also reduce ladder fuels and the continuity of the tree crowns. This is proposed both within the areas treated by the commercial fuel reduction treatments and in areas where there is little commercial material but there is still a need to remove the smaller trees.

Direct and Indirect Effects

Fire Hazard

An overall effect of the proposed action would be a reduction of canopy fuels, ladder fuels, and surface fuels which would contribute to successful fire suppression and protection of life and property under most fire scenarios. Mechanical fuel treatments that reduce ladder and canopy fuels would have a direct effect on canopy base height and crown bulk density. The continuity of the fuels within the project area is broken up especially along boundaries with private lands, along the major ridge that is the southern project boundary, and along the Wilderness boundary. The construction of the road to access private land will allow for fuel treatment that will contribute to modifying fire behavior on the landscape. This private land is adjacent to proposed units that will create a contiguous block of treated ground.

Surface Fuels

There is a short-term increase in fire hazard following treatment and prior to slash disposal when fuels remain in the units and on the ground. Existing surface fuels and created slash would be treated by one or a combination of methods. Yarding tops to landings for utilization or disposal by burning is one method. The landing locations for many of the units that are proposed for skyline yarding do not have sufficient landing area to pile the slash from whole tree yarding or yard tops to landing fuel treatment methods. This means the all tops and limbs will need to be left in the stand and existing and created fuels will be treated by hand piling and burning of the piles. Within the units that will be yarded by helicopter, the limbs and tops will be separated from the bole and left in the unit. This material will also need to be piled and burned, mostly by hand piling, but some grapple piling may also occur. Pile burning would occur during the first burning window after piling is complete. Other treatments include handpiling and burning, grapple piling and burning, and application of understory prescribed fire. These treatments reduce the surface fuel load. All units include treatments to reduce the surface fuels to mitigate the possible increase in surface wind movement and drier fuels. A prescribed burning program into the future will be needed to maintain the desired fuel levels and limit regeneration from becoming a ladder fuel concern as well as a stand density concern.

Van Wagtendonk (1996) found in fire simulations that a reduction in fuel loads decreased subsequent fire behavior, increased fireline control possibilities and decreased fire suppression costs. Efficient fireline construction rates are also enhanced where fuel reduction has occurred, which decreases resistance to control (Agee et al 2000). Increased fireline control leads to enhanced firefighter safety.

The beneficial effects of prescribed fire on altering fuel structure and wildfire behavior and effects have long been observed and reported. Prescribed fire is a useful tool to alter potential fire behavior by influencing multiple fuelbed characteristics, including:

- Reducing loading of fine fuels, duff, large woody fuels, rotten material, shrubs, and other live surface fuels, which together with compactness and continuity change the fuel energy stored on the site and potential spread rate and intensity.
- Reducing the horizontal fuel continuity (shrub, low vegetation, woody fuel strata), which disrupts growth of surface fires, limits the buildup of intensity, and reduces spot fire ignition probability.
- Increasing compactness of surface fuel components, which retards combustion rates (Graham et al. 2004).

Prescribed burning often consumes some of the lowest ladder fuels, and scorches the lowest tree branches, killing them which raise the live crown above the ground surface. Prescribed burning can reduce fire intensity and severity from wildfires (Omi, Martinson 2002, Pollet, Omi, 1999). The primary stand attributes that control fire behavior are surface fuel condition, crown bulk density, and crown base height (Graham 1999). Prescribed burning reduces downed woody material and ladder fuels including removal of some understory trees and increasing the ground to crown distance through scorch. In a study of the effects of low intensity fires on ponderosa pine forests in Zion National Park, needle/litter fuel load layer was reduced by 54 percent, duff loading was reduced by 35 percent and pole sized trees were reduced by 18 percent (Bastian 2001). With the reduction in ladder fuels, there would be a reduced probability of a surface fire moving into the tree crowns.

The proposed prescribed burning is all within the warm-dry biophysical environment and fire regime 1. It is proposed within 2,050 acres that would be treated mechanically first and within 950 acres outside of treatment units. The objective for the surface fuels is to reduce loadings to desirable levels. Mortality in the smaller diameter trees is acceptable. Mortality of larger diameter trees would be minimized as described in the project design. Lighting would occur in approximately 200 acres of RHCA's in units 2, 3, 4, 5, 6, 7, and 8. The objective within RHCAS is to reduce the surface fuels. By lighting within the RHCA 's lighting patterns can be utilized that will best meet the surface fuel reduction with limited tree mortality and soil exposure. Soil effects from prescribed burning would be minor. Burning would take place so as to avoid decreasing ground cover below LRMP standards, so erosion would not be significant.

The treatments of the Proposed Action result in an 11% increase in Fuel Models 2 and 9 and a 5% decrease in Fuel Model 10 and 12. The loading within each fuel model also decreases. Average flame lengths increase as areas of fuel model 2 increase due to increased effective wind speed within stands and increases in fine fuels (grasses). While increased surface-fire intensity (flame-length) under extreme fire-weather conditions is not desirable, the combination of modified surface, ladder, and canopy fuels still suggests improved firefighting capability even under difficult weather circumstances, and also reduced fire severity (resource impacts). These expected outcomes are the result of less crown-fire potential and thus lower overall intensity. Ongoing grazing in the project area can also effect fire intensity as flame lengths will be less in areas where grazing has reduce the grass height.

Table F-7 Fuel Model Percent in project area after Proposed Action treatments

Fuel Model	Existing Condition % of project area	After Proposed Action Treatments % of project area	Percent change from Existing Condition
2	**44%**	52%	+8%
3	**7%**	7%	0%
5	**4%**	6%	-2%
8	**19%**	15%	-4%
9	**10%**	7%	+3%
10	**14%**	10%	-4%
12	**<1%**	0%	-1%

Table F-8 Fuel Loadings by Fuel Model after treatments of the Proposed Action

Size Class	Loading for Areas Identified as FM2 (Approximate)	Loading for Areas Identified as FM8 in Tons/Acre (Approximate)	Loading for Areas Identified as FM9 in Tons/Acre (Approximate)	Loading for Areas Identified as FM10 in Tons/Acre (Approximate)
0”-0.25”	0.3 Tons per Acre	0.4 Tons per Acre	0.6 Tons per Acre	0.7 Tons per Acre
0.26” – 1”	0.5 Tons per Acre	0.6 Tons per Acre	0.8 Tons per Acre	0.8 Tons per Acre
1.1” – 3”	0.9 Tons per Acre	1.3 Tons per Acre	1.4 Tons per Acre	2.2 Tons per Acre
3” +	3.3 Tons per Acre	7.0 Tons per Acre	5.7 Tons per Acre	11.5 Tons per Acre
Duff	1.2 Tons per Acre	1.6 Tons per Acre	2.2 Tons per Acre	1.4 Tons per Acre
Total	**6.2 Tons per Acre**	**10.9 Tons per Acre**	**10.7 Tons per Acre**	**16.6 Tons per Acre**

Ladder and Crown Fuels

Mechanical thinning can be effective in reducing vertical fuel continuity that contributes to the initiation of crown fires, especially when the thinning emphasizes the smaller trees. The net effect of removing ladder fuels is that surface fire burning through treated stands are less likely to ignite the overstory canopy fuels (Graham et al. 2004). Thinning is potentially effective at reducing the probability of crown-fire spread, and is precise in that specific trees are targeted and removed from the fuels bed. Commercial and precommercial cutting would be accomplished by thinning from below so the smaller diameter trees would be cut the larger trees retained. This would reduce canopy fuels, ladder fuels, and continuity of the tree crowns.

There is a concern that has been raised that removal of the canopy level trees can increase fire risk. As Peterson (2004) points out, in some cases, removal of trees from the canopy and understory could increase surface wind movement, and facilitate the drying of live and dead fuel, although effective removal should mitigate these factors by reducing the fuel load and potential for fire spread. Agee (2005) also states that sufficient surface fuel treatment after thinning provides an overall reduction in expected fire behavior and fire severity that usually outweighs the changes in wind speed and fuel moisture. The overall reduction is surface, ladder, and crown fuels in addition to reducing the fuel continuity. Commercial and precommercial treatments in overstocked stands reduces the ladder fuels, increases the average distance between the ground and the crown of the trees, increases the distance between the crowns of the trees, and decreases the continuity the overstory.

Other benefits of these treatments include increased growth and improved vigor on residual trees, which in turn decreases their susceptibility to mortality from insects and disease. Observations by Cram (2006) that mechanical treatment followed by prescribed fire (including pile burning) had the greatest influence toward mitigating fire severity. Specifically, as density and basal area decreased and mean tree diameter increased, fire severity decreased. See the vegetation section for additional effects on composition and density, and structural stages.

Canopy base height, canopy bulk density, and canopy continuity are key characteristics of forest structure that affect the initiation and propagation of crown fire. In treated units, the average crown base height is 28 feet, a 13 foot increase from the existing condition. The average canopy bulk density of treated units is .03 $lb/ft/^3$, a .02 $lb/ft/^3$decrease. Reducing canopy bulk density and raising the crown base height by commercial harvest and precommercial thinnings is a means to minimize crown fire hazard.

Reducing the fuel loadings, fuel continuity, and the availability of ladder fuels keeps fire confined as a surface fire and reduces the occurrence of firebrands, which increases the ability to control fires. In the WUI, reducing the threat of ignition from firebrands requires reducing fuels both near and at some distance from the structures. Proposed treatments reduce the likelihood of firebrands being lofted from fires onto private land and structures. This improves our ability to protect life and property.

Crown Fire Initiation Potential

After the treatments of the proposed action, approximately 72% of the project area has a low to moderate potential for crown fire and these areas are located in treatment units along boundaries with other ownerships, along the major ridge that is the southern project boundary, and along the Wilderness boundary. These areas of low and moderate crown fire potential, along with the approximately 10% of the project area that is non-forest or non-vegetated ground, break up the continuity of fuels in order to change fire behavior. The Proposed Action decreased the amount of area with a high or very-high potential for crown fire by 13%. The areas remaining with higher potentials are scattered across the project area not in contiguous blocks. These factors will contribute to successful fire suppression and protection of life and property under most fire scenarios. It is important to keep in mind when looking at the percentages that approximately 34% of the project area diagnosed for treatment is not being treated but are included in the tables. These acres are not proposed for treatment because fire hazard could be reduced sufficiently and these areas would address other resource needs. In stands that are being treated the changes are more apparent (see Maps 16 and 17 in Appendix B). The crown code determined from the crown fire index which indicates if a stand is capable of sustaining a running crown fire indicates a 17% increase in low from the existing condition. After treatments of the proposed action 54% of the project area has low potential for sustaining a running crown fire.

A maintenance burning program is needed in the future to limit regeneration and maintain low levels of surface fuels. Without maintenance burning, future conditions will be represented as in Map 17 (Appendix B). The modeling for this project applied prescribed burning once and in the first decade not intervals over the next 50 years. By implementing a maintenance burning program the crown fire potential would be kept similar to that of the proposed action as regeneration would be kept at low levels, not creating ladder fuels and the surface fuels would be kept at low levels.

Table F-9 Crown Fire Potential after treatments of the Proposed Action

Crown Fire Initiation Potential	% of project area Existing Condition	% of project area after treatments	% change compared to Existing Condition
Extreme	0%	0%	0%
Very-High	6%	3%	-3%
High	24%	14%	-10%
Medium	52%	55%	+3%
Low	7%	17%	+10%

The stands proposed for treatment, stands currently with a low crown fire potential, non-forested and non-vegetated stands all contribute on the landscape to breaking up fuel continuity. When all these stands are considered, the pattern on the landscape will modify fire behavior and reduce fire growth, allowing for protection of life and property.

Fire Regime Condition Class

Fire regime 1, a low severity but high frequency regime, comprises approximately 88% of the project area. Treatments will change vegetation characteristics including stand density, species composition, and structural stage. Treatments will also change fuel composition and potential fire severity, components relating to change from reference conditions. After completion of all mechanical treatment and prescribed burning on the 1,800 proposed acres, these stands will be changed to a Condition Class 1. Maintenance burning in these stands will maintain them in Condition Class 1. Mechanical treatment of stands not followed by prescribed burning (5,240 acres) will improve the stand Condition Class but stands won't be considered to be CC1 until prescribed fire is applied in the future (identified as a future action in Appendix C). Of the treated area, the Proposed Action results in an approximate 44% increase in CC2 and an approximate 23% increase in CC1.

Untreated stands will remain in the existing FRCC and most will depart further from the reference conditions resulting in changes from FRCC 2 to FRCC 3.

At the landscape scale, the appropriate scale at which to evaluate fire regimes and ecological departure for FRCC determination (Hann et al 2003), the project area after the treatments of the Proposed Action remains a FR1CC2. The project area moves closer to the reference condition remains in the same Condition Class. Future prescribed burning and as more stands reaching old forest structural stages will help move the project area into a FRCC 1.

Treatments result in a project area FRCC2 of 2 but with a lower percentage indicating some stands would be considered in a Condition Class 1. The increased tree growth from thinning would cause the development of old forest structural stages to accelerate, allowing the thinned stands to grow into the large size classes sooner. In the Warm Dry biophysical environment old forest single strata is projected to increase from 1% to 16%. As structure approaches the historic range of variability and with continued maintenance burning to sustain low fuel levels, the FRCC percentage number will decrease (moving into FRCC1) as the ecological departures decrease.

Air Quality

Approximately 100-140 lbs/acre of PM2.5 emissions and 120-180 lbs/acre of PM10 emissions are produced from prescribed burning. This is substantially less per acre emissions than a wildfire. There will be short term impacts to some of the residences along Canyon Creek, in Canyon City, and John Day. There will also be impacts along Highway 395.

Cumulative Effects

All activities in Appendix C have been considered for their cumulative effects on fire and fuels. The area considered for cumulative effects is the Canyon Creek Watershed. The time period considered for cumulative effects begins with the initial operations and continues for 50 years. The following discussion focuses on those past, ongoing, and foreseeable activities that may contribute effects to fire or fuels.

Past actions including fire suppression, timber harvest, and grazing have contributed to the current conditions of fuels and the departure from the natural disturbance regime. These actions have resulted in increases in understory vegetation and surface fuels, changes in species composition and vegetative continuity. Past grazing reduced fine fuels at varying levels depending on the intensity of grazing which reduced potential fire spread. Some of the 177 miles of road construction enabled fire suppression personnel to more easily access fire starts and contributed to successful fire suppression. A portion of the 768 acres of commercial thinning and 3,606 acres of precommercial thinning reduced canopy and ladder fuels but many acres are still overstocked needing additional fuel reductions treatments.

Cumulatively, this project, in combination with the fuel treatments on private ownerships, Little Canyon Fuels Reduction on BLM land, and the future fuel treatment projects on private land such as Mr. John Morris, around Dry Soda Lookout and along Highway 395 would have a positive effect on protection of life and property and reduction in the potential for a severe wildfire across the landscape. Fire suppression will continue as an ongoing activity and the probability of successful suppression will improve with the above mentioned projects.

Future grazing will continue to affect fine fuels. This can impact the implementation of prescribed fire and meeting objectives if it removes the fuel (grasses) to carry fire. Grazing management and fuels management need be coordinated to best meet objectives of both. Some people have suggested that continued grazing will also shift the plant communities toward shrubs and trees. Local experience shows increases in trees is not due to grazing but to the past combination of timber harvest and fire suppression as described in the Forest Vegetation - Existing Condition section of Chapter 3.

Future prescribed burning would be necessary to maintain fuels at desirable levels and limit ingrowth. If a maintenance burning program is not implemented future conditions will be represented as in Map 17 (Appendix B). The modeling for this project applied prescribed burning once in the first decade and not intervals over the next 50 years. By implementing a maintenance burning program the crown fire potential would be kept similar to that of the proposed action as regeneration would be kept at low levels, not creating ladder fuels and the surface fuels would be kept at low levels.

Consistency With Direction and Regulations

The No Action Alternative does not meet the Forest Plan direction 1) initiate initial management action that provides for the most reasonable probability of minimizing fire suppression costs and resource damage, consistent with probable fire behavior, resource impacts, safety, and smoke management and 2) identify, develop, and maintain fuel profiles that contribute to the most cost-efficient fire protection program consistent with management direction (Forest Plan IV-4).

The No Action Alternative also does not meet the objectives of the Grant County Community Fire Protection Plan or the Healthy Forest Restoration Act.

The Proposed Action meets the Forest Plan direction as stated above.

The Proposed Action is also consistent with the objectives of the Grant County Community Fire Protection Plan and the Healthy Forest Restoration Act because it reduces hazardous fuel to protect lives and propterty.

Irreversible and Irretrievable Commitments

There are no irreversible and irretrievable commitments of resources that may result from the proposed action with respect to fire and fuels.

Forest Vegetation

Introduction

The following discussion assumes that all of the project design features for each alternative are carried out as described in Chapter 2. The silvicultural aspects and implications to the affected environment and environmental consequences of the treatments will be covered.

Definition of Terms

Mechanical Treatments – Vegetation changes done by mechanical methods (pre-commercial thinning, commercial thinning, shelterwood harvest, etc) instead of by other means, such as prescribed burning.

Reference Condition - The vegetation resulting from conditions and disturbances that existed prior to European - American settlement, which began in the 1850's. Used as a baseline for "natural" conditions.

Current Condition - The current forest vegetation resulting from actions taken over the last 150 years, in combination with natural processes. Some of the actions include grazing, mining, logging, and fire suppression.

Desired Condition – Forest vegetation resilient to natural disturbances and where disturbances result in historic patch sizes.

Expected Range of Variation – The expected range of variation in ecosystem composition and structure that would be anticipated (similar to historic conditions) under natural disturbance regimes in the current climatic period.

Historic Range of Vegetation (HRV) – The percentage of each structural stage thought to have existed across the landscape before European - American settlement.

Biophysical Environments – PAG (Plant Association Groups) - Vegetation classification using similar moisture and temperature environments resulting in similar fire regimes.

Hot Dry Forest – Occupies low to mid elevations and mainly south slopes. Stands are composed primarily of ponderosa pine. Fire regime is low intensity, high frequency (10-15 years) over most of the area, with small patches of mortality.

Hot Moist Forest – Transition zone between low sagebrush meadows and hot dry plant associations. Stands are composed primarily of ponderosa pine and juniper. Fire regime is low intensity, high frequency (10-15 years) over most of the area, with small patches of mortality.

Warm Dry Forest – Occupy low to mid elevations and south slopes at higher elevations. Stands are composed of ponderosa pine, Douglas-fir, lodgepole, grand fir, and western larch. Fire regime is low intensity, high frequency (10-15 years) over most of the area, with small patches of mortality.

Warm Moist Forest – Similar to warm dry, but located in areas of more moisture with more shrubs such as ninebark, shrub maples, and oceanspray in the understory. Fire regime is low intensity, high frequency (10-15 years) over most of the area, with small patches of mortality.

Cool Moist Forest – Occupy mid elevations, northerly aspects and cooler, wetter draw bottoms. Stands are composed of ponderosa pine, Douglas-fir, grand fir, lodgepole pine, western white pine, and western larch. Fire regime is mixed, with low intensity, high frequency (10-15 years) regime overlaid with a high intensity, low frequency (100-200 years) regime. Patch size would range from 200 to 2,000 acres.

Cool Dry Forest – Occupy mid to higher elevations, northerly aspects and cooler areas that are relatively dry. Stands are composed of ponderosa pine, Douglas-fir, grand fir, lodgepole pine, western white pine, and western larch. Fire regime is mixed, with low intensity, high frequency (10-15 years) regime overlaid with a high intensity, low frequency (100-200 years) regime. Patch size would range from 200 to 2,000 acres.

Cold Dry Forest – Occupy high elevation sites, northerly aspects, and colder, relatively dry areas. Stands are composed of Englemann spruce, subalpine fir, whitebark pine, and lodgepole pine and the fire regime is high intensity, low frequency (50-275+ years) with noticeable susceptibility to torching and crown fires.

Woodlands – Occupy dry sites at low to mid elevations, often on south slopes. Stands are historically open ponderosa pine savannahs and sparse western juniper that was maintained by frequent fires.

Structural Stage – Classification of forest stands by developmental stage and size.

Stand Initiation (SI) – A single canopy stratum of seedlings and saplings established after a stand replacing disturbance.

Stem Exclusion Open Canopy (SEOC) – A single canopy stratum of pole to small saw sized timber that excludes an understory by lack of water.

Stem Exclusion Closed Canopy (SECC) – A single canopy stratum of pole to small saw sized timber that excludes an understory by shade.

Understory Reinitiation (UR) – The overstory has been opened up by natural mortality or thinning, allowing an understory to become established.

Young Forest Multi Strata (YFMS) – Multiple canopy layers provide vertical and horizontal diversity with a mix of tree sizes. Large trees are absent or at low stocking levels.

Old Forest Single Strata (OFSS) – Large trees are frequent, limited understory and one canopy level.

Old Forest Multi Strata (OFMS) – Large trees are frequent, has multiple canopy levels.

Regulatory Framework

Forest Wide Standards and timber management constraints set forth in the Malheur National Forest Land and Resources Management Plan, as amended, are followed. Additional details on the regulatory framework for vegetative management are described in the specialist report.

Analysis Methods

Modeling is used to project stand development for future structural stages. The INFORMS program was used to run the FVS growth simulator on all of the forested stands within the project area. The Forest Vegetation Simulation (FVS) model, with the Blue Mountain variant, is being used to compare between alternative treatments. Long-term projections become estimates at best; however, results do show trends and are useful for comparing different alternatives.

Assumptions

Assumptions for the INFORMS Model

- Benchmarks for the future structural stage analysis are set at a time 10 years after treatment has occurred and 50 years from now.
- The mechanical treatments in this alternative are only applied once, at the start of the modeling time period. They are not repeated again within the 50 year modeling cycle.
- There was no adjustment for the modified thinning in the connectivity corridors
- Prescribed burning is applied only once and in the first decade in the INFORMS model.
- The stands without mechanical treatment are grown using the assumptions for the No Action Alternative.
- No other stand disturbances occur that result in stand replacement (fire, insects, wind, etc.).

(The above modeling constraints are used to simplify the analysis and are to be used for comparative purposes only and are not meant to accurately predict actual future conditions.)

The following conditions are reasonable expectations for the future management of the area and are used to estimate the effects of the various alternatives. All alternatives are compared using this set of assumptions for the future.

Assumptions for Estimating Effects

- The Historic Range of Variation approximates the Desired Condition.
- The future climate will be within the current range of variation.
- Current insects and diseases will continue to inhabit the forest and populations will fluctuate depending on stand conditions.
- The current trends in forest stand composition, structure, and density will continue, assuming that no further mechanical vegetation management would occur.
- Regenerating resulting from opening up stands will be kept at low levels by periodic underburning.

- The project area (22,700 acres) is located within portions of three subwatersheds, the analysis area for HRV analysis is expanded to encompass all three subwatersheds in their entirety (57,761 acres).
- The time period is from the present through 50 years into the future for HRV.

Existing Condition

Analysis Area Past Actions

Settlement by European immigrants began in the mid-1800's, initially by those involved in mining and grazing. Timber harvesting was localized, mainly for mine props and buildings. Towards the middle of the century, harvest moved upland to the middle and upper elevations of the project area and at first consisted of partial removal of the higher value species. Later a number of clearcuts of predominantly fir stands were harvested and reforested to mostly early seral species. The early 1900's also saw the formation of the National Forests and eventually fire suppression, which along with intensive grazing reduced the amount of fires to a low level.

The combination of timber harvest and fire suppression gradually converted forests from early seral species to a higher proportion of late seral species. Stand densities and multi-layer canopies also increased across the forests. These late seral trees are not resistant to forest insects, diseases, or to fire.

Within the last three decades there have been several outbreaks or defoliating insects and bark beetles that have caused widespread mortality. Large, high severity fires have burned across the forest including areas that historically burned at a low intensity but at frequent intervals. The Table Mountain Fire in 1988 burned approximately 600 acres in the project area and there have been two other fires in adjacent subwatersheds that have burned in the last 20 years. These have been fueled by the increased dead and down timber, dense stands, and multiple crown layers creating ladder fuels into the upper tree crowns.

Approximately 3,000 acres of timber harvest in the last 25 years has begun to correct the past changes, concentrating on thinning overstocked stands and shifting the species composition of late-seral species stands to more resilient early-seral species. There has been approximately 1,000 acres of commercial thinnings, mostly in small to medium diameter ponderosa pine stands, but have had limited improvement of tree growth due to the high densities that were left. The approximately 2,000 acres of regeneration treatments in fir-dominated stands have removed many of the late-seral species and retained healthy early-seral species trees, and reforested with early-seral species with the goal of shifting the species composition to more resilient early-seral tree species.

Precommercial thinning has been applied to a small proportion of the project area, predominately in the ponderosa pine stands. The effect has been to select the better growing trees and reduce competition between trees, resulting in increased growth rates and larger trees produced in a shorter time period.

Biotic Conditions

Information concerning stands has been gathered through a combination of photo interpretation, formal timber stand exams in 2003, and walk-throughs in 2004. The analysis area for determining the Historic Range of Variation (HRV) consists of the three sub-watersheds that contain the project area. The project area is smaller at 22,700 acres while the analysis area for HRV is 57,800 acres. The analysis area is 90% forested.

The lower elevations and south facing slopes are generally ponderosa pine plant associations with ground vegetation of pine grass, elk sedge, and common snowberry. Other tree species include western larch, Douglas-fir, lodgepole pine and grand fir. These stands are generally young and even-aged due to the nature of past harvests. There is low structural diversity and a lack of larger diameter trees and snags. The limiting factors to vegetative growth are competition for water, sunlight and soil nutrients.

The rest of the plant associations are predominantly Douglas-fir and grand fir climax. The grand fir series contain grand fir, Douglas-fir, western larch, lodgepole pine and ponderosa pine. Pinegrass, twinflower, grouse huckleberry, and big huckleberry dominate ground vegetation. These stands are typically overstocked multi-stratum canopies that are at high risk for insect and disease problems and stand replacement fire. Lodgepole pine with ground vegetation of grouse huckleberry occurs in the upper elevations.

The plant associations are grouped into biophysical environments that function somewhat alike. There are seven forested biophysical environments (plant association groups) that occur within the analysis area as displayed in the table below. Of these the Warm Dry biophysical environment is by far the most common, and within the actual project area it is even more dominant (see Biophysical Environment Map in Appendix B).

Table V-1: Biophysical Environments

Biophysical Environment	Acres within the Analysis Area	Percent within the Analysis Area
Hot-Dry	1,705	3 %
Hot-Moist	365	<1 %
Warm-Dry	46,115	80 %
Warm Moist	411	<1 %
Cool-Dry	846	1 %
Cool-Moist	378	<1 %
Cold-Dry (Lodgepole)	2,347	4 %
Non Forest	5,594	10 %
Total	**57,761**	

In the following discussions the plant association groups that comprise minor proportions of the analysis area (1% or less) have been combined with the association groups that function in a similar manner.

Hot Dry and Hot Moist Biophysical Environments

Hot Dry forests occupy approximately 1705 acres (3% of the analysis area). They occur across a range of soils (volcanic ash as well as mixed and residual soils - gravely to cobbly loams, clay loams) and southerly to flat aspects along mid to lower elevations. Species composition includes nearly pure stands of ponderosa pine to mixes where ponderosa pine is the dominant species and Douglas-fir, grand fir, western larch, and lodgepole pine occur in lesser amounts. The hot dry forests were subject to frequent, low intensity fires that maintained the ponderosa pine in the stands.

Hot Moist forests occupy approximately 365 acres (<1% of the analysis area). They occur across a range of soils (primarily residual soils - gravely to cobbly loams, clay loams) and southerly to flat aspects along mid to lower elevations. These areas are the transition between the low sagebrush-bunchgrass meadows and the hot dry ponderosa pine plant association groups. Species composition includes nearly pure stands of ponderosa pine with some juniper mixes in some locations. The hot moist forests were subject to frequent, low intensity fires that maintained the ponderosa pine in the stands, often at wide savannah-like spacings.

In some locations juniper is increasing its range into the hot dry forests in the absence of frequent ground fires. Also, ponderosa pine is encroaching into meadows that historically were kept free of trees by frequent fire occurrences.

Species Compositions and Successional Development

The low intensity/high frequency disturbance regime common in this forest type favored fire resistant species (ponderosa pine, and to a lesser extent western larch and Douglas-fir) and development of more open stands with little vertical structure. Shade tolerant species (grand fir and Douglas-fir) were generally susceptible to these fires due to their thinner bark when young and persistent, low hanging crown characteristics. Smaller understory trees were vulnerable to periodic fires surviving only in openings with too little fuels to carry a fire. The extent of these ground fires likely varied from small areas (less than 10 acres in size) to entire slopes covering thousands of acres depending upon the season, topography, and climatic conditions. The intensity also varied in response to vegetative conditions.

Overall, the frequency of these fires made them an agent of stability in these forest ecosystems. They kept the ground vegetation dominated by fire adapted grasses (such as pine grass and elk sedge), while promoting and maintaining mature forest vegetation dominated by ponderosa pine.

Disturbance Processes

Hot dry forests have been affected by a variety of disturbances. These include: insects; diseases; fire; and human related disturbances such as timber harvest, fire suppression, and grazing. Fire is by far the major natural disturbance agent in dry forests. Other disturbance agents in this forest type include a variety of insects and diseases. In general, these disturbance agents added to the structural diversity of these stands by providing small areas/openings for understory vegetation to establish.

Fire

Historic fire disturbance regimes in these forest environments can be best characterized as high frequency/low intensity. Fires started by natural ignition (i.e. lightning) or American Indian people burned in the form of underburns and small areas of lethal fires on a frequency of every 10-35 years in these forest types (Agee 1993, Hall 1977). These fires were agents of stability, helping to maintain stands with high proportions of fire tolerant species and large areas of relatively open park-like conditions. Small areas of denser forest patches occurred in areas missed or more resistant to fire (draws, spring seep areas, wetter aspects).

Recent fires have been large, stand replacement events that are very out of character with the historical fires that occurred. The Summit and Flagtail Fires are the most recent on the Blue Mountain Ranger District and covered 30,000 acres and 7,000 acres respectively, of which a portion of each fire was in the hot dry forest PVG. Both the Summit and Flagtail Fires burned with stand replacement intensity across ¾ of the area burned, much more intense than historical fires.

Insects

Bark beetles are the most common insects present in the dry forests that were historically dominated by larger diameter ponderosa pine. Mountain pine beetle and pine engraver were likely present at low levels due to the overall lack of suitable habitat (i.e. dense thickets of smaller diameter trees). Denser stands with a high proportion of sapling to pole sized ponderosa pine have increased levels of mountain pine beetle and Ips beetle activity and associated mortality. Western pine beetle is also present across dry forests, keying in on highly stressed larger overstory ponderosa pine. Fir engraver activity is prevalent in dry forests due to the combination of high stand densities and increased proportion of grand fir occupying these sites. At endemic levels, these forest insects play an important role in contributing to structural diversity, and providing dead wood habitat important for wildlife and soil productivity. Scattered individual tree mortality created small openings in stands where pockets of understory could establish. At epidemic levels, they create excessive dead fuel conditions that can lead to disturbance intensities outside the historic range.

Impacts of the recent (1985-1992) spruce budworm outbreak have been relatively minor in the hot dry forest as there is a lack of sufficient host trees (grand fir and Douglas-fir) to sustain populations.

Diseases
The primary root diseases in dry forests are Annosus and Armillaria that result in small "centers" of mortality and associated gaps in the forest canopy. These areas provided openings for understory vegetation (grasses, shrubs and seedlings) to establish and added to structural diversity. Overall levels were generally low because of the effects of fires maintaining increased abundance of species most tolerant to diseases (ponderosa pine and western larch), and increased ability of trees to ward off infections due to lower stand densities. Root diseases are currently at low levels within the project area.

Dwarf mistletoe was present in low levels throughout the hot dry forests of the watershed. The brooms created by mistletoe infections predisposed the occasional tree to bark beetle attack or torching by fire. Thus, frequent fires likely helped keep overall levels of mistletoe low due to the "fire pruning" of infected branches and negative impacts of the heat and smoke on developing mistletoe plants. Levels of mistletoe infection vary and are currently generally high on the south facing slopes in the planning area, probably a result of the historic partial cutting that removed a portion of the overstory trees and created openings that allowed an understory to become established.

Mechanical
Wind throw of occasional trees also added structural diversity by creating small gaps in the forest canopy, facilitating establishment of understory vegetation. Generally, ponderosa pine is relatively wind firm, but small patches of blowdown do occur.

Human
Human related disturbances (timber harvest, fire exclusion) have affected the dry forests more than the other forest types across the watershed. In the past, the most harvests focused on the removal of the larger overstory ponderosa pine. The most noticeable feature is the absence of large ponderosa pine trees in many stands. This is particularly evident in the lower and mid elevations due to early logging; there are few large trees and an abundance of young, small to medium sized trees. A number of the young ponderosa pine stands have been pre-commercial thinned in the past and some have already been commercial thinned too.

Table V-2: Hot Dry Forest HRV and Current Structural Stages within the 3 Subwatershed Analysis Area

Structural Stage	Historic Range of Variation[1]	Current Condition
Stand Initiation (SI)	5-15%	0%
Stem Exclusion Open Canopy (SEOC)	5-20%	56%
Stem Exclusion Closed Canopy (SECC)	0-5%	1%
Understory Reinitiation (UR)	0-5%	0%
Young Forest Multi-strata (YFMS)	5-10%	6%
Old Forest Single-stratum (OFSS)	20-70%	1%
Old Forest Multi-strata (OFMS)	5-15%	36%

[1]The HRV percentages are based on professional judgment of the historical extent of structural stages. (Powell, 1998).

Table V-3: Hot Moist Forest HRV and Current Structural Stages within the 3 Subwatershed Analysis Area

Structural Stage	Historic Range of Variation[1]	Current Condition
Stand Initiation (SI)	5-15%	0%
Stem Exclusion Open Canopy (SEOC)	5-20%	16%
Stem Exclusion Closed Canopy (SECC)	0-5%	3%
Understory Reinitiation (UR)	0-5%	10%
Young Forest Multi-strata (YFMS)	5-10%	3%
Old Forest Single-stratum (OFSS)	20-70%	9%
Old Forest Multi-strata (OFMS)	5-15%	59%

[1]The HRV for Hot-Moist is not published; the HRV percentages are based on the structural stages for the similar Hot Dry Biophysical Environment in Powell, 1998.

Warm Dry and Warm Moist Biophysical Environments

Warm Dry forests occupy approximately 46,115 acres (80% of the analysis area and 88% of the forested area). By far they are the most prevalent plant association group in the Canyon Creek WUI project area. They occur across a range of soils (volcanic ash as well as mixed and residual soils - gravely to cobbly loams, clay loams) and all aspects ranging from high to lower elevations.

Warm Dry forests are represented by an array of plant associations, indicating the wide range of environments they occupy. Species compositions range from nearly pure ponderosa pine to mixes of ponderosa pine, Douglas-fir, grand fir, western larch, and lodgepole pine. The warm dry forest includes most of the Douglas-fir plant associations and the drier grand fir plant associations (up to and including the grand fir/grouse huckleberry assoc.), since they all were subject to frequent, low intensity fires that maintained early seral species in the stands.

Warm Moist forests occupy approximately 411 acres (<1% of the analysis area). They are similar to the Warm Dry plant associations but are found in sites that are somewhat moister, such as north slopes and in areas of greater moisture due to topography. Warm Moist forests are represented by Douglas-fir and grand fir plant associations that contain ninebark, shrub maples, and oceanspray in the understory.

Species Compositions and Successional Development

The low intensity/high frequency disturbance regime common in this forest type favored fire resistant species (ponderosa pine, western larch, and to a lesser extent Douglas-fir) and development of more open stands with little vertical structure. Shade tolerant species (grand fir and Douglas-fir) were generally susceptible to these fires due to their thinner bark when young and persistent, low hanging crown characteristics. This was also true for moist forests occurring in the transitional area with dry forests. Smaller understory trees were vulnerable to periodic fires, surviving only in openings with too little fuels to carry a fire. The extent of these frequent ground fires likely varied from small areas (less than 10 acres in size) to entire slopes covering thousands of acres depending upon the season, topography, and climatic conditions. The intensity also varied in response to vegetative conditions. Areas missed by frequent fires (moister northerly aspects) developed conditions where subsequent fires could potentially be of moderate to high intensity, resulting in patches of stand replacement/regeneration.

Overall, the frequency of these fires made them an agent of stability in these forest ecosystems. They kept the ground vegetation dominated by fire adapted grasses (such as pine grass and elk sedge) and shrubs (ceanothus, snowberry, Oregon grape), while promoting and maintaining mature forest vegetation dominated by early seral species, such as ponderosa pine, western larch and, to a lesser extent, Douglas-fir. Because of the stabilizing effect of these fires, stands tended to be maintained with early seral species and larger fire resistant trees. Succession to shade tolerant species and associated multi-strata structures only occurred in areas that escaped several fire cycles.

Disturbance Processes

Warm dry forests have been affected by a variety of disturbances. These include: insects; diseases; fire; and human related disturbances such as timber harvest, fire suppression, and grazing. Fire is by far the major natural disturbance agent in dry forests. Other disturbance agents in this forest type include a variety of insects and diseases. In general, these disturbance agents added to the structural diversity of these stands by providing small areas/openings for regeneration and understory vegetation to establish.

Fire

Historic fire disturbance regimes in these forest environments can be best characterized as high frequency/low intensity. Fires started by natural ignition (i.e. lightning) or American Indian people burned in the form of underburns and small areas of lethal fires on a frequency of every 10-35 years in these forest types (Agee 1993, Hall 1977). These fires were agents of stability, helping to maintain stands with high proportions of fire tolerant species and large areas of relatively open, park like conditions. Small areas of denser forest patches occurred in areas missed or more resistant to fire (draws, spring seep areas, wetter aspects).

Recent fires on the Malheur National Forest have been large, stand replacement events that are very out of character with the historical fires that occurred. The Summit Fire covered 30,000 acres, of which over half of the fire occurred in the warm dry forest biophysical environment. The Summit Fire burned with stand replacement intensity across ¾ of the area burned, much more intensive than historical fires would have burned in this biophysical environment. The Flagtail Fire burned 7,000 acres with similar intensities and was primarily located in the warm dry plant association group.

Insects

The western pine beetle was the primary bark beetle working in the stands historically dominated by larger diameter ponderosa pine. Scattered individual tree mortality created small openings in stands where pockets of understory could establish.

Mountain pine beetle and pine engraver were likely present at low levels due to the overall lack of suitable habitat (i.e. dense thickets of smaller diameter trees). Denser stands with a high proportion of sapling to pole sized ponderosa pine have increased levels of mountain pine beetle and Ips beetle activity and associated mortality. Western pine beetle is also present across dry forests, keying in on highly stressed larger overstory ponderosa pine. Fir engraver activity is currently prevalent in dry forests due to the combination of high stand densities and increased proportion of grand fir occupying these sites. At endemic levels, these forest insects play an important role in contributing to structural diversity, and providing dead wood habitat important for wildlife and soil productivity. At epidemic levels, they create conditions that can lead to disturbance intensities outside the historic range.

Defoliating insects such as the spruce budworm and Douglas-fir tussock moth were historically at relatively low levels due to the lack of grand and Douglas-fir trees and lack of multi-storied stand structures. With the changes in forest composition and structure that favor these insects, there have a number of severe outbreaks in the last several decades. Impacts of the recent (1985-1992) spruce budworm outbreaks are found in the warm dry vegetation types, especially in the multi-strata stand structures. In general, the suppressed tree classes of grand fir, Douglas-fir, and spruce exhibit poor crowns, reduced growth and varying degrees of mortality because of past repeated defoliation. Many of the north-facing slopes in the project area exhibit trees with dead and forked tops as well as unnatural mortality levels due to the budworm and Douglas –fir tussock moth defoliations of the 1980' and early 1990's. The slopes along Bear Creek across from Highway 395 are one noticeable example.

Diseases

The primary root diseases in dry forests are Annosus and Armillaria that result in small "centers" of mortality and associated gaps in the forest canopy. These areas provided openings for understory vegetation (grasses, shrubs and seedlings) to establish and added to structural diversity. Overall levels were generally low because of the effects of fires maintaining increased abundance of species most tolerant to diseases (ponderosa pine and western larch), and increased ability of trees to ward off infections due to lower stand densities. Frequent fires also helped keep root diseases at low levels due to the promotion of soil fungi that compete with pathogenic fungi, and through beneficial effects of fire on soil nutrients and nutrient cycling.

Annosus root disease is most prevalent in stands previously entered with overstory and partial overstory removal harvests. Annosus related mortality is usually associated with large old stumps and harvest related disturbance (skid trails). These past harvests resulted in varying degrees of disturbance to the soils and ground vegetation, facilitating the spread of Annosus root disease through wind-borne spores infecting large stumps. Mortality from the disease has been identified in both ponderosa pine and grand fir indicating that both the P-strain (pine strain) and S-strain (true fir strain) of the Annosus root disease are present. In the planning area the incident of Annosus is relatively minor.

Armillaria root disease is also present (often with Annosus), resulting in mortality in virtually all sizes and species of trees in areas of heavy infection. Armillaria root rot has not been found to be widespread in the planning area. Grand fir and Douglas-fir are most susceptible while, lodgepole pine, Engelmann spruce, ponderosa pine, and the occasional western white pine show varying degrees of tolerance. Western larch is the most resistant to the disease, but can still be infected when growing poorly due to overstocking. Conversion of stands to ponderosa pine and western larch at appropriate stocking levels for good growth is a suitable solution to reduce the effects of the two major root rot diseases.

Dwarf mistletoe was present in low levels throughout the dry forests of the watershed. It predisposed the occasional tree to bark beetle attack or torching by fire. Brooms created by mistletoe infections were susceptible to fire, especially brooms in the lower crown. Thus, frequent fires likely helped keep overall levels of mistletoe low due to the "fire pruning" of infected branches and through potential negative impacts of the heat and smoke on developing mistletoe plants. The primary species infected by dwarf mistletoe are ponderosa pine and Douglas-fir. Levels of mistletoe infection vary in the Canyon Creek planning area with severe infections occurring in both ponderosa pine and Douglas-fir with infected overstories that are spreading the disease to susceptible understory trees.

As with insects, these forest diseases play an important role in creating structural diversity, creating a source of snags and down logs, and providing important wildlife habitat and recycling nutrients "locked up" in trees and logs to maintain soil productivity. At severe levels, these diseases can greatly inhibit the growth of trees and old forest structure. They also provide unique wildlife habitat, such as roosting sites for grouse.

Mechanical

Wind throw of occasional trees also added structural diversity by creating small gaps in the forest canopy, facilitating establishment of understory vegetation. As in the cooler, more moist forest types, all of these disturbance agents played an important role in providing a diversity of vegetative conditions and associated habitats across the landscape.

Human

Human related disturbances (timber harvest, fire exclusion) have affected the dry forests more than the other forest types across the watershed. In the past, the most noticeable harvests focused on the removal of the larger overstory ponderosa pine. The most noticeable feature is the absence of large ponderosa pine trees in many stands. This is particularly evident in the lower and mid elevations due to early logging; there are few large trees and an abundance of young, small to medium sized trees. Another noticeable trend has been increasing proportions of shade tolerant grand fir and Douglas-fir growing in the understory. This has increased the proportion of stands with multi-strata structures.

Table V-4: Warm Dry Forest HRV and Current Structural Stages within the 3 Subwatershed Analysis Area

Structural Stage	Historic Range of Variation[1]	Current Condition
Stand Initiation (SI)	5-15%	2%
Stem Exclusion Open Canopy (SEOC)	5-20%	19%
Stem Exclusion Closed Canopy (SECC)	1-10%	39%
Understory Reinitiation (UR)	1-10%	5%
Young Forest Multi-strata (YFMS)	5-25%	14%
Old Forest Single-stratum (OFSS)	5-55%	1%
Old Forest Multi-strata (OFMS)	5-20%	20%

[1]The HRV percentages are based on professional judgment of the historical extent of structural stages. (Powell, 1998).

Table V-5: Warm Moist Forest HRV and Current Structural Stages within the 3 Subwatershed Analysis Area

Structural Stage	Historic Range of Variation[1]	Current Condition
Stand Initiation (SI)	1-15%	2%
Stem Exclusion Open Canopy (SEOC)	0-5%	19%
Stem Exclusion Closed Canopy (SECC)	5-20%	39%
Understory Reinitiation (UR)	5-20%	5%
Young Forest Multi-strata (YFMS)	20-50%	14%
Old Forest Single-stratum (OFSS)	0-5%	1%
Old Forest Multi-strata (OFMS)	10-30%	20%

[1]The HRV percentages are based on professional judgment of the historical extent of structural stages. (Powell, 1998).

Cool Dry and Cool Moist Biophysical Environments

Cool Dry forests occupy approximately 846 acres (1% of the analysis area) on drier, colder frost pockets throughout the watershed.

Cool Moist forests occupy approximately 378 acres (<1% of the analysis area) on northerly aspects, mid elevations, and in the cooler, wetter draw bottoms throughout the watershed.

In the absence of a major disturbance (fire) cool dry and cool moist forests will develop forest vegetation dominated by grand fir, Douglas-fir, and spruce. Where frost is frequent, lodgepole pine will be the dominant species. Ponderosa pine, western white pine, western larch, and lodgepole pine are early seral species that are dependent on disturbances to maintain suitable growing conditions.

Species Compositions and Successional Relationships

Species compositions and structural characteristics of the cool dry and cool moist forests were largely dependent upon the stage of succession of the stand and associated landscape as dictated by the time since the last major disturbance (namely high intensity fire). The historic species composition of the cool moist forest had higher proportions of fire tolerant early seral species (ponderosa pine, lodgepole pine, and western larch) and lesser amounts of fire intolerant species (grand fir, Engelmann spruce, and Douglas-fir) prior to European influences. The conditions that affect disturbances in the cool dry and cool moist forests have not changed as substantially over time as has happened in the drier forest types, resulting in less change in the fire severity from historic times to the present.

Species composition varies depending upon the successional development stage, past disturbances, and microclimate or microsite differences. In the absence of a major disturbance such as fire, cool dry forests will develop forest vegetation dominated by grand fir, Douglas-fir, and western larch. Earlier successional stages are dominated by early seral species such as lodgepole pine, ponderosa pine, western white pine, and western larch; while later stages show increased proportions of climax species such as grand fir, Douglas-fir, or spruce (in wetter areas). Western larch increases in abundance where past disturbance created bare soil conditions and an adequate seed source was present to re-colonize the disturbed areas. Wetter and cooler areas (such as along riparian areas and headwater areas) have increased amounts of Engelmann spruce. Western white pine was likely present in greater proportions since blister rust, an exotic disease, had not been introduced.

Where frost is frequent, lodgepole pine will be the dominant species. Lodgepole pine is the primary early seral species that would initially occupy a site. In stands with a longer fire-free interval, climax species such as grand fir would become established. Stands with a short fire return interval were maintained in lodgepole pine because succession was continually reset never getting past the early seral stages.

Disturbance Processes

Cool dry forests were not economically attractive in the past; therefore timber harvest has been at a lesser level than in the warmer and drier forests.

Fire

The historic/natural fire disturbance regime in the cool dry forest types is best characterized as a high frequency, low intensity regime overlaid with a low frequency, high intensity regime. The relatively frequent disturbances were generally low severity, ground fires which would occur every 10-50 years. Every 100 to 200 years there would be an infrequent disturbance that was generally a high severity, stand replacing fire. The extent of the fires was variable due to the topography and could be as large as several hundred acres to over a thousand acres. Fire return intervals in these forest environments were on the magnitude of 50-275+ years (Agee 1993).

Tree mortality was variable, as the tree species that grow in the moist forest have both thin and thick bark, and shallow and deep roots. Western larch and ponderosa pine have thick bark on medium to large trees. Grand fir, western white pine, Engelmann spruce, and Douglas-fir have thinner bark, especially when young and are most susceptible to mortality from ground fires. The persistent branches of grand fir and Douglas-fir make them very susceptible to torching, often resulting in crown fires which kill all of the trees in a patch. The moist forests occupying the transitional areas with the dry forests experienced more frequent, low to moderate intensity fires, resulting in vegetative and structural characteristics more similar to the dry forests (see Dry Forest section).

Where seed sources are present, fires can germinate snowbrush, creating a dense shrub field that could persist for several decades. Snowbrush adds to the diversity of vegetation and is a nitrogen fixing plant that can help replace some of the nitrogen lost through volatilization and leaching during and after a fire.

Historically, wildfire was the major disturbance affecting cool moist forests. The historic/natural fire disturbance regime in these forest types is best characterized as a low frequency, high intensity regime. These relatively infrequent disturbances were generally high severity, stand replacing fires. Between high intensity fires; other disturbance agents, such as wind throw, insects, and diseases, also played a role in shaping stand structures and compositions across the landscape. The low frequency of stand replacement fires allowed for the development of large contiguous stands (large patch sizes) that provided high quality core habitats ranging from 200 to 2,000 acres. Fires generally kept the forest in a fairly vigorous condition, which reduced the role of insects and disease as a disturbance process.

Fire starts are frequent, due to the higher elevation location of the cool dry forest stands. The extent of fires was highly variable due to topography and the extent of flammable lodgepole stands. Fire size could be as small as one stand of trees or as large as several thousand acres. Fire return intervals in these forest environments were on the magnitude of 50-275+ years (Agee 1993).

Tree mortality from fires is high; many of the trees in this group retain branches to the ground for a long time and grow in dense, multistory patches. This predisposes them to torching and crowning fire behavior which kills all of the trees in the stand. Additionally, the thin bark of these species does not protect them from basal heating, making them easily killed, even by light ground fires. Stand establishment after disturbance is often very rapid.

Fire is still the most influential disturbance process occurring in cool dry forests. The impact of fire suppression is much less in this forest type than in other types, due to long fire return intervals. The main effect of fire suppression over the last 70 plus years has been to increase the species diversity, allowing more fir and spruce to occupy the stands than would naturally occur.

Insects

Between the high intensity fires, other disturbance agents (such as insects and diseases) played a role in shaping stand structures and compositions across the landscape.

Epidemic levels (populations that maintain themselves in a local area below outbreak population levels) of insects periodically occur in cool dry forest types. Large areas of dense stands of lodgepole that developed following fires created conditions conducive for outbreaks of mountain pine beetles (such as the 1970s mountain pine beetle outbreak) resulting in subsequent stand reinitiation as understory trees responded to increased available light, water and nutrients. Resultant fuel levels associated with bark beetle mortality also set the stage for regeneration/renewal by creating conditions conducive for subsequent high intensity fires.

Defoliating insects such as western spruce budworm and Douglas-fir tussock moth also occurred at endemic levels in these forest types. They caused minor damage, weakening some trees and predisposing them to subsequent attack by mountain pine beetles and fir engraver. Impacts of the recent (1985-1992) spruce budworm outbreak are widespread, especially in the multi-strata structures. In general, the suppressed tree classes of grand fir and Douglas-fir exhibit poor crowns, reduced growth, and varying degrees of mortality because of past repeated defoliation.

The current and past insect related mortality has provided significant increases in snag levels and down logs, providing increased amounts of cavity nesting species habitat. While it provides wildlife habitat, insect related mortality has also increased fuel loads, and the potential for regeneration by a high intensity stand replacement type fire.

Fir engraver and Douglas-fir bark beetles are other common insects in the moist forests. Historically, these two insects are endemic causing low levels of mortality. Presently fir engraver activity is increasing in the project area, and causing noticeable mortality in the fir trees. Douglas-fir bark beetle activity is present in association with larger diameter, heavily mistletoe infected Douglas-fir trees. The heavy mistletoe infection stresses these trees so that they are highly susceptible to opportunistic insects such as bark beetles.

Disease

Root diseases such as Annosus and Armillaria generally infected stands at small scales (less than 1 acre). Root disease mortality centers created gaps in stands helping to develop multi-stratum structural characteristics enhancing both horizontal and vertical structural diversity. Severe levels of root disease resulted in significant tree mortality, hindering development of late structural characteristics while maintaining understory reinitiation and young forest multi- strata structural characteristics. These areas of high mortality were also at increased risk to stand replacing fires which ultimately returned stands to early seral species with greater tolerance to root diseases. Areas that escaped fires and developed large areas of suitable hosts likely showed increased levels of root diseases resulting in changes to the stand structure and composition as levels of root disease intensified.

Other diseases such as gall rust and atropellis canker occurred as they do today, affecting lodgepole growing in humid areas, resulting in stem malformation and subsequent breakage, adding to the diversity of tree forms within stands.

Dwarf mistletoe, a parasitic plant, was another disease present throughout these forest types. Lodgepole mistletoe was likely present at low levels since infected trees were generally highly susceptible to fire. Stand replacing fires also sanitized stands of mistletoe infected trees, keeping mistletoe levels low across the landscape.

Mechanical
Wind throw and breakage of occasional trees also added structural diversity by creating small gaps in the forest canopy allowing the "release" of understory vegetation. Wind related disturbance was also important in recruiting habitat logs to the forest floor and creation of live snags where tops were broken out, but the tree remained alive.

Human
Fire exclusion, sheep and cattle grazing, and past harvest activities have also changed the condition of the cool forests. These human disturbances have affected the structural character, patch size, and species compositional across the watershed. In general, human disturbance has reduced large tree structures, reduced patch sizes, increased fragmentation, and reduced the proportions of fire tolerant species.

All of these disturbance processes played an important role in providing a diversity of vegetative conditions and associated habitats across the landscape.

Table V-6: Cool Dry Forest HRV and Current Structural Stages within the 3 Subwatershed Analysis Area

Structural Stage	Historic Range of Variation[1]	Current Condition
Stand Initiation (SI)	5-30%	0%
Stem Exclusion Open Canopy (SEOC)	0-5%	7%
Stem Exclusion Closed Canopy (SECC)	5-35%	2%
Understory Reinitiation (UR)	5-20%	91%
Young Forest Multi-strata (YFMS)	5-20%	0%
Old Forest Single-stratum (OFSS)	1-10%	0%
Old Forest Multi-strata (OFMS)	1-20%	0%

[11]The HRV percentages are based on professional judgment of the historical extent of structural stages. (Powell, 1998).

Table V-7: Cool Moist Forest HRV and Current Structural Stages within the 3 Subwatershed Analysis Area

Structural Stage	Historic Range of Variation[1]	Current Condition
Stand Initiation (SI)	1-10%	0%
Stem Exclusion Open Canopy (SEOC)	0-5%	48%
Stem Exclusion Closed Canopy (SECC)	5-25%	13%
Understory Reinitiation (UR)	5-25%	39%
Young Forest Multi-strata (YFMS)	40-60%	0%
Old Forest Single-stratum (OFSS)	0-5%	0%
Old Forest Multi-strata (OFMS)	10-30%	0%

[1]The HRV percentages are based on professional judgment of the historical extent of structural stages. (Powell, 1998).

Cold Dry (Lodgepole) Biophysical Environment

Cold Dry forests occupy approximately 2347 acres (4% of the analysis area) on high elevation sites, northerly aspects, and in the colder frost pockets throughout the watershed.

Species Compositions and Successional Relationships

Species compositions and structural characteristics of the cold dry forests were largely dependent upon the stage of succession of the stand and associated landscape as dictated by the time since the last major disturbance (namely high intensity fire). The conditions that affect disturbances in the cold forests have not changed substantially over time, resulting in little change in the fire severity from historic times to the present.

In the absence of a major disturbance such as fire, cold dry forests will develop forest vegetation dominated by grand fir, western larch, subalpine fir, and Engelmann spruce. Where frost is frequent, lodgepole pine will be the dominant species. Lodgepole pine and western larch are the primary early seral species that would initially occupy a site. In stands with a longer fire-free interval, climax species such as grand fir, subalpine fir, and Engelmann spruce would become established. Stands with a short fire return interval were maintained in lodgepole pine because succession was continually reset never getting past the early seral stages.

Disturbance Processes

Cold dry forests were not economically attractive in the past; therefore timber harvest has been at a lesser level than in the warmer and drier forests.

Fire
Historically, wildfire was the major disturbance affecting cold dry forests. Between high intensity fires; other disturbance agents, such as wind throw, insects, and diseases, also played a role in shaping stand structures and compositions across the landscape.

The historic/natural fire disturbance regime in these forest types is best characterized as a low frequency, high intensity regime. These relatively infrequent disturbances were generally high severity, stand replacing fires.

Fire starts are frequent, due to the higher elevation location of the cold dry forest stands. The extent of fires was highly variable due to topography and the extent of flammable lodgepole stands. Fire size could be as small as one stand of trees or as large as several thousand acres. Fire return intervals in these forest environments were on the magnitude of 50-275+ years (Agee 1993).

Tree mortality from fires is high; many of the trees in this group retain branches to the ground for a long time and grow in dense, multistory patches. This predisposes them to torching and crowning fire behavior which kills all of the trees in the stand. Additionally, the thin bark of these species does not protect them from basal heating, making them easily killed, even by light ground fires. Stand establishment after disturbance is often very rapid.

Fire is still the most influential disturbance process occurring in cold dry forests. The impact of fire suppression is much less in this forest type than in other types, due to long fire return intervals. The main effect of fire suppression over the last 70 plus years has been to increase the species diversity, allowing more fir and spruce to occupy the stands than would naturally occur.

Insects
Endemic levels of bark beetles (primarily mountain pine beetles and fir engraver beetles) occurred in small patches acting as natural thinning agents, facilitating the growth and development of residual trees and creating small openings (increasing structural diversity).

Epidemic levels (populations that maintain themselves in a local area below outbreak population levels) of insects periodically occur in cold forest types. Large areas of dense stands of lodgepole that developed following fires created conditions conducive for outbreaks of mountain pine beetles (such as the 1970s mountain pine beetle outbreak) resulting in subsequent stand reinitiation as understory trees responded to increased available light, water and nutrients. Spruce bark beetles are also found in cold forests. These insects are active within burned areas, blowdown areas, and areas with elevated levels of root disease. Resultant fuel levels associated with bark beetle mortality also set the stage for regeneration/renewal by creating conditions conducive for subsequent high intensity fires.

Defoliating insects such as western spruce budworm and Douglas-fir tussock moth also occurred at endemic levels in these forest types. They caused minor damage, weakening some trees and predisposing them to subsequent attack by mountain pine beetles and fir engraver. Impacts of the recent (1985-1992) western spruce budworm outbreak were moderate. Budworm defoliation did not cause the widespread top kill or mortality that it did in the moist forest types.

The current and past insect related mortality has provided significant increases in snag levels and down logs. While it provides wildlife habitat, insect related mortality has also increased fuel levels, increasing size and intensity of future stand replacement fires.

Diseases

Root diseases such as Annosus and Armillaria generally infected stands at small scales (less than 1 acre). Root disease mortality centers created gaps in stands helping to develop multi-stratum structural characteristics enhancing both horizontal and vertical structural diversity. These areas of high mortality were also at increased risk to stand replacing fires which ultimately returned stands to early seral species with greater tolerance to root diseases. Areas that escaped fires and developed large areas of suitable hosts likely showed increased levels of root diseases resulting in changes to the stand structure and composition as levels of root disease intensified.

Other diseases such as gall rust and atropellis canker occurred as they do today, affecting lodgepole growing in humid areas, resulting in stem malformation and subsequent breakage, adding to the diversity of tree forms within stands.

Dwarf mistletoe, a parasitic plant, was another disease present throughout these forest types. Lodgepole mistletoe was likely present at low levels since infected trees were generally highly susceptible to fire. Stand replacing fires also sanitized stands of mistletoe infected trees, keeping mistletoe levels low across the landscape.

Root diseases in the subalpine fir have not caused major problems. Tomentosus root disease, which is common in the mature spruce, makes it vulnerable to wind throw and subsequent spruce beetle attack.

Mechanical

Wind throw and breakage of occasional trees also added structural diversity by creating small gaps in the forest canopy allowing the "release" of understory vegetation. Wind related disturbance was also important in recruiting habitat logs to the forest floor and creation of live snags where tops were broken out, but the tree remained alive.

Human

The main human disturbance has been fire suppression, which has allowed stands to follow successional paths farther than otherwise would have happened with more fires. Logging and other activities have been somewhat limited with the exception of salvage harvest of beetle killed lodgepole pine stands in the northeast portion of the project area that has resulted in regeneration of those stands.

Table V-8: Cold Dry Forest HRV and Current Structural Stages within the 3 Subwatershed Analysis Area

Structural Stage	Historic Range of Variation[1]	Current Condition
Stand Initiation (SI)	1-20%	4%
Stem Exclusion Open Canopy (SEOC)	0-5%	4%
Stem Exclusion Closed Canopy (SECC)	5-20%	14%
Understory Reinitiation (UR)	5-25%	68%
Young Forest Multi-strata (YFMS)	10-40%	0%
Old Forest Single-stratum (OFSS)	0-5%	10%
Old Forest Multi-strata (OFMS)	10-40%	0%

[1]The HRV percentages are based on professional judgment of the historical extent of structural stages. (Powell, 1998).

Aspen Stands

Aspen is found in many locations within the project area. It is a unique habitat that is currently much reduced from its historical extent. It is felt that the combination of fire suppression, heavy grazing by both domestic and wild ungulates, and conifer encroachment has reduced the survival of aspen and a deteriorating condition of the remaining stands.

Mountain Mahogany

Mountain mahogany is found in many places throughout the project area. It is a unique habitat that elsewhere is much reduced from its historical extent. It has been reduced by heavy grazing by both domestic and wild ungulates and conifer encroachment, but there are still large patches on the ridgetops and surrounding dry meadows.

Non Forest Biophysical Environments

Non forest areas occupy approximately 5600 acres (10% of the analysis area).

Dry meadows and grasslands are found in several locations within the planning area and are characterized by generally shallow and rocky soils. They were historically maintained by frequent wildfires in an open savannah condition with a few widely spaced ponderosa pine trees and juniper woodlands. With fire suppression there has been varying degrees of ingrowth of juniper and ponderosa pine trees.

Moist meadows are scarce due to the geography of the analysis area. When they are found they are usually relatively small riparian meadows scattered along streams.

Species Compositions and Successional Relationships

Species compositions and structural characteristics of juniper woodlands were largely dependent upon frequent fire and occasional insect attacks during droughts. Widely spaced ponderosa pine trees are the only tree species in any numbers, with an understory of juniper in varying amounts. With fire exclusion, both juniper and ponderosa pine have expanded their range into previously fire maintained meadows and have increased their numbers in the savannah areas.

Disturbance Processes

Fire

Fire was the dominant disturbance process in woodlands, occurring as frequent, low intensity underburns in the past.

Human

Human related disturbances (timber harvest, fire exclusion) have affected woodlands. Selective removal of the occasional ponderosa pine, combined with exclusion of fire, resulted in significant changes in the structural and compositional character of the woodlands.

Environmental Consequences

Vegetative conditions within the project area are not within the Historic Range of Variability within most biophysical environments. In addition, the species composition and stand densities are changed from the historical conditions, leading to a forest that is less resilient to natural disturbances. Wildlife use the current resources available for food, cover, and reproductive habitat. Changed vegetative conditions from the proposed treatments may not provide the same levels of habitat or food sources.

Measures of Success for developing a Resilient and Sustainable Forest:

- Acres and percentage change of structural stages in relation to the Historic Range of Variability.
- Acres and percent change in areas treated to reduce overstocking and to change species composition.

Alternative 1 – No Action

Direct and Indirect Effects

Introduction

This alternative does not treat any stands by commercial harvest, pre-commercial thinning, mechanical fuel treatment, or prescribed fire.

Composition and Density

The forest is now mostly overstocked compared with historical levels except where recent management has thinned forest stands. While many stands were pre-commercial thinned several decades ago, the amount of growth and understory re-initiation has made these stands overstocked again. Along with the overstocking, there has been a large increase in the proportion of Douglas-fir and true firs in both the hot dry and warm dry forest types due to both past harvest that removed the early seral species of large diameter and to the exclusion of fire that would have removed most of the fire susceptible species in favor of the fire resistant species of ponderosa pine and western larch..

Structural Stages

In the Warm Dry biophysical environment there is currently a lack of old forest single story stand structure. The overstocked stands will result in slow growth rates, therefore the development of old forest stand structures would continue to develop slowly with old forest single strata increasing from 1% to 9% and old forest multi strata from 20% to 48% in the next 50 years. Meanwhile, there is an increasing risk of large-scale, stand-replacing fires that would set back old forest development, resulting in large areas of young trees and longer time spans to develop old forest structures. Disturbances would continue to be at a larger scale than historically occurred, with "out of scale" adverse effects to water, fish, wildlife, vegetation, and other resources. Stands would not be within the Historical Range of Variability (HRV) for stand structure.

Since there would be no treatment with Alternative 1 to reduce overstocking or to shift the species composition, the stands would continue to become more overstocked, growth would continue to slow, and the trees would become increasingly susceptible to disturbance from insects, disease, and fire. The more crowded and dense the timber stands become over time increases the likelihood and potential severity of catastrophic disturbance events such as uncharacteristically severe wildfire. The overall resiliency to withstand natural disturbances would continue to decrease.

Table V-9: Effects of No Action on Hot Dry Forest Structural Stages

Year	SI	SEOC	SECC	UR	YFMS	OFSS	OFMS
HRV	5-15%	5-20%	0-5%	0-5%	5-10%	20-70%	5-15%
Existing	0%	29%	0%	0%	0%	15%	56%
10	0%	29%	0%	0%	0%	15%	56%
50	0%	29%	0%	0%	0%	15%	56%

Table V-10: Effects of No Action on Hot Moist Forest Structural Stages

Year	SI	SEOC	SECC	UR	YFMS	OFSS	OFMS
HRV	5-15%	5-20%	0-5%	0-5%	5-10%	20-70%	5-15%
Existing	0%	16%	2%	10%	3%	9%	59%
10	0%	16%	2%	10%	3%	9%	59%
50	0%	0%	0%	0%	2%	88%	10%

Table V-11: Effects of No Action on Warm Dry Forest Structural Stages

Year	SI	SEOC	SECC	UR	YFMS	OFSS	OFMS
HRV	5-15%	5-20%	1-10%	1-10%	5-25%	15-55%	5-20%
Existing	2%	19%	39%	5%	14%	1%	20%
10	2%	19%	39%	5%	14%	1%	20%
50	1%	9%	18%	1%	13%	9%	48%

Table V-12: Effects of No Action on Warm Moist Forest Structural Stages

Year	SI	SEOC	SECC	UR	YFMS	OFSS	OFMS
HRV	1-15%	0-5%	5-20%	5-20%	20-50%	0-5%	10-30%
Existing	0%	49%	51%	0%	0%	0%	0%
10	0%	49%	51%	0%	0%	0%	0%
50	0%	26%	0%	0%	0%	24%	51%

Table V-13: Effects of No Action on Cool Dry Forest Structural Stages

Year	SI	SEOC	SECC	UR	YFMS	OFSS	OFMS
HRV	5-30%	0-5%	5-35%	5-20%	5-20%	1-10%	1-20%
Existing	0%	7%	2%	91%	0%	0%	0%
10	0%	7%	2%	91%	0%	0%	0%
50	0%	0%	0%	80%	0%	20%	12%

Table V-14: Effects of No Action on Cool Moist Forest Structural Stages

Year	SI	SEOC	SECC	UR	YFMS	OFSS	OFMS
HRV	1-10%	0-5%	5-25%	5-25%	40-60%	0-5%	10-30%
Existing	0%	48%	13%	39%	0%	0%	0%
10	0%	48%	13%	39%	0%	0%	0%
50	0%	13%	0%	39%	48%	0%	0%

Table V-15 Effects of No Action on Cold Dry Forest Structural Stages

Year	SI	SEOC	SECC	UR	YFMS	OFSS	OFMS
HRV	1-20%	0-5%	5-20%	5-25%	10-40%	0-5%	10-40%
Existing	4%	4%	14%	69%	0%	10%	0%
10	4%	4%	14%	69%	0%	10%	0%
50	5%	0%	1%	59%	2%	21%	11%

Understory Vegetation

Mountain mahogany will continue to be encroached on by conifers, leading to decline in vigor and numbers. Other shrubs, which were adapted to sprout after frequent fires and need sunlight, will continue to decline as the stands become more closed. Pine grass, and other ground vegetation, will continue to decrease in vigor and forage quality with increasing shade and lack of nutrient cycling provided by burning.

Aspen

Aspen will continue to be encroached on by conifers, leading to decline in vigor and numbers. Reproduction will remain low due to the lack of fire and continued browsing by ungulates will eliminate those few suckers that do attempt to grow.

Mountain Mahogany

Mountain mahogany will continue to be encroached on by conifers, leading to decline in vigor and numbers. Reproduction will remain low due to the continued browsing by ungulates that will eliminate those few seedlings that become established.

Pristine Areas/Roadless Areas/Wilderness

Most of the areas planned for mechanical treatments have previously been harvested. Old tractor skid trails and roads are found throughout the planning area. Few of the timber stands to be treated are in an unaltered condition due to the past harvesting, which mostly removed the larger and more valuable ponderosa pine.

Exceptions are the two designated and replacement old growth areas (#236) that are proposed to be swapped. These have had very little harvesting and have no roads or skid trails within them.

In all areas, fire suppression has allowed the ingrowth of many more trees and the conversion of some stands from early seral species like ponderosa pine to late seral species like grand fir.

Genetic Diversity

The existing genetic diversity within units scheduled for regeneration harvest (in the other alternatives) will retain the existing natural genetic diversity. Generally, trees that have grown up in near proximity are relatively homogeneous and share pollen with nearby trees, resulting in narrow genetic variability.

Resiliency and Sustainability

The resiliency and sustainability of the forest will continue to decline and it will remain at risk to natural disturbances that have outcomes larger and more severe than happened historically. Overstocked forest stands will continue to slow in growth and decrease in vigor as stand density continues to increase. Trees will slowly increase in size, but will remain multi-storied. The bulk of the stands which will grow into old forest will be continue to be OFMS structural stage with very few growing into OFSS, continuing the imbalance compared to HRV. Late seral species will continue to increase occupancy in the mixed conifer stands. The quantity and vigor of grasses and shrubs in the understory will continue to decline due to the shading and competition for nutrients and water.

Insect Risk

Risk of attack by bark beetles will increase as the trees lose vigor and are less able to pitch out the beetles. Research has determined that trees have increased susceptibility when radial tree growth is less than 10/20ths of an inch per decade. As more attacks become successful, the population increases to outbreak levels, killing and damaging larger pockets of trees.

Risk of outbreaks of defoliating insects would continue to increase as the stand composition continues to shift to more late seral species, as the late seral species like grand fir and Douglas-fir are much more susceptible to defoliating insects. Large-scale applications of insecticides are felt to be ineffective since the habitat for the insect remains and the natural populations are available to periodically reach outbreak levels (Mason 1998, Powell 1994). Widespread defoliation and mortality would increase the fuel loads greatly. The dense, slow growing stands would remain a high risk for fir engraver attacks; further increasing mortality and fuel loading.

Disease Risk

Dwarf mistletoe infections can be expected to increase as trees slow in height growth and the crowns grow closer together. Stem and root diseases would continue to spread in the host fir trees, causing increasing mortality.

Cumulative Effects

Resiliency and Sustainability

With no mechanical or prescribed fire treatments, the forested stands would remain at risk to large-scale disturbances by insects, disease, or wildfire. These disturbances can cross subwatershed boundaries into surrounding areas causing varying amounts of change. There would be no change to the existing condition and there would be no additional cumulative effects from this project.

The foreseeable actions listed in Appendix C would most likely still occur, including the Fuel Reduction projects along Highway 395 south of Starr Ridge. This project would continue the recent trend to improve forest health and reduce the overall fire danger but since it is physically removed from the project area and so small in scope it will have no noticeable effect in the Canyon Creek project area.

Alternative 2 – Proposed Action

Introduction

Most treatment is planned to take place in the Hot Dry and the Warm Dry biophysical environments. All treatments are designed to enhance growth of young stands into old forest structural stages and to enhance the sustainability of the forest to have enough time to grow into the old forest stages. These are the areas that are most in need of restoration to return the forest to a more resilient and sustainable condition. The stands not treated would have the same effects as discussed for the No Action alternative.

Direct and Indirect Effects

Composition and Density

Commercial thinning in overstocked stands would enable the remaining trees to respond by increasing their crowns and roots, increasing their ability to utilize nutrients, sunlight, and water. Growth would increase and the trees would grow into old forest structural stages sooner. The increased vigor of the trees would decrease their susceptibility to disturbance from insects and disease; and lessen the likelihood and potential severity of bark beetle outbreaks and mistletoe infestation. The decreased stand density, the increase in size, and the increase in the height to the bottom of the live crown will reduce the chances of torching and the potential for catastrophic crown fires. The overall resiliency to natural disturbances would be increased.

Reducing the stand density will encourage natural regeneration to occur in the thinned stands. Observations show that when stand densities are below 50 ft^2/acre ponderosa pine regenerates quite readily and can form another understory. Periodic prescribed fire is recommended in the future to maintain the understory to an acceptable level to maintain the historic conditions of low stocking and few ladder fuels.

Stands dominated by late seral species trees are planned for shelterwood treatments. The shelterwood treatments would remove many of the late-seral species trees from stands, retaining the early-seral species that are there, and reforesting openings with early-seral species. This will shift the species composition closer to the historic composition. The result would range in appearance from a commercial thin to a shelterwood harvest, depending on the existing stand species composition. Treated stands would be more adapted to the natural disturbances that exist, increasing the overall resiliency to natural disturbances. Resilient stands would decrease the risk that disturbance would “reset” the stands to earlier structural stages, enabling them to continue to grow into large trees. Disturbances would be closer to the historic scale of 200 to 2,000 acres.

The portions of stands that resemble commercial thinning would respond by increasing their crowns and roots, increasing an ability to utilize nutrients and water. The increased vigor of the trees would decrease their susceptibility to disturbance from bark beetles and mistletoe. The decreased density, increase in tree size and height of the live crown, and reduction in fuel loading will lessen the chances of stand replacing fire. The portions of stands that resemble shelterwood treatments would be replanted to early-seral species seedlings. The shelterwood trees left in the stand would be retained as legacy trees to provide a degree of vertical structure. With the reduced competition they would grow well and be resistant to disturbance from insects, disease, and fire

Structural Stages

There is currently a lack of old forest stand structures due to timber harvest, fires, and other disturbances. The increased tree growth from thinning would cause the development of old forest structural stages to accelerate, allowing the thinned stands to grow into the large size classes sooner. In the Warm Dry biophysical environment old forest single strata is projected to increase from 1% to 16% and old forest multi strata from 20% to 42% in the next 50 years for a total of 58% in old forest stages. This is compared to the No Action alternative that only increases the percentage of old forest single strata to 9% in 50 years and old forest multi strata to 48% for a total of 57% in the old forest stages. While the old forest multi strata remains about the same between the alternatives, the proportion of old forest single strata is about doubled by the treatments in the Proposed Action alternative.

There is a decreased risk of large-scale disturbances such as insect defoliators or stand-replacing fires that would set back structural stage development, both for the treated stands and surrounding stands. Stands would be resilient to disturbance and would be the least likely to "reset" to earlier structural stages by disturbances, enabling them to continue to grow into large trees. Disturbances would be closer to the historic scale of small patches and clumps of trees removed.

Where shelterwoods are created for regeneration to early seral species, the seedlings would grow rapidly, and with proper spacing control, would eventually develop into the large forest single strata structural stage. They would be more resistant to insects and disease than the current late seral species, but are susceptible to fire until they are about 30 years old. After that time they would be more resistant to fire due to their thicker bark and lack of persistent lower limbs (ladder fuels). Stands treated would be growing towards the Historical Range of Variability (HRV) for stand structure.

Table V-16: Effects of Alternative 2 on Hot Dry Forest Structural Stages

Year	SI	SEOC	SECC	UR	YFMS	OFSS	OFMS
HRV	5-15%	5-20%	0-5%	0-5%	5-10%	20-70%	5-15%
Existing	0%	29%	0%	0%	0%	15%	56%
10	1%	51%	1%	0%	5%	6%	36%
50	0%	29%	2%	0%	0%	25%	44%

Table V-17: Effects of Alternative 2 on Hot Moist Forest Structural Stages

Year	SI	SEOC	SECC	UR	YFMS	OFSS	OFMS
HRV	5-15%	5-20%	0-5%	0-5%	5-10%	20-70%	5-15%
Existing	0%	16%	2%	10%	3%	9%	59%
10	0%	26%	2%	4%	0%	9%	59%
50	0%	0%	0%	0%	0%	96%	4%

Table V-18: Effects of Alternative 2 on Warm Dry Forest Structural Stages

Year	SI	SEOC	SECC	UR	YFMS	OFSS	OFMS
HRV	5-15%	5-20%	1-10%	1-10%	5-25%	15-55%	5-20%
Existing	2%	19%	39%	5%	14%	1%	20%
10	3%	23%	36%	5%	11%	3%	19%
50	1%	12%	17%	2%	11%	16%	42%

Table V-19: Effects of Alternative 2 on Warm Moist Forest Structural Stages

Year	SI	SEOC	SECC	UR	YFMS	OFSS	OFMS
HRV	1-15%	0-5%	5-20%	5-20%	20-50%	0-5%	10-30%
Existing	0%	49%	51%	0%	0%	0%	0%
10	0%	49%	51%	0%	0%	0%	0%
50	0%	0%	26%	0%	0%	24%	51%

Table V-20: Effects of Alternative 2 on Cool Dry Forest Structural Stages

Year	SI	SEOC	SECC	UR	YFMS	OFSS	OFMS
HRV	5-30%	0-5%	5-35%	5-20%	5-20%	1-10%	1-20%
Existing	0%	7%	2%	91%	0%	0%	0%
10	0%	0%	2%	98%	0%	0%	0%
50	0%	0%	0%	80%	0%	2%	18%

Table V-21: Effects of Alternative 2 on Cool Moist Forest Structural Stages

Year	SI	SEOC	SECC	UR	YFMS	OFSS	OFMS
HRV	1-10%	0-5%	5-25%	5-25%	40-60%	0-5%	10-30%
Existing	0%	48%	13%	39%	0%	0%	0%
10	0%	48%	13%	39%	0%	0%	0%
50	0%	13%	0%	39%	48%	0%	0%

Table V-22: Effects of Alternative 2 on Cold Dry Forest Structural Stages

Year	SI	SEOC	SECC	UR	YFMS	OFSS	OFMS
HRV	1-20%	0-5%	5-20%	5-25%	10-40%	0-5%	10-40%
Existing	4%	4%	14%	69%	0%	10%	0%
10	4%	4%	14%	69%	0%	10%	0%
50	5%	0%	1%	59%	2%	21%	11%

The thinning treatments in connectivity corridors will not reduce the stand density as much as the standard thinning, therefore it will improve stand conditions somewhat, but not to the degree as thinning to the lower basal areas. If not thinned again in the future, growth will slow and it would take an additional time to reach the old forest structural stage than with the 50 basal area thinning.

Understory Vegetation

Thinning would reduce the conifers encroaching on mountain mahogany, increasing the shrub vigor and numbers. Other shrubs, which were adapted to sprout after frequent fires and needing sunlight, will increase as the stands become more open. Pine grass and other ground vegetation will increase in vigor and forage quality with decreasing shade.

Riparian Vegetation

No commercial thinning is planned with this alternative, but there are six areas where precommercial thinning is planned within riparian areas. Prescribed fire is anticipated to also burn in portions of riparian areas, generally as low intensity fire. Past experience has shown that the different moisture regime in the riparian areas moderates the fire behavior so that there are only minor effects to the streamside vegetation. Shrubs and conifers providing streamside shade are almost never affected because they do not burn with enough intensity to cause mortality.

In the outer portions of the riparian areas where the moisture regime transitions into drier conditions similar to the surrounding uplands, the result is more of a mosaic of burned and unburned areas with some shrub and small conifer mortality. This creates an opportunity for more shrubs, which were adapted to sprout after frequent fires and needing sunlight, to increase as the stands become more open.

Aspen

Most aspen is located in riparian areas that will not be treated, and will continue to decline in vigor and abundance. The few Aspen in stands treated by thinning or burning will experience an increase in regeneration by suckering. Existing trees will have reduced competition from conifers and will be able to live longer. Since no fencing is proposed, continued browsing by ungulates will still be a problem, but the increased supply of young aspen will help some of them to escape the browsing and grow into larger trees.

Mountain Mahogany

Mountain mahogany in treated stands will have less competition from vegetation, but will continue to be browsed by ungulates that will most likely eliminate many of the seedlings that become established.

Pristine Areas/Roadless Areas/Wilderness

Most of the areas planned for mechanical treatments have previously been harvested. Old tractor skid trails and roads are found throughout the planning area. Few of the timber stands to be treated are in an unaltered condition due to the past harvesting, which mostly removed the larger and more valuable ponderosa pine. In addition, fire suppression has allowed the ingrowth of many more trees and the conversion of some stands from early seral species like ponderosa pine to late seral species like grand fir. The proposed treatments are designed to allow the stands to grow into a condition that replicates past conditions more closely than the current stands.

Genetic Diversity

Units scheduled for regeneration harvest by planting will have increased genetic variability compared to native stock since the tree seed the seedlings are grown from is collected from widely separated trees. Generally, trees that have grown up in near proximity are relatively homogeneous and share pollen with nearby trees, resulting in narrow genetic variance. Current seedlings are grown from seed collected in the wild from selected genetic trees (not from clonal seed orchards). Genetic tree selection guidelines ensure that trees are widely dispersed across the local seed zone within the same elevation band.

Resiliency and Sustainability

Approximately 66% of the area diagnosed in need for treatment is proposed for thinning and regeneration. Of the areas diagnosed for treatment; approximately 80% of the thinning, 55% of the understory removals, and 40% of the shelterwood treatments are included in the Proposed Action. Thinned ponderosa pine stands will increase in growth and vigor as the stand density is reduced. The quantity and vigor of grasses and shrubs will increase due to the reduction in shading and competition for nutrients and water. Shelterwood regeneration in mixed conifer stands will shift the species composition towards early-seral species that are more resistant to insects and diseases and are not as susceptible to fire damage and crown fires.

Insect Risk

Thinning is prescribed in ponderosa pine stands. The additional light and warmth in thinned stands is inhospitable for bark beetles, providing an immediate degree of protection to the trees. As the trees respond with increased growth over the next several decades after the thinning, their increased vigor will allow them to withstand attempted beetle attacks by successfully pitching out the invading insects. As fewer attacks are successful, the population outbreaks will decrease to low levels, reducing the amount or size of pockets of mortality. The reduction in the proportion of late-seral species will reduce the extent of defoliation by spruce budworm and Douglas-fir tussock moth (Mason 1998, Powell 1994).

The host tree species for spruce budworm, tussock moth, and fir engraved will be reduced by thinning mixed conifer stands. Experience has shown that when late seral species make up less than 25% of the stand composition, defoliation is very light with little effect to tree growth or survival. The incidence of fir engraver would also be reduced as the proportion of fir is reduced, and the remaining fir trees would be healthier and less susceptible to attacks. Stands not treated would benefit from the reduction of host species in nearby stands, which would lessen the severity and size of outbreaks.

Disease Risk

Stem and root diseases will be reduced since both the thinnings and the shelterwood cuts will reduce the primary host (late seral species). The removal of late seral species during the thinning operations will reduce the amount of trees susceptible to root diseases. Eventually allowing the disease to fade to a minor role in the forest. Thinning will increase height growth rates which will allow the remaining trees to outgrow dwarf mistletoe infections, gradually decreasing the amount of crown infected. The increased spacing will reduce the lateral spread of mistletoe.

Cumulative Effects

The area considered for cumulative effects is the Vance Creek, East Fork Canyon Creek, and Upper Canyon Creek Subwatersheds and the immediately adjacent subwatersheds. The effects of past and present activities listed in Appendix C have been integrated into and described under the affected environment. The effects of planned future activities in Appendix C will be considered in this analysis and include the fire hazard reduction along Highway 395 to the south and the proposed road into the Morris property so that he may also treat his timber stands to reduce fire hazard.

Most of the effects of the planned activities on the forest vegetation are mainly local in nature with limited geographic scope. These effects have been discussed in the previous direct and indirect effects section. The major cumulative effect is the impact on the resiliency and sustainability of the forest.

Resiliency and Sustainability

Past activities in the 1990's in this subwatershed have made some small scale positive changes in the overall forest health and sustainability. The planned actions in this alternative, in combination with the past actions, will create a matrix of treated stands over most of the subwatershed and across ownership boundaries (Morris property). These treatments will be over a sufficient proportion of the landscape (approximately 1/3 of the project area) to effectively serve to reduce the severity and extent of wildfire and also to reduce the chance of insects and disease reaching an outbreak situation. Disturbances within treated stands are expected to be reduced in intensity and duration, as a result of better growing conditions and a more resistant species mix. Disturbances in stands not treated will be smaller in geographic scope and more within historic scales as there will be less unbroken blocks of stands in unhealthy condition.

The foreseeable future actions listed above are anticipated to further increase the overall sustainability and resiliency of the forest as a whole, especially those activities planned in nearby subwatersheds. By creating large blocks of land with a matrix of treatments, the risk of large-scale disturbances will be reduced over the landscape.

With the planned mechanical and prescribed fire treatments, the risk of large-scale disturbances to forested stands would be reduced. These disturbances can cross subwatershed boundaries into surrounding areas causing varying amounts of change; therefore, reducing risk in one area also has a beneficial effect to the surrounding areas. This alternative does the most treatment of stands and has the most beneficial increase in forest resiliency to disturbance by fire, insects, and disease, reversing the adverse effects of past overstory removal and fire suppression.

Consistency with Direction and Regulations

Forest Plan

The No Action Alternative does not meet the Forest Plan direction to establish ponderosa pine (and other early seral species) in appropriate sites to increase fire, insect, and disease resiliency.

The Proposed Action Alternative (Alt. 2) meets the direction to minimize losses due to insects and disease by establishing ponderosa pine and western larch where they are appropriate within 5 years after harvest. Both natural regeneration and planting are utilized to reforest the harvested areas and seed used to grow the seedlings is collected from superior trees within the seed zone and elevation band.

Regional Forester Forest Plan Amendment #2 (Eastside Screens)

All alternatives meet the direction to not decrease old forest structural stages, since no live trees over 21" are to be harvested (except for incidental trees cut for road and landing construction and for safety).

There is no shelterwood harvesting in old forest structural stages. There is thinning and understory removal in some Old Forest Multi Story designed to make these stands more resilient to natural disturbances such as fire and insects. The treated Old Forest Multi Story stands will be converted to Old Forest Single Story stands which is currently is underrepresented compared to the HRV for this area. There is no net loss of old forest (LOS) structure with any of the alternatives.

The prescriptions for the connectivity corridors between old forest structure stands are designed to maintain the canopy cover in the upper 1/3 of site potential, except for 4 stands that are close to the National Forest Boundary. Because of their location and the need to protect public health and safety, they will be not be treated with the leave the canopy cover in the upper 1/3 of site potential prescription, but instead the full conventional prescription will be implemented in these 4 units.

The Proposed Action Alternative (Alts. 2) better meets the objective to protect existing old forest structure and to shorten the time to grow additional old forest structural stages, since thinning overstocked stands will increase growth rates and sustainability against loss to insects, disease, and fire.

Healthy Forest Restoration Act

The project is consistent with Healthy Forest Restoration Act (HFRA) direction. HFRA, Section 102 (e), directs states that…"if the management direction in a resource management plan (Forest Plan) for an old growth stand was established before December 15, 1993, that HFRA covered projects shall fully maintain, or contribute toward the restoration of, the structure and composition of old growth stands according to the pre-fire suppression old growth conditions characteristic of the forest type, taking into account the contribution of the stand to landscape fire adaptation and watershed health, and retaining the large trees contributing to old growth structure. Review management direction for covered HFRA projects, taking into account any relevant scientific information made available since the adoption of the management direction; and amend the management direction to be consistent with pre-fire suppression old growth conditions, if necessary to reflect relevant scientific information".

To address HFRA direction a historic condition analysis was completed. This analysis, called a Historic Range of Variability Analysis (HRV), is required by Regional Forester's Amendment #2 for projects that include timber sales. The HRV analysis completed for the Canyon Ck. WUI Project included an assessment of the amount of current Old Forest Structure and was completed on a subwatershed basis for each biophysical environment found. In the assessment, existing proportions of Old Forest Structure were compared to the historic range that was thought to have existed prior to settlement. The actual estimates of the historic range were based on published research, historic timber inventories, other available science, and professional judgment. In the proposed action alternative, about 172 acres of old forest multi-stratum (OFMS) would be converted to old forest single stratum (OFSS) structure by the combination of thinning and underburning treatments. This treatment would increase the amount of OFSS, which is lacking in the subwatershed. The amount of OFMS would decrease slightly but would still be within the historical range. Forest Plan Amendment #2 allows manipulation of one type of Old Forest Structure to move stands into the Old Forest Structure stage that is deficit if this meets historical conditions. Historically, vegetation in the hot-dry and warm-dry Plant Association Groups was commonly burned by frequent, low-intensity and low-severity fires. These fires generally maintained the stands in an open, park-like condition that was dominated by ponderosa pine. Conversion of the 172 acres to OFSS would move stand condition to a pre-fire suppression old growth condition characteristic of the forest type.

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

Relevant scientific information used in the analysis to describe pre-fire suppression old growth conditions and old dependent species habitat needs is cited in the Canyon Creek WUI Fuels Reduction Project Silviculture Specialist Report, and in the Wildlife Specialists Report. Based on review of relevant scientific information, no amendments to current management direction were proposed to be consistent with pre-fire suppression old growth conditions. All proposed activities and their predicted effects are consistent with forest vegetation standards of the Forest Plan and its associated amendments, including the 1995 Regional Forester's Forest Plan Amendment #2: Interim Management Direction Establishing Riparian, Ecosystem, and Wildlife Standards for Timber Sales, and the requirements of other applicable laws, regulations, and policies.

Irreversible and Irretrievable Commitments

Irreversible Commitments

There are no anticipated long-term irreversible commitments of the forest vegetation since it is renewable as long as the soil productivity is maintained. There may be short-term losses of growth related to soil compaction, but compaction is to be kept below 20% of the forest area, and the growth reduction on compacted ground is about 15%. This would result in a total maximum growth loss of approximately 3% per year of the growth potential until the compaction gradually diminished (in about 50 years).

Irretrievable Commitments

There are irretrievable commitments of the growth of forest vegetation for about 5 years because of the new landings and roads that are built for the salvage operation. They are to be rehabilitated after use, but there will be a lag in reforestation and growth since the sites are impacted more heavily than the surrounding forestland.

There are no other known irreversible or irretrievable commitments of forest vegetation resources that would be caused by the Proposed Action.

Wildlife

Introduction

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

This section of the EA summarizes existing habitat conditions for various wildlife species and the effects of the No Action and Proposed Action alternatives on these species. Additional details can be found in the “Terrestrial Wildlife Specialist Report” located in the project record and the “Biological Evaluation of Threatened, Endangered, Proposed, and Sensitive Species” in Appendix G of this EA.

Regulatory Framework

The three principle laws relevant to wildlife management are the National Forest Management Act of 1976 (NFMA), the Endangered Species Act of 1973 (ESA), and the Migratory Bird Treaty Act (MBTA) of 1918. Direction relative to wildlife follows:

- NFMA requires the Forest Service to manage fish and wildlife habitat to maintain viable populations of all native and desirable non-native wildlife species and conserve all listed threatened or endangered species populations (36CFR219.19).
- ESA requires the Forest Service to manage for the recovery of threatened and endangered species and the ecosystems upon which they depend. Forests are required to consult with the US Fish and Wildlife Service if a proposed activity may affect the population or habitat of a listed species.
- MBTA established an international framework for the protection and conservation of migratory birds. This Act makes it illegal, unless permitted by regulations, to “pursue, hunt, take, capture, purchase, deliver for shipment, ship, cause to be carried by any means whatever, receive for shipment, transportation or carriage, or export, at any time, or in any manner, any migratory bird . . .”

Forest Service Manual Direction provides additional guidance: identify and prescribe measures to prevent adverse modifications or destruction of critical habitat and other habitats essential for the conservation of endangered, threatened, and proposed species (FSM2670.31 (6)). The Forest Service Manual directs the Regional Forester to identify sensitive species for each National Forest where species viability may be a concern.

The principle policy document relevant to wildlife management on the Forest is the 1990 Malheur National Forest Land and Resource Management Plan, referred to as the

Forest Plan for the remainder of this section. The Forest Plan provides standards and guidelines for management of wildlife species and habitats. Standards and guidelines are presented at the Forest level (LRMP, pp. IV-26 to IV-33) or Management Area level (LRMP pp. IV-50, IV-53, IV-56 to IV-57, IV-105 to IV-107, and IV-108). Management Areas include General Forest (MA-1), Rangeland (MA-2), Anadromous Riparian Area (MA-3B), Old Growth (MA-13) and Visual Corridors (MA-14).

The 1995 Regional Forester's Eastside Forest Plans Amendment #2 amended Forest Plans for the National Forests in Eastern Oregon and Eastern Washington, including the Malheur National Forest. Amendment # 2 established interim wildlife standards for old growth, old growth connectivity, snagslarge down logs, and northern goshawks. The Regional Forester has periodically distributed letters clarifying direction in Amendment #2 (Regional Forester, October 2, 1997; October 23, 1997; June 11, 2003).

Additional management direction is provided for conservation of migratory landbirds. This direction is consolidated in the Forest Service Landbird Strategic Plan and further developed through the Partners in Flight Program. The Oregon-Washington Partners in Flight Conservation Strategy for Landbirds in the Northern Rocky Mountains of Eastern Oregon and Washington (Altman 2000) identifies priority bird species and habitats for the Blue Mountains in Oregon.

Analysis Methods

Effects on wildlife species and habitat have been assessed within National Forest lands in the Canyon Creek project area, focusing on the effects of activities within proposed treatment units. For several wildlife species, the effects boundary has been expanded to the subwatershed level. Each wildlife section will identify the analysis boundary used in the effects analysis. The project area (22,700 acres) is located within portions of three subwatersheds; the analysis area encompasses the three subwatersheds in their entirety (57,761 acres).

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

- Immediate – Approximately one growing season or several months or less
- Short-term – 0 to 5years
- Mid-term – 5 to 25 years
- Long-term – 25+ years

Direct, indirect, and cumulative effects of alternatives are identified and discussed.

Rather than addressing all wildlife species, the Forest Plan focuses on three categories of wildlife: management indicator species (MIS), threatened, endangered and sensitive (TES) species and featured species. In addition, interest has been raised for landbirds including neotropical migratory birds. Categories and wildlife species are summarized below:

- **Management Indicator Species (MIS) —** species selected by the Malheur National Forest as "barometers" of species diversity, viability, and the forest ecosystem. They are monitored over time to assess how changes in forest conditions (especially from management) affect MIS populations and habitat, and thus also populations of other species with similar habitat needs. Pine marten, pileated woodpecker, and northern three-toed woodpecker represent old growth habitats. Rocky Mountain elk represent big game species. Primary cavity excavators (most woodpeckers) represent dead wood habitats. Effects to MIS species will be discussed in the Old Growth Forest, Big Game Habitat and Primary Cavity Excavator sections respectively.

- **Threatened, Endangered and Sensitive (TES) Species —** An endangered species is an animal or plant species listed under the Endangered Species Act that is in danger of extinction throughout all or a significant portion of its range. A threatened species is an animal or plant species listed under the Endangered Species Act that is likely to become endangered within the foreseeable future throughout all or a significant portion of its range. A sensitive species is an animal or plant species identified by the Forest Service Regional Forester for which species viability is a concern either a) because of significant current or predicted downward trend in population numbers or density, or b) because of significant current or predicted downward trends in habitat capability that would reduce a species' existing distribution. Threatened, endangered, and sensitive species effects are summarized in the Canyon Creek Biological Evaluation in Appendix G.

- **Featured Species —** The Malheur Forest Plan defines a featured species as a wildlife species of high public interest or demand. The featured species associated with the project area are northern goshawk and blue grouse. Effects to northern goshawk and blue grouse will be discussed in the Featured Species – Northern Goshawk and the Featured Species – Blue Grouse sections, respectively.

- **Landbirds including Neotropical Migratory Birds (NTMB) —** Landbirds, including Neotropical migratory birds, are discussed because many species are experiencing downward population trends. Discussion can be found in the section Species of Concern – Landbirds including Neotropical Migratory Birds (NTMB).

Species presence/absence determinations were based on habitat presence, wildlife surveys, recorded wildlife sightings, observations made during reconnaissance, non-Forest Service databases, and status/trend and source habitat trend documented for the Interior Columbia Basin. Formal wildlife surveys were not conducted for most species. There is a high confidence level that species discussed in this document are currently present in the area.

Species ecology is summarized in the Wildlife Report in the Project Record. Habitat and population trend information was derived from Interior Columbia Basin studies (Wisdom et al. 2000), if available; this data is also summarized in the Wildlife Report.

Alternative 1, the No Action alternative, is used as a benchmark to compare and describe the differences and effects between taking no action and implementing action alternatives. The No Action alternative is designed to represent the existing condition. Resource conditions are then projected forward in time to estimate resource changes expected in the absence of the proposed management activities.

Effects on species will be determined by assessing how the No Action and Proposed Action alternatives affect the structure and function of vegetation relative to current, projected and historical distributions. Effects on habitats are discussed, with the assumption that if appropriate habitat is available for a species, then that species occupies or could occupy the habitat. This strategy is based upon science that demonstrates connections between species populations and viability and the quantity and condition of habitat at appropriate scales of analysis (Baydack et al. 1999).

Cumulative effects have been analyzed in respect to past, ongoing and foreseeable future activities listed in Appendix C. Effects were first analyzed within the context of the project area (22,700 acres). If there were no negative or positive contributions to cumulative effects at this scale, then no further analysis was conducted. If there were contributions to effects at this scale, then the analysis scale was broadened to a larger land base or analysis area typically encompassing the three subwatersheds in their entirety (57,761 acres).

The Wildlife section is subdivided into sub-sections: Old Growth Habitat, Big Game Habitat, Primary Cavity Excavators, Northern Goshawks and Other Raptors, Blue Grouse and Landbird Species including Neotropical Migratory Species. Sub-sections will summarize specific analysis methods.

Old Growth Existing Condition

The Forest Plan identifies three Management Indicator Species (MIS) for old growth, primarily Old Forest Multiple Strata (OFMS) structured stands: pileated woodpecker, pine marten and three-toed woodpecker. In addition, the white-headed woodpecker is a good indicator of the health of Old Forest Single Stratum (OFSS). By providing old growth habitat for these species, it is assumed that habitat for old-growth obligate species will be provided as well.

The Dedicated and Replacement Old Growth network was analyzed at the project area level (22,700 acres). Existing and historic old growth levels (OFMS and OFSS) are calculated at the analysis area level (i.e., three subwatersheds at 57,761 acres). Future old growth was projected 10 years after treatment and 50 years after treatment. Connectivity corridors were only designated for the project area, but connect with old growth located outside the project area.

The following terms for old growth are used interchangeably throughout this section. Nuances in the vocabulary are defined throughout the section.

- Old Growth
- Late and Old structure (LOS)
- Dedicated Old Growth (DOG)
- Replacement Old Growth (ROG)
- Old Forest Multiple Strata (OFMS)
- Old Forest Single Stratum (OFSS)

Dedicated Old Growth (DOG) & Replacement Old Growth (ROG)

Forest Plan, Management Area 13 (MA-13) provides for the management of old growth through a network of DOG/ROG areas. Each DOG/ROG is specifically managed for one of two Management Indicator Species (MIS) for OFMS: pileated woodpecker or pine marten. ROG's are established to counter possible catastrophic damage or deterioration of the DOG's. Replacement areas may not have all the characteristics of old growth at the present time, but are to be managed to achieve those characteristics in the future so that when a DOG area no longer meets the needed habitat requirements, the ROG can take its place.

The Forest Plan directs continued review of DOG/ROG areas, with adjustments to boundaries as appropriate, to ensure suitable levels of old growth habitat are provided for species dependent upon them and to ensure those units meet Forest Plan standards and guidelines. The Forest Plan and its corresponding Final Environmental Impact Statement identifies the process and direction to identify Replacement Old Growth (ROG) and Pileated Woodpecker Feeding Areas (PWFA) for each DOG area. MA-13 direction permits exchanging the status of DOGs and ROG's.

In addition to the DOG/ROG network, Forest-wide Standard 59 (LRMP, page IV-31) directs Forest managers to delineate areas of old growth lodgepole pine. These old growth areas are specifically managed for three-toed woodpeckers, a MIS for old growth lodgepole pine. These areas are not considered part of the MA-13 network. Since there is no pure old growth lodgepole pine stands in the project area, there will be no old growth effects. Changes in dead wood habitats could affect this species; discussions are in the Primary Cavity Excavator section.

Two Dedicated Old Growth (DOG) areas and associated Replacement Old Growth (ROG) areas are located within the project area. Table WL-1 below lists each DOG or ROG, its associated MIS, and total acres. Management requirements are described in the footnote. See Map 9 in Appendix B for locations.

Table WL-1. Dedicated Old Growth (DOG), Replacement Old Growth (ROG), and Pileated Woodpecker Feeding Area (PWFAs).

DOG #	Management Requirement Species	Minimum Forest Plan Acre Requirements1	DOG Acres	ROG Acres2	Pileated Feeding Acres2	Total Acres
DOG 236	Pine Marten	240	278	294	NA	572
DOG 241	Pileated Woodpecker	600	309	142[3]	161[3]	612
TOTAL		**840**	**587**	**436**	**161**	**1,184**

1Old-growth Management Area (MA-13) Minimum Management Requirements:
Pileated Woodpecker Areas (PWFA) = 300-acre DOG + 300-acre feeding area = 600 acres. ROG's = 150-acres and can overlap with feeding areas.
Pine Marten = 160-acre DOG + 80-acre ROG = 240 acres
2 ROG acres also contribute towards pileated woodpecker feeding acres. "Proposed ROG Acres" and "Additional Pileated Feeding Acres" fields should total at least 300 acres for each DOG.
3 ROG 241 is 8 acres shy of minimum standard of 150 acres; PWFA is 11 acres in excess of standard. Acres could be shifted into the appropriate category, but it is preferred to manage ROGs at the "stand level". Combined, the ROG and PWFA exceed total standard of 300 acres; both are being managed for future old growth.

To maintain an even distribution of old growth across the Forest, DOG's and ROGs were designated in all biophysical environments or forest types. Attempts were made to identify some of the best habitat available, while maintaining the old growth grid system. Generally, dry forest types provide lower quality habitat for pileated woodpeckers and pine martens than moist forest types. Historically, dry forest types were maintained under a low intensity, frequent fire regime; historic stand structure was likely Old Forest Single Stratum (OFSS). Due to fire suppression, tree stocking and canopy closure are greater than they were under historic conditions. Although many of the stands in the DOG's/ROG's currently do not meet old growth definitions, some stands do contain habitat components that can support pileated woodpeckers and martens in the short- to mid-term.

In the early- to mid-1990s, old growth surveys were conducted in the DOG's/ROG's. In 2005, taped pileated woodpecker calls were broadcasted. The DOG's/ROG's have periodically been visited to record presence of pileated woodpeckers, pine marten and other wildlife species.

DOG 236 – Pine Marten
DOG 236 is within the warm-dry biophysical environment. Stands are mixed conifer. Species composition consists of varying levels of ponderosa pine, Douglas-fir and grand fir. Stands do not classify as old growth; rather, they are in a mid-seral condition, primarily Young Forest Multiple Strata (YFMS) and Stem Exclusion (SE). The number of large diameter trees fall short of quantities required for Old Forest Multiple Strata (OFMS) classification. Past and ongoing insect and disease has caused tree mortality. As a result, canopy cover is reduced with about 20% of the DOG meeting canopy cover levels that provide primary or secondary habitat for pine marten or pileated woodpecker.

Snags exceed Forest Plan standards, estimated at about 5.8 snags per acre greater than 10 inches dbh with 2.7 snags per acre 20 inches dbh and greater. Lack of large diameter trees and cover are likely limiting the ability of this DOG to support pine marten for denning or foraging. In 2005, taped calls solicited responses from pileated woodpeckers and foraging signs were evident; existing habitat is not considered optimum for this species.

ROG 236 – Pine Marten

ROG 236 is within the warm dry biophysical environment. The ROG is comprised of mixed conifer stands of grand fir, Douglas-fir, and ponderosa pine, with lower levels of western larch and lodgepole pine. The ROG is primarily comprised of OFMS and YFMS structured stands and contains some of the highest quality and quantity of mature mixed conifer stands in the project area. Snags are below Forest Plan standards, estimated at 6 snags per acre, 10 inches dbh and greater with about 0.75 snag 20 inches dbh and greater. This ROG is capable of supporting pine marten, although no formal surveys have been conducted and no sightings are reported. In 2005, taped calls solicited no responses from pileated woodpeckers. Signs of past woodpecker foraging is evident. The area adjoins the Strawberry Mountain Wilderness and the Canyon Creek Natural Area, potentially providing a large contiguous block of unroaded old growth.

DOG 241 – Pileated Woodpecker

Approximately 55% (170 acres) of DOG 241 is within the project area; the reminder of the DOG extends eastwards beyond the project area boundary. DOG 241 is within the warm dry biophysical environment. The DOG is comprised of mixed conifer stands of Douglas-fir, ponderosa pine, grand fir, western larch and/or lodgepole pine. About 13% of the DOG classifies as OFMS. The DOG is primarily comprised of mid-seral stands of SE and YFMS. The number of large diameter trees fall short of quantities required for Old Forest Multiple Strata (OFMS) classification. Past and ongoing insect and disease has caused tree mortality. As a result, canopy cover is reduced with about 20% of the DOG meeting canopy cover levels that provide primary or secondary habitat for pine marten or pileated woodpecker. Overall, snags are below Forest Plan standards, estimated at 6 snags per acre, 10 inches dbh and greater with about 0.50 snag 20 inches dbh and greater. Snags are variable, however, with several areas of high snag levels. Down logs are in excess of Forest Plan standards throughout most of the DOG. Although this area does not classify as Old Forest Multiple Strata (OFMS), there are areas with large diameter trees and sufficient canopy closure to provide habitat for pileated woodpeckers and pine martens. No formal surveys for pine marten have been conducted and no sightings are reported. In 2005, taped calls solicited responses from pileated woodpeckers as well as a sighting. Foraging/nesting signs were evident.

ROG 241 - Pileated Woodpecker

ROG 241 is located outside, but immediately adjacent to the project area. The ROG is within the warm dry biophysical environment and is comprised of stands of ponderosa pine/Douglas-fir. Stands are primarily mid-seral, even-aged stands classifying as Stem Exclusion Open Canopy (SEOC). Portions of the ROG have been thinned. Snag levels and down log levels are low. Stands currently do not provide for pileated woodpecker or pine marten due to the lack of high and complex canopy cover, large diameter trees, and sufficient snags and down logs. These stands are being managed for future old growth.

PWFA 241 - Pileated Woodpecker
PWFA 241 is within the warm dry biophysical environment and is comprised primarily of stands of ponderosa pine/Douglas-fir. Stands are mid-seral, even-aged stands classifying as Stem Exclusion (SE). Stands are generally over-stocked, providing higher canopy levels. Snag levels and down log levels are low. Overall, snags are below Forest Plan standards, estimated at 6 snags per acre 10 inches dbh and greater with about 0.50 snag 20 inches dbh and greater.

Old Growth within the Analysis Area

Regional Forester's Eastside Forest Plans Amendment #2 (USDA 1995) amended the Forest Plan to manage late and old structure (LOS) stands within the Historic Range of Variability (HRV). Amendment #2 direction applies to LOS stands both inside and outside of the DOG/ROG network. Stands classified as Old Forest Multiple Strata (OFMS) and Old Forest Single Stratum (OFSS) would be considered LOS habitat. Refer to the Forest Vegetation section of this EA for the HRV Analysis. Discussions will focus on effects to old growth in the warm dry and hot dry biophysical environments; old growth treatments are not being proposed in any other biophysical environments.

OFMS stands exceed HRV for the warm dry and hot dry biophysical environments. Currently, OFMS occurs on 20% of the warm dry biophysical environments and 36% of the hot dry biophysical environments. Historically, this structural stage occurred on 5-20% and 5-15% of the warm dry and hot dry biophysical environments, respectively. Fire suppression has allowed young tree stocking to increase in many stands that historically were classified as OFSS. In the project area, habitat is highly fragmented due to past timber harvest. In the Strawberry Mountain Wilderness, habitat is more extensive and contiguous.

OFSS is below HRV for the warm dry and hot dry biophysical environments, primarily due to past timber harvest and fire suppression. In the analysis area, OFSS occurs on 1% of the warm dry and hot dry biophysical environments. Historically, this structural stage occurred on 15-55% and 20-70% of the warm dry and hot dry biophysical environments, respectively.

Based on HRV, current old growth conditions are more supportive of species that require high canopy cover such as the pileated woodpecker, pine marten and northern goshawk, and are barely supportive of species that use open stand conditions such as the white-headed woodpecker and flammulated owl.

Connectivity

Dedicated Old Growth habitat and late and old structure (LOS) stands are distributed throughout the analysis area. The Regional Forester's Eastside Forest Plans

Amendment #2 (USDA 1995) gives direction for maintaining connectivity between LOS habitats to allow the free movement of old growth wildlife species.

Connectivity corridors should commonly have medium diameter or larger trees (≥9 inches DBH) and canopy closure within the upper third of site potential. Corridors should be at least 400 feet wide. If stands with these conditions are not available, then the next best stands will be selected and should be managed to improve connectivity. Those stands with a high degree of ground level vegetation provide additional screening and security cover for old growth associated species as well as for wide ranging carnivores. Generally, connectivity corridors are maintained or managed at higher tree densities and canopy cover than adjacent areas to provide more security for dispersal or movement.

Connectivity corridors have been established for the project area (see Map 9 in Appendix B). Corridors generally meet or exceed the minimum requirements as described in Amendment #2 of the Forest Plan. In most cases, corridors were designated at the “stand level” with stand width often exceeding the minimum 400-foot width. In some cases, where suitable forest conditions do not exist, stands have been identified as connectivity habitat even though minimum canopy closure or corridor width requirements were not met. One example is where large blocks of non-forest bracket a narrow riparian area. Connectivity corridors were established for blocks of OFMS and OFSS 10 acres in size and greater.

In the Canyon Creek project, collaborators expressed interest in maintaining connectivity for deer and elk movement as well. Corridors established for old growth species typically serve big game as well. Collaborators identified additional connectivity stands to support deer and elk movement (see Map 9 in Appendix B). These corridors provide addition connectivity between old growth stands, but are not considered critical to meet Forest Plan standards. Currently, connectivity corridors are expected to support the free movement of old growth associated terrestrial wildlife.

Old Growth Environmental Consequences

Alternative 1 - No Action

Direct and Indirect Effects

The No Action alternative has no direct effects on existing old growth. In the short-to mid-term, DOG's/ROG's would remain in their current condition and location. OFMS and OFSS located both inside and outside the DOG/ROG network would remain in their current condition. Existing stand structures and high stocking levels would persist.

In the long-term, stands would move towards old growth conditions. Table WL-2 displays the existing percentages of OFMS and OFSS and the percentages expected in 50 years if No Action is taken. Projected old growth levels are also provided for the

Proposed Action alternative for comparison purposes. Under the No Action Alternative, both OFMS and OFSS would increase overtime. OFSS would develop from stands that have been thinned in the last 20 years.

Table WL-2 displays the estimated percentage changes of OFMS and OFSS for the warm dry and hot dry biophysical environments.

	Warm Dry PAG		Hot Dry PAG	
	OFMS	OFSS	OFMS	OFSS
Historic Range of Variation	5-20%	15-55%	5-15%	20-70%
Existing Condition – No Action	20%	1%	36%	1%
Condition Following Proposed Action	19%	3%	36%	6%
No Action in 50 Years	48%	9%	56%	15%
Proposed Action in 50 Years	42%	16%	44%	25%

White-headed woodpecker habitat would not change in the short- to mid-term. OFSS would remain below HRV, limiting habitat for white-headed woodpecker and other species associated with OFSS. In the long-term (50 years), OFSS habitat would increase from 1% to 9% in the warm dry biophysical environments and from 1% to 15% in the hot dry biophysical environments, respectively. Populations of white-headed woodpeckers would be expected to increase, although OFSS would still remain below HRV, limiting habitat.

Habitat for pileated woodpeckers and pine martens would increase as stand density and canopy cover increases. Populations would not be expected to change in the short- to mid-term. In the long-term (50 years), OFMS habitat would increase from 20% to 48% in the warm dry biophysical environments and from 35% to 56% in the hot dry biophysical environments. OFMS would exceed HRV. Populations of marten and pileated woodpecker would potentially increase.

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

Fire hazard would remain high in the project area as discussed in the Fuels section of this EA. Long-term development of old growth could be diminished if stand development is disrupted by epidemic bark-beetle activity (likely) or severe fire effects (possible).

Alternative 2 – Proposed Action

Direct and Indirect Effects

The Proposed Action would exchange Dedicated Old Growth (DOG) 236 for Replacement Old Growth (ROG) 236. In their current conditions, the existing ROG provides better old growth habitat than the DOG. Management Area (MA-13) direction permits switching the status of DOG's and ROG's. The newly classified DOG (old ROG) would be located near the Strawberry Mountain Wilderness boundary and would provide better old growth habitat (see Existing Condition section). The exchange would require a non-significant Forest Plan amendment.

Management Area (MA-13) direction for old growth prescribes management to reduce residues and to maintain or enhance old growth and to protect old growth from catastrophic wildfires. The newly classified ROG (old DOG) is located immediately adjacent to the National Forest boundary. The ROG is overstocked with trees and is high risk to wildfire and insect epidemics. Within the newly classified ROG, about 100 acres would be precommercially thinned up to 9 inches dbh in units 352, 354, 355, 358, 364 and 366. Only those stands immediately adjacent to the public/private boundary would be treated. Precommercial thinning would reduce the risk of uncharacteristically severe fires and insect epidemics, and increase the growth rates on the remaining trees. Stands to be treated are currently classified as YFMS or SECC; historically these stands were OFSS. In the short-to mid-term, treatment would reduce the ability of the ROG to support pine martens or pileated woodpeckers, but these stands are currently providing marginal habitat for these species at best. In the long-term, these stands would be expected to develop into old growth more quickly than if left untreated.

Outside the DOG/ROG network, the proposed action would commercial and/or precommercial thin about 500 acres of existing OFMS. Units in OFMS are 66, 82, 84, 106, 369, 370, 371, 372, 373, 404, 405, 506, 520, 588 and 710. Stands would be immediately converted to OFSS structure, i.e., shifting stands back towards their historic condition. This conversion treatment is appropriate in the warm dry and hot dry biophysical environments. Table WL-2 displays the percentage of OFMS acres immediately converted from OFMS to OFSS following treatment. Note that the increases in OFSS would be greater than the reduction in OFMS because FVS projects structural stages out 10 years following treatment and some stands would grow from one structural stage to the next in that time.

The main benefit from thinning and underburning treatments would be realized in the long-term. Treatment of YFMS, UR, SECC and SEOC stands would increase tree growth rates, accelerating the development of OFSS as compared to the No Action alternative. Treated stands would likely be managed towards OFSS, currently, the most limiting forest habitat. Table WL-2 displays expected OFMS and OFSS in 50 years. Both structural stages would be expected to increase. Under the Proposed Action, OFMS would be expected to meet or exceed HRV. OFSS would meet HRV in 50 years while the No Action alternative would remain below HRV.

Shifting stands from OFMS to OFSS would reduce habitat for canopy dependent species such as pileated woodpecker and pine marten and improve habitat for species such as white-headed woodpecker and flammulated owl. Thinning and prescribed underburning is intended to reduce understory cover and open up stands, shifting stands towards historic conditions. No activities would occur in primary habitat for pileated woodpecker and pine marten. About 300 acres or 13% of secondary habitat would be treated, degrading habitat in the units treated. Primary and secondary habitat would remain plentiful and well distributed. The Forest's network of Dedicated Old Growth (DOG) would also continue to maintain populations of marten and pileated woodpecker.

Following treatment, many stands or forest patches would closely resemble desired conditions: a large-tree, single-layered canopy with an open, park-like understory dominated by herbaceous cover with scattered shrub cover and pine regeneration. In the short-term, stands would still not have the requisite number of large diameter trees to classify as old growth, but desired species such as the white-headed woodpecker would still be expected to respond favorably. Populations of white-headed woodpecker would not be expected to change in the short- to mid-term, and could increase in the long-term.

Snag and down logs habitat are important to old growth MIS. Harvest and prescribed burning treatments have been designed to minimize effects to these habitats. Effects to these habitats are described in the Primary Cavity Excavator section.

Construction of temporary roads would fragment mature and old growth habitat; however, roads would be decommissioned when project work is completed. Less than a 1/2 mile of temporary road would be constructed in these habitats. Construction of 200 feet of permanent road would not affect old growth habitat.

Under the Proposed Action, thinning in 9 units would reduce canopy cover on about 260 acres, or 7% of established connectivity corridors. Thinning prescriptions in units 121,194, 338, 340, 386, 392, 394, 538, and 712 would be adjusted to maintain canopy cover in the upper 1/3 of site potential as required by Regional Forester's Forest Plan Amendment #2. Only a portion of units 121, 392 and 538 lie in connectivity corridors; acres outside of corridors would receive standard treatments. Prescribed underburning and pre-commercial thinning would reduce understory stocking; however, design requirements would retain non-thinned patches to facilitate animal movement.

Amendment #2 gives the Forest Service flexibility to modify or forgo connectivity direction for projects that address safety and health concerns (USDA 2006). There are 4 units within ¼ mile of the public/private boundary that are considered high priority for fuels reduction to protect private property. In units 62, 90, 95 and 536, harvest treatments would reduce canopy cover below the upper 1/3 of site potential. Connectivity standards would not be met on 104 acres, or 3% percent, of established connectivity corridors. In units 95 and 536, unthinned patches would be maintained on about 5% of the acres to help mitigate cover reductions. Units 62 and 90 are proposed for shelterwood harvest; post-treatment very little cover would be left. Harvest would reduce, but not entirely eliminate, connectivity habitat to adjacent old growth areas. Proposed road construction would not fragment LOS connectivity corridors.

In the short- to mid-term, connectivity corridors would continue to provide for the free movement of old growth associated species. Harvest in units 62, 90, 95 and 536 would reduce, but not entirely eliminate, connectivity habitat to adjacent old growth areas. Even in these units, there would be some level of post-treatment vegetation that would provide some degree of cover for the movement of animals. In the long-term, untreated corridors would remain at a higher risk to insects and fire that could degrade or eliminate habitat.

Proposed treatments would reduce the hazards associated with insect epidemics and stand-replacement fire. Old growth and connectivity corridors would more likely persist into the future than under the No Action alternative.

During project operations (logging, noncommercial thinning, machine work, road work and use, burning) degrees of disturbance and displacement of wildlife would be likely. Overall, disturbance from activities would be limited in time and place, and therefore, would not be expected to change populations of species at the landscape level. The Forest Plan requires protection for raptors during the reproduction periods, including northern goshawk, a species associated with old growth. Seasonal restrictions for nesting raptors would be applied in active territories for this project. Designation and use of an alternative snowmobile route during operations would not dramatically increase disturbance.

Overall the shift in old growth type from OFMS to OFSS would increase, rather than decrease wildlife species diversity. Restoring natural vegetation conditions and fire regimes would make these habitats far more self-sustaining for associated wildlife species. Overall, proposed timber management and prescribed burning would contribute positively toward the viability of species that use old growth habitats.

Cumulative Effects

The area considered for cumulative effects is the Vance Creek, East Fork Canyon and Upper Canyon Creek subwatersheds. All of the activities in Appendix C have been considered for their cumulative effects on old growth species. Past activities such as timber harvest, road construction, fire suppression and wildfire have combined to create the current old growth condition in the analysis area. HRV tables in the Forest Vegetation section reflect the effects of past activities on structural stage.

As stated previously, OFMS in the warm and hot dry biophysical environments is generally within HRV; OFSS is below HRV. Since 1995, the Forest Plan as amended has directed the Malheur National Forest to conduct timber sales in a manner that moves stands towards OFMS and OFSS structural stages, and timber sales planned since that time should not have contributed to a loss of mature and old growth forest.

Future thinning and burning projects listed in Appendix C would design projects to meet this direction as well. The only exception would be the proposed harvest around the Dry Soda Lookout; harvest would likely forgo old growth development in order to keep the sight views from the lookout open. Overall, projects in warm dry and hot dry biophysical environments would likely shift stands towards historic conditions that tend to support OFSS habitats and species such as the white-headed woodpecker.

Shifting stands from OFMS to OFSS would reduce habitat in the short-term for canopy dependent species such as pileated woodpecker and pine marten and improve habitat for species such as white-headed woodpecker and flammulated owl. This shift in old growth type would increase, rather than decrease the wildlife species diversity. In the long term both types of old growth would increase. Cumulatively, restoring natural vegetation conditions and fire regimes would make these habitats far more self-sustaining for associated wildlife species. Overall, proposed timber management and prescribed burning would contribute positively toward the viability of species that use old growth habitats.

The Forest's network of Dedicated Old Growth (DOG's) and Replacement Old Growth (ROG's) is being managed to maintain or develop habitat for pine marten and pileated woodpeckers. Additional OFMS habitat outside the DOG/ROG network is available and currently exceeds HRV, and would also continue to provide habitat for these species.

Snag and down logs habitat are important to old growth MIS. Cumulative effects to snags and down logs are discussed in the Primary Cavity Excavator section. This project includes design features to protect snags and down logs; overall, changes in dead wood habitats would be considered incidental.

Generally, adjacent private lands have been intensively managed. In the past, these timber stands do not appear to have been managed for old growth habitat and no change in this strategy is expected. These areas are not expected to provide OFMS or OFSS habitat in the future. On Little Canyon Mountain, recent fuels treatments by the BLM shifted stands away from OFMS towards OFSS.

Past harvest has reduced the quantity and quality of connectivity between old growth stands. Since 1993, the Forest Plan as amended has directed the Malheur National Forest to protect connectivity habitat between LOS stands. Even though the Proposed Action would conduct additional harvest and prescribed burning within connectivity corridors, most treatments would maintain Forest Plan standards, permitting movement of old growth species across the landscape. Connectivity standards would not be met on 104 acres, or 3%, of established connectivity corridors. Harvest in units 62, 90, 95 and 536 would reduce, but not entirely eliminate, connectivity habitat to adjacent old growth areas. Effects would be considered incidental. Future thinning and burning prescriptions would be designed to maintain connectivity.

Cumulatively, management activities across the Forest are distributed sufficiently to minimize disturbance impacts at the population levels. Seasonal restrictions are applied on a project by project basis as needed.

In the short- to mid-term, the No Action alternative would not contribute to cumulative losses of old growth or connectivity habitat because stands would not be treated. In the long-term, the No Action alternative, by forgoing action, could negatively contribute to the loss of old growth and associated species if a stand-replacing event such as wildfire occurs.

In the short-term, the Proposed Action would not contribute to cumulative losses of mature and old growth habitat. In the long-term, the Proposed Action would contribute positively to cumulative effects by accelerating the development of OFSS and maintaining connectivity habitat between LOS. Therefore, proposed activities would contribute positively toward the viability of species that use these habitats.

There are no significant adverse cumulative effects to pileated woodpeckers or pine martens or their habitat from either alternative; there are positive effects to white-headed woodpeckers from OFSS development.

Big Game Habitat – Existing Condition

Rocky Mountain elk and mule deer are big game species of concern due to their high public value. Species are considered wildly distributed across the District, Forest and the Blue Mountain Region. Rocky Mountain elk are identified in the Forest Plan as a Management Indicator Species (MIS); habitat quality is evaluated in terms of forest cover, forage quality, and open road density.

The project area is divided into winter range and summer range. Winter range is primarily at lower elevations, less than 5200 feet, where forested areas are interwoven with non-forested grasslands and shrublands. The Vance Creek, Upper Canyon Creek and East Fork Canyon Creek subwatersheds all include winter range. Summer range is predominantly in mixed conifer stands above 4,600 feet in elevation, and during periods of high temperatures both deer and elk most likely utilize northern aspects and stands with high canopy closure. The Vance Creek, Upper Canyon Creek and East Fork Canyon subwatersheds contain summer range, although East Fork Canyon Creek' summer range does not overlap with the project area.

Elk habitat was evaluated using the Habitat Effectiveness Index (HEI) (Thomas et al. 1988), marginal and satisfactory cover percentages, and open road densities. Big game cover was designated using stand exams, Most Similar Neighbor analysis, aerial photographs and ground reconnaissance. Cover calculations included stands smaller than 30 acres because signs of elk and deer indicated many of these stands are being used. Open road densities were calculated using the District access travel management database. Values were estimated by subwatershed and winter/summer range classification. Cover and forage estimates were projected out 10 years following treatment. Elk population data were discussed for the Murderer's Creek Big Game Management Unit from 1995 through 2006.

This project adjusts Big Game Winter Range (MA-4a) boundaries, tying the management area to the National Forest Boundary either side of Canyon Creek (see map Chapter 2). A non-significant Forest Plan amendment is required to expand MA-4a. HEI, cover and road calculations in this analysis have been derived using the new MA-4a boundary.

MA-4a adjustments are proposed because:

- The proposed mapping refines the original mapping in the Forest Plan to tie winter and summer range to logical boundaries. Management Area 4a, Standard #8 (LRMP, page IV-71) directs the Forest Service to adjust winter range boundaries as necessary.
- MA-4a additions better reflect how big game species use this area; i.e., lower elevations along Canyon Creek are primarily being used as winter range rather than summer range.
- Proposed changes permit a more accurate analysis of the effects of commercial thinning, precommercial thinning and prescribed fire on big game habitat.

Boundary adjustments would increase MA-4a designation by approximately 875 acres. About 140 of the 875 acres would be converted from General Forest (MA-1). The remaining acres would overlap with Anadromous Riparian (MA-3a), Old Growth (MA-13), and Visual Corridors (MA-14). MA-4 standards and guidelines would apply to the additions. Standards and guidelines for MA-3a, MA-13 and MA-14 would also apply where they overlap with MA-4a.

Big Game Populations

Big game management on the Malheur National Forest is a cooperative effort between the Forest Service and the Oregon Department of Fish and Wildlife (ODFW) where the Forest Service manages habitat while ODFW manages populations. The agencies cooperate by managing big game according to pre-established Management Objectives (MOs) for each big game management unit. The project area is in the Murderer's Creek Big Game Management Unit. Table WL-3 displays MOs for elk populations, bull to cow ratios, and calf to cow ratios. Annual estimates by ODFW are displayed since 1995.

Table WL-3 displays Management Objectives (MOs) for the Murderer's Creek Big Game Management Unit. Annual estimates, 1995-2006, are displayed for populations, bull to cow ratios and calf to cow ratios.

Year	Population	Bulls per 100 cows	Calves per 100 cows
Management Objectives	**1,700**	**15**	**N/A**
2006	1,800	17	30
2005	1,700	15	27
2004	1,800	11	21
2003	1,800	10	18
2002	2,200	15	19
2001	2,200	22	28
2000	2,000	15	35
1999	1,800	21	34
1998	2,200	15	49
1997	2,300	13	37
1996	1,800	14	36
1995	1,800	13	38

Table WL-3 indicates that wintering elk populations have met population MOs since 1995. Elk population levels have remained stable in spite of past forest management activities.

Bull to cow ratios are influenced by a number of factors including numbers of hunters, length of hunting seasons, including the rutting period in the hunting season, lack of restrictions of antler class in harvest, lack of hiding cover, and high open road densities (Schommer and Johnson 2003). Bull to cow ratios have been variable, meeting or exceeding the MO 6 of the last 11 years. As bull/cow ratios decline below 10 bulls/100 cows, breeding dynamics within a herd also change, and there can be a corresponding reduction in cow/calf ratios (ODFW 2003). Bull to cow ratios have met or exceeded 10 bulls/100 cows since 1995.

Calf recruitment is the number of sub-adult animals added to the population each year. Recruitment levels are expressed as the number of calves per 100 cows. ODFW does not establish MOs for calf to cow ratios because the level of recruitment necessary for population maintenance varies annually depending on the rate of adult mortality. The average number of calves needed to sustain an elk population ranges between 20 to 40 calves per 100 cows, depending on the annual adult mortality. In the Murderer's Creek Management unit, calf to cow have ranged from 18 to 49.

Habitat Effectiveness Index (HEI)

Past management activities have altered cover, forage and road densities. Thomas, et al. (1988), developed the Habitat Effectiveness Index (HEI) model for estimating elk habitat effectiveness on the landscape. HEI incorporates four variables or indices: cover quality (HEc), size and spacing of cover (HEs), quality and quantity of forage

(HEf) and open road density (HEr). The Forest Plan establishes minimum standards for these indices. In addition, the Forest Plan establishes minimum standards for retention of satisfactory cover (%S), marginal cover (%M), total cover (%S and M), and open road density (see Table WL-3). In summer range, forage is not considered a limiting factor; therefore, a forage value is not used in calculations.

Table WL-4: Existing HEI Values, Cover Percentages and Open Road Densities by Subwatershed and Winter/Summer Range Classification.

Subwatershed	HEc	HEs	HEf	HEr	HEcsfr (HEI)	%S	%M	Total Cover %	Open Road Density (miles per square mile)
Winter Range									
Forest Plan Standard	**.40**	**.30**	**.40**	**.50**	**.50**	**10%**	**10%**	**25%**	**2.2**
Vance Creek	.64	.72	.50	.50	.58	9%	23%	33%	1.82
Upper Canyon	.60	.71	.50	.50	.57	5%	20%	25%	1.89
E. Fork Canyon	.60	.73	.50	.86	.66	7%	22%	29%	0.26
Summer Range									
Forest Plan Standard	**.30**	**.30**	**N/A**	**.40**	**.40**	**12%**	**5%**	**20%**	**3.2**
Vance Creek	.60	.65	**N/A**	.33	.53	7%	29%	36%	3.58
Upper Canyon	.69	.70	**N/A**	.43	.57	21%	35%	56%	2.55
E. Fork Canyon	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	

HEI = Habitat Effectiveness Index
HEc = habitat effectiveness derived from the quality of cover
HEs = habitat effectiveness derived from the size and spacing of cover
HEf = habitat effectiveness derived from the quantity and quality of forage; HEf is not used in summer range.
HEr = habitat effectiveness derived from the density or roads open to vehicular traffic
%S = Satisfactory Cover, %M = Marginal Cover, % Total Cover = %S + %M
N/A – Not Applicable. East Fork Canyon has no summer range within the project area.

Table WL-4 displays existing HEI values, cover percentages, and open road densities for the Vance Creek, Upper Canyon Creek and East Fork Canyon Creek subwatersheds. Values are displayed for both winter range and summer range. The project area does not overlap with East Fork Canyon Creek summer; therefore, no values are provided.

All subwatersheds exceed minimal standards for the Habitat Effectiveness Index (HEI), i.e., 0.4 for summer range and 0.5 for winter range. The Forest Plan also identifies target objectives for summer range and winter range at 0.5 and 0.6 respectively. The Forest Plan directs moving stands towards these objectives where site-specific vegetation characteristics and health provide that opportunity (LRMP Record of Decision, LRMP, Management Area-4a). In summer range, all subwatershed exceed the desired objective. In winter range, the Vance Creek and Upper Canyon subwatersheds are just below the desired objective; the East Fork Canyon Creek subwatershed exceeds the desired objective.

The desired objectives for HEI are probably not sustainable; the minimum standards for HEI are more appropriate. In dry biophysical environments, cover requirements (HEc, satisfactory and marginal cover percentages) may not be compatible with Historical Range of Variability (HRV). Historical conditions and fire return intervals favored large blocks of OFSS with canopy closure too low to support large blocks of satisfactory or marginal cover. Under historical conditions, cover percentages would be inherently low, probably below Forest Plan standards and guidelines. Much of the Canyon Creek analysis area typifies this condition; about 83% of the analysis area is in the hot dry and warm dry biophysical environments.

Past timber harvest, fragmentation, fire suppression and natural openings have resulted in a cover/forage ratio of about 41% cover and 59% forage. Individual habitat components, i.e., satisfactory cover and open road densities do not always meet standards, but appear to be at levels that support desired populations. The following sections discuss the various habitat components in more detail.

Forage

Approximately 59% of the analysis area currently classifies as forage. For the purpose of this analysis, forage areas include areas ranging from grasslands to forested stands with less than 40% canopy cover. Forage conditions are primarily the result of timber and grazing management, fire suppression and site productivity. Overstocked forested stands tend to reduce forage; many shrub, grass and forb species are inhibited by reduced sunlight reaching the forest floor. Livestock grazing can be beneficial or detrimental to big game. Range standards and AUMs (animal unit months) are set to meet the forage needs for both livestock and big game.

Cover

Satisfactory and marginal cover is sometimes referred to as thermal cover. Deer and elk use thermal cover to moderate harsh weather conditions, i.e., to keep cooler on hot days and to keep warmer on cold days. Under thermal cover, animals need to expend less energy for thermal regulation. The Forest Plan defines satisfactory cover for elk as a stand of coniferous trees 40 or more feet tall with an average canopy closure equal to or exceeding 50% for ponderosa pine and 60% for mixed conifer. Marginal cover is defined as a stand of coniferous trees greater than 10 feet tall with an average canopy cover meeting or exceeding 40 percent. Satisfactory and marginal cover comprises 13% and 28% of the analysis area, respectively. Total cover is provided on 41% of the analysis area.

The Forest Plan recommends conducting cover calculations at the subwatershed level to better describe cover distribution. Total cover and marginal cover meet or exceed Forest Plan standards for both winter range and summer range for all subwatersheds (see Table WL-4). Satisfactory cover falls below standards in all subwatersheds except Vance Creek summer range. The low satisfactory cover levels may not be unreasonable. As discussed previously, historical conditions and fire return intervals in Canyon Creek favored large blocks of OFSS with canopy closure too low to support large blocks of satisfactory or marginal cover. Under historical conditions, cover percentages would be inherently low, probably below Forest Plan standards and guidelines.

Hiding cover, also referred to as security cover, is also important to big game animals. Hiding cover provides a visual barrier between big game animals and disturbance sources. This is especially important during hunting season when big game animals alter their travel patterns to avoid humans. Hiding cover is difficult to quantify. Many stands classified as satisfactory or marginal cover also provide hiding cover. Even in non-thermal cover stands, small thickets of saplings 1 to 2 acres in size can offer security. Generally, hiding cover is more prevalent in the moist forest environments at higher elevations and less prevalent in the dry forest environments at lower elevations. Topography can also reduce sight distance. Where topography is steep and dissected by multiple ridge lines and valley bottoms, greater security is provided. Such is the case in much of the Canyon Creek project area. Table WL-4 displays levels of satisfactory and marginal cover; these cover percentages provide some indication of the availability of hiding cover in the analysis area. Satisfactory cover is typically multi-storied and often provides the best elk hiding cover. Marginal cover also provides hiding cover, but cover can be much more variable or patchy.

Historically, the project area may not have had a substantial amount of hiding cover. About 83% of the area is in the hot dry and warm dry biophysical environments. These environments typically do not support high densities of conifer stems for more than 40 years. In recent years, commercial and precommercial thinning in the dry biophysical environments have started shifting stands back towards more historic conditions, reducing hiding cover in size and quality. Nevertheless, hiding cover is currently believed to be at levels that exceed HRV.

During project planning, connectivity corridors were designated between late and old (LOS) structured stands to allow movement of old growth species (see Chapter 3, Old Growth Existing Condition, Connectivity Section). The goal is to manage stands in the corridors at higher canopy densities than more intensively managed stands located outside the corridors. In the Canyon Creek project, collaborators expressed interest in maintaining connectivity for deer and elk movement as well. Corridors established for old growth species typically serve big game as well. In the Canyon Creek project, collaborators identified additional connectivity stands to support deer and elk movement (see Map 9 in Appendix B for connectivity corridors).

Roads

Table WL-4 displays the open road densities for the project area by subwatershed in winter and summer range. All subwatersheds meet the Forest Plan standards for open road density except the Vance Creek summer range which is currently at 3.58 open miles per square miles (standard = 3.2 open miles). Total cover in Vance Creek summer range is well above Forest Plan standards and likely helps mitigate the potential for disturbance effects.

Perhaps more important than the impacts of road densities upon elk habit use and selection is the spatial relationships of those roads. Recent studies at the Starkey Experimental Station found a strong correlation between road activity and habitat selection (USDA 2006). Elk response was affected by traffic rates, amount of forest cover near roads, and the type of road (which related to traffic rates). Female elk consistently selected areas away from open roads in both spring and summer. Once the elk were farther away from roads, they were more influenced by other factors such as conditions affecting forage. When elk were unable to avoid roads and trails, subsequent studies showed that animals increased their movement rates, which can increase energy expenditures. Higher movement rates could thus reduce the animals' fat reserves and undermine general animal condition and winter survival. The Starkey research indicated that mule deer behavior seemed to be affected more by elk than by roads. Mule deer tended to avoid elk and so the deer often used areas near roads. That is, mule deer are more likely to use areas least used by elk, which means deer end up in areas near roads with the most traffic.

The Starkey research suggests the special arrangement of roads has a greater influence on elk and deer than the Forest Plan road density model suggests. The research has shown that distance bands are more accurate for estimating disturbance to elk than road density alone. This effect would gradually decrease as distance from open roads increases. About 95% of the Canyon Creek project area is within 1,000 meters of an open road; i.e., only 5% of the area is further than 1,000 meters. About 75% of the area is within 500 meters of an open road; i.e., 25% of the area is further than 500 meters. The presence of open roads likely reduces the habitat effectiveness of the area.

Fawning/Calving Habitat

Optimum calving and fawning habitat include a combination of thermal cover, hiding cover, and quality forage located in close proximity to water (USDA 1979). Habitat is provided primarily within riparian areas where high quality succulent vegetation and water are readily available. Hardwood shrubs, thickets of confer saplings and seedlings, and down logs provide hiding/security cover. Typically calving and fawning habitats is located in spring/fall range where slopes are gentle, usually less than 15%.

In the project area, untreated, riparian areas at mid-elevations probably provide some of the best calving and fawning habitat, at least where open roads have not been constructed directly in the riparian areas. Typically conifer and hardwood stocking are higher and stand structure more complex than in adjacent uplands areas where trees have been thinned. Deer and elk populations in the Murderer's Creek Big Game

Management Unit remain at or above Management Objective's; therefore, it is assumed fawning and calving habitat is adequate.

Big Game Habitat - Environmental Consequences

Alternative 1 - No Action

Direct and Indirect Effects

In the short- to mid-term, the existing condition would be maintained in the analysis area, resulting in no change in the Habitat Effectiveness Index (HEI) for elk. HEI would remain as described in Table WL-4. The existing cover to forage ratio (41:59) would be maintained.

In the short-term, there would be no changes in cover. Total cover and marginal cover would remain in excess of Forest Plan standards for all subwatersheds. Satisfactory cover would remain deficient in all subwatersheds except Vance Creek summer range. In the mid- to long-term (with continued fire suppression), development of multi-strata stands would create additional satisfactory and marginal cover stands, increasing both thermal and hiding cover. Long-term changes could improve HEI over time.

Forage habitats would not be affected in the short- to mid-term. The current quality and distribution of forage habitat within the analysis area would be unchanged. In the mid- to long-term, forage would decrease as tree canopies close and shade the ground.

Open road densities would be maintained at current levels as described in the Existing Condition section. Open road densities meet Forest Plan standards in all subwatersheds except for Vance Creek summer range at 3.6 open miles per square mile. Cover is well in excess of Forest Plan standards for this subwatershed, mitigating the effects of elevated road density. This alternative would not result in direct effects to big game security. Implementation of this alternative would construct no new roads, but at the same time, it would do nothing to modify existing open road densities or road management. Relationships between the spatial distribution and disturbance associated with open roads and hiding cover habitat would also not change, as existing road densities and levels of use are expected to remain the same in the short-, mid- and long-term.

Increased tree stocking may increase the chance of a high severity wildfire. A fire of moderate to intense magnitude and severity could convert multi-strata cover habitat to stand initiation forage habitat in the short- and mid-term, increasing vulnerability of big game to hunting in the roaded portion of the analysis area.

Use of these habitats would not change from the way they are currently utilized by deer and elk. Table WL-3 indicates that elk populations have met population MOs. Elk population levels have remained stable over the last 10 years in spite of past forest management activities.

Alternative 2 – Proposed Action

Direct and Indirect Effects

The proposed action reduces cover with negative effects to habitat effectiveness for elk, but overall HEI values would remain above minimum Forest Plan standards for all subwatersheds, both in summer and winter range. Table WL-5 displays post-treatment HEI, cover, and open road densities. FVS was used to predict post-treatment canopy cover. See Table WL-4 for existing condition comparison.

The most direct effect from the Proposed Action is the reduction in satisfactory and marginal cover and the change in cover/forage distribution. Cover would be converted to lower quality cover habitat or forage depending on the treatment. In shelterwood harvest, understory removal, and commercial thin units, canopy cover would drop below 40% and be classified as forage. In precommercial thinning units, only smaller trees would be removed; post-treatment classification varies by unit. Some units drop from satisfactory to marginal cover while other stands would fall out of cover. Following treatment, satisfactory and marginal cover would comprise 11% and 24% of the analysis area, respectively. Total cover is provided on 35% of the analysis area.

Satisfactory cover, already below Forest Plan standards, would be further reduced. Only Upper Canyon Creek summer range would maintain satisfactory cover in excess of standards. Total cover in Vance Creek and Upper Canyon winter range would drop below standard. A non-significant Forest Plan amendment would be required to reduce cover below standards. In a 2003 letter to the Eastside Forests, the Regional Office provided direction encouraging Forests to use site specific Forest Plan amendments to move the landscape towards HRV (USDA FS June 11, 2003).

Table WL-5: Proposed Action HEI Values, Cover Percentages and Open Road Densities by Subwatershed and Winter/Summer Range Classification.

Subwatershed	HEc	HEs	HEf	HEr	HEcsfr (HEI)	%S	%M	Total Cover %	Open Road Density (miles per square mile)
Winter Range									
Forest Plan Standard	**.40**	**.30**	**.40**	**.50**	**.50**	**10%**	**10%**	**25%**	**2.2**
Vance Creek	.66	.66	.50	.54	.58	6%	13%	19%	1.82
Upper Canyon	.56	.67	.50	.50	.55	3%	20%	23%	1.89
E. Fork Canyon	.60	.73	.50	.89	.66	5%	22%	27%	0.26
Summer Range									
Forest Plan Standard	**.30**	**.30**	**N/A**	**.40**	**.40**	**12%**	**5%**	**20%**	**3.2**
Vance Creek	.59	.64	N/A	.33	.50	5%	24%	29%	3.58
Upper Canyon	.68	.69	N/A	.43	.57	20%	35%	55%	2.55
E. Fork Canyon	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	

HEI = Habitat Effectiveness Index
HEc = habitat effectiveness derived from the quality of cover
HEs = habitat effectiveness derived from the size and spacing of cover
HEf = habitat effectiveness derived from the quantity and quality of forage; HEf is not used in summer range.
HEr = habitat effectiveness derived from the density or roads open to vehicular traffic
%S = Satisfactory Cover, %M = Marginal Cover, % Total Cover = %S + %M
N/A – Not Applicable. East Fork Canyon has no summer range within the project area.

Harvest treatments would occur primarily in warm dry and hot dry biophysical environments. These stands are considered outside HRV, i.e., overstocked and likely unsustainable given the high risk of uncharacteristically severe fire and insect epidemics. Many of these stands could fall out of cover within the next 25 years if not treated.

Deer and elk are believed to use thermal cover, i.e., satisfactory and marginal cover, to reduce the effects of weather and temperature extremes and to hide from predators. It is important to note that recent research at the Starkey Experimental Station in La Grande, Oregon (Cook 1998) has raised the concern that resource managers may be overstating the importance of thermal cover on elk condition. Studies suggest that the energetic benefits of cover may be inconsequential to elk performance, and that it is forage or nutritional effects that may have the greater impact on individual animal performance. However, these studies do not dispute elk's preference for dense forest stands or the numerous studies that show elk using dense stands disproportionately to their availability. Dense conifer cover contributes to better distribution of elk across available habitat, and may be more of a disturbance/hiding cover issue than a thermal regulation issue.

The Proposed Action would cause the loss of hiding/security cover during and immediately after thinning and burning operations. The potential negative effects of removing understory trees would be reduced by the design requirement to retain unthinned patches of dense trees throughout the project area. Unthinned patches would comprise 5% to 15% of the treated area and range from 2 to 5 acres in size depending on proximity to the wildland-urban interface boundary and the density of understory trees. In units where treatment is limited to prescribed burning, losses in hiding cover would be reduced. Design measures provide limits on tree mortality (see Chapter 2). Burning occurs in a mosaic of burned and unburned patches.

Connectivity corridors established for LOS and big game would support deer and elk movement across the landscape (see Map 9 in Appendix B). Prescribed underburning and thinning would reduce understory stocking; however, design requirements would retain non-thinned patches to facilitate animal movement. Harvest treatments would be conducted on about 7% of the corridors. See the Old Growth Habitat section for detailed discussion of effects by treatment unit. Additional connectivity acres have been added to the old growth connectivity corridors to facilitate big game movement; therefore, the percentage treated described in the Old Growth section would be reduced from 10% to 7% here. Adverse effects would be considered low.

Recent results from long-term big game studies at the Starkey Project indicates that elk avoided the short-term disturbance of logging activity itself, but elk did not avoid the harvests units or the log-hauling roads during and after timber harvest. In general, the elk populations become more dispersed during and after timber harvest which suggests that elk were moving farther over larger areas to meet their needs. Elk productivity was not negatively affected by timber harvest; however, the vulnerability of elk to hunting did increase. Open landscapes and relatively flat topography make elk more visible to hunters. This would increase hunter success, but would have little effect on elk performance (weight gain, general body condition) (USDA 2006).

Thinning and burning would improve forage conditions by opening canopies and allowing more light to the forest floor. Most native grasses and forbs and many shrubs respond positively to increased light and fire. Plants tend to sprout vigorously from their roots if the above ground portions are killed by fire, although it might take 2 to 3 years for grass and forb species and 10 to 15 years for shrubs to return to their pre-fire abundance and volume. Fire can also increase nutrient content and palatability of forage, although the increased quantity of forage after a fire may be more significant than the increased quality of that forage (USDA 2000). Species that respond favorably to fire include pinegrass, elk sedge, wild rose, snowberry, ceanothus, serviceberry, chokecherry and currant.

Mountain mahogany and bitterbrush appear to be somewhat dependent on fire for long-term viability, although short-term effects can be detrimental to these plants. Fire may kill existing plants, but will prepare the necessary seedbed for regeneration. Sagebrush is also killed by fire, but seed germination can be fostered by improved seedbeds as well. The project is not intending to burn through large, expansive shrublands.

Mortality/damage of smaller shrub stands and scattered individual plants would be expected. Mosaic burning would retain shrubs throughout the project area. Overbrowsing has been detrimental to existing shrubs and fire might increase abundance and vigor of many species, thus reducing the level of browsing on any individual species or plant. Ideally, landscapes would be underburned every 10 to 15 years to enhance forage quality and quantity.

Precommercial thinning and pile burning would be conducted on 61 acres in riparian areas; prescribed burning would be conducted on about 251 acres. Treatments would potentially affect calving and fawning habitat. Design features would retain untreated patches to maintain hiding/security cover. Precommercial thinning would have a greater impact than burning, but the number of acres being treated is considered incidental. In known calving/fawning area, precommercial thinning and underburning would be prohibited from May 1st to June 30th to minimize effects. In areas not specifically identified for calving and fawning, burning crews would watch for lone deer or elk. If crews see lone animals, they would search the immediate area for calves and fawns and avoid igniting fire where young animals are discovered.

Open road densities would increase during timber sale operations as roads are opened to facilitate log haul. There would be a short-term increase in big game disturbance during operations. Seasonal restrictions in winter range would minimize effects during the most sensitive season. Disturbance is less of a concern to summer range; more of the land base is available for use. In the Canyon Creek area, the wilderness provides high quality escapement cover when accessible. Activities would likely change big game distribution, but not affect populations. Roads opened for log haul would be closed upon completion of timber work. About 2 miles of temporary roads would be constructed and then decommissioned upon completion of harvest activities. About 200 feet of permanent road would be constructed and left open. This increase in open road density is considered negligible; it did not change the open road density or HEI values at the landscape level. Although open road density exceeds the Forest Plan standard in Vance Creek summer range, cover in the subwatershed would remain in excess of standards, minimizing effects. Elsewhere, open road densities remain below Forest Plan standards helping mitigate the effects of cover loss.

Disturbance to big game is a concern in winter range. To avoid disturbing animals, no management activities would be permitted from December 1st to April 30th. The alternative snow mobile route is located outside winter range to the south; additional disturbance effects would be considered minimal.

In summary, reductions in thermal and hiding cover would likely affect big game distribution, but would not be expected to affect population numbers. Although satisfactory cover is reduced below standards, total cover remains near or in excess of standards. Retention of unthinned patches in units would help mitigate losses in cover. Open road densities would remain below Forest Plan standards in all areas except Vance Creek summer range, reducing the potential for disturbance. Seasonal restrictions on activities would minimize disturbance in winter range. The project was designed to maintain connectivity corridors for deer and elk. Winter and summer range would continue to meet Forest Plan standards for HEI. Elk populations have remained stable during the last 10 years, meeting or exceeding ODFW Management Objectives. Implementation of the Proposed Action would not be expected to reduce populations.

Cumulative Effects

The area considered for cumulative effects is the Vance Creek, East Fork Canyon and Upper Canyon Creek subwatersheds. All of the activities in Appendix C have been considered for their cumulative effects on big game habitat and associated species. The following discussion focuses on those past, ongoing and foreseeable future activities that may contribute positive or negative effects.

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

Future thinning and burning projects would have effects similar to those described for the Canyon Creek Project. Combined projects would improve forage quality and quantity for big game, while reducing cover habitat and increasing big game vulnerability. Projects would likely be designed to retain unthinned patches to reduce cover losses. The only exception would be the proposed thinning around the Dry Soda Lookout where more trees would be removed to maintain visibility from the lookout. Combined projects would be expected to maintain overall HEI at or above Forest Plan standards.

Cumulatively, management activities across the Forest are distributed sufficiently to minimize disturbance impacts at the population levels. Seasonal restrictions are applied on a project by project basis as needed.

Other ongoing and foreseeable actions, i.e., summer and winter recreation, hunting, and firewood cutting would continue to occur in the area but are not expected to affect big game on the large scale. These actions may temporarily and in the short-term affect individuals but are not expected to affect populations.

Disturbance of elk by hunting along open roads and off-road vehicle use would have more impact on big game populations than big game cover conditions created by the proposed action. Although no new roads would be closed with this project, the ongoing trend in the Forest Service is to reduce open road densities below Forest Plan Standards whenever possible.

Elk population census data for the Murderer's Creek Management Unit indicates a stable, level, population trend (Table WL-3). It appears that past forest management has not been detrimental to elk populations in this management unit. It is not anticipated that planned activities in this alternative would cause a decline in elk populations either. However, it will likely cause a redistribution of animals across the landscape.

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

Primary Cavity Excavators – Existing Condition

Primary Cavity Excavators (PCEs) depend on standing and downed wood for foraging, nesting, and roosting. These species create cavities in dead and live trees. Secondary cavity users (flying squirrels, etc.) can use cavities excavated by these species. Primary cavity nester habitat can occur in a variety of vegetative communities with various structural conditions (Thomas 1979).

The Forest Plan identifies 11 Primary Cavity Excavators (PCE) as MIS for the availability and quality of dead and defective wood habitat: black-backed woodpecker, three-toed woodpecker, Lewis' woodpecker, white-headed woodpecker, pileated woodpecker, downy woodpecker, hairy woodpecker, northern flicker, Williamson's sapsucker, red-breasted sapsucker and yellow-bellied sapsucker. Because sapsucker species have been re-classified in recent years, the red-naped sapsucker will be used as a surrogate for the red-breasted and yellow-bellied sapsuckers. Species ecology is summarized in the Wildlife Report in the Project Record. Habitat and population trend information was derived from Interior Columbia Basin studies (Wisdom et al. 2000) if available; this data is also summarized in the Wildlife Report.

Snags and down log densities were estimated using data obtained through stand exams, Most Similar Neighbor analysis, and field reconnaissance. On average, current snag densities in the analysis area do not meet Forest Plan standards for 100% potential population levels, i.e., 2.39 snags per acre equal to or greater than 21" dbh. Existing snags average 6.4 snags per acre 10-20" dbh and 1.4 snags per acre 20" dbh and greater. Total snags may exceed the Forest Plan standard, but the large diameter snags 20" dbh and greater are deficient. Existing snags levels are primarily a result of past harvest which removed a large portion of the existing snags and large, mature trees (snag replacement trees).

Snags and down log densities were estimated using data obtained through stand exams, Most Similar Neighbor analysis, and field reconnaissance. Snags were estimated for the analysis area (i.e., three subwatersheds at 57,761 acres), focusing on the dry biophysical environments. Future snags were projected 10 years after treatment and 50 years after treatment.

On average, current snag densities in the analysis area do not meet Forest Plan standards for 100% potential population levels, i.e., 2.39 snags per acre equal to or greater than 21” dbh. Existing snags average 6.4 snags per acre 10-20” dbh and 1.4 snags per acre 20” dbh and greater. Total snags may exceed the Forest Plan standard, but the large diameter snags 20” dbh and greater are deficient. Existing snags levels are primarily a result of past harvest which removed a large portion of the existing snags and large, mature trees (snag replacement trees).

Existing snag levels are, however, similar to densities reported in 1927 timber surveys conducted on the Malheur Forest about 10 mile east of the project area (Matz 1927). Matz recorded approximately 1.7 snags per acre that were between 12 and 20 inches in diameter and 1.2 snags per acre greater than 20 inches in diameter. These surveys were conducted in vegetation conditions similar to those found in the Canyon Creek project area.

Appendix 2 of the Wildlife Specialists Report includes snag distributions for the project area; existing distributions were compared to inventory distribution data in DecAID 2.0 (Mellen 2006). Data suggests that small snags are below HRV; larger snags are variable with some density classes below HRV and some classes above HRV.

Existing snag data was also compared to wildlife data in DecAID 2.0 (Mellen 2006). DecAID is an internet-based computer program developed as an advisory tool to help federal land managers evaluate effects of management activities on wildlife species that use dead wood habitats. The tool synthesizes published literature, research data, wildlife databases, and expert judgment and experience.

In DecAID, wildlife tolerance levels (30%, 50%, 80%) are used to describe the % of a population that utilizes a particular habitat characteristic (e.g., snag density). Essentially, the lower the tolerance level, the fewer individuals will likely use the area. For example, at the 30% tolerance level for any given species, it would be expected that 30% of a population would find suitable or usable habitat at the specified snag density. Consequently, 70% of a population would not find suitable habitat conditions at that snag density. It should not be assumed that the highest tolerance level (80%+) is always the goal for management. In many instances, historic conditions, particularly in the dry forest types, did not support the density of snags at the 80% level. In the analysis area, existing snag levels correlate to the lower tolerances levels for various PCE species, primarily at the 30%-50% tolerance levels or lower (see Appendix 1 of the Wildlife Specialists Report for DecAID wildlife tolerance levels by wildlife species and habitat type). The 1927 local data (Matz 1927) suggest that historic conditions could only provide for dead wood conditions at these lower tolerance levels.

While DecAID provides data on wildlife use of snags and down wood, it does not measure the biological potential of wildlife populations. There is no direct relationship between wildlife tolerances, snag density and size used in DecAID and snag density and size that measure potential population levels (Mellen et al. 2006). Therefore, DecAID wildlife tolerance levels are only one component used to evaluate the effects of this project on dead wood habitats and associated species. This analysis also used species' ecology, project design features, Forest Plan standards, local historic snag data and projected snag levels to analyze effects.

Regional Forester's Eastside Forest Plans Amendment #2 prescribes standards for down logs. In the ponderosa pine types, Amendment #2 prescribes retention of 3-6 logs per acre, total lineal length of 20-40 feet, 12 inches in diameter at the small end and each log at least 6 feet in length. In the mixed conifer types, Amendment #2 prescribes 15-20 logs per acre, total lineal length of 100-140 feet.

Visual estimates of down logs were made for each of the 277 stand exams taken. In addition, volumetric estimates of down logs were made for the examined stands. Both visual estimates and volumetric calculations of down wood indicate that most forested stands in the project area meet Forest Plan standards. Results were also compared against down log inventory data in DecAID (Mellen 2006). Exam plots generally indicated that the stands in the project area have more down wood than would be expected under a historic or reference condition. Past management activities, fire suppression, disease and insects could all be cause for the build up of down wood.

Primary Cavity Excavators - Environmental Consequences

Alternative 1 - No Action

Direct and Indirect Effects

Selection of the No Action alternative would maintain existing levels of snags and downed wood in the analysis area. No activities would be implemented, so there would be no creation or loss of existing snags or downed wood. Snags would continue to be recruited and fall at existing rates. In the short- and mid-term, the number of large diameter snags would continue to be below Forest Plan standards. In the long term, continued fire suppression and multi-strata development would increase the chance of insect infestations and disease. These occurrences would potentially increase snag densities. Downed wood densities, on average, would continue to meet Forest Plan standards now and into the future. Logs would be expected to increase as existing or created snags fall.

Table WL-6 displays the average number of existing snags for the warm dry and hot dry biophysical environments in the analysis area. FVS was used to project snag levels to year 50 if No Action is taken. Projected snag levels are also provided for the Proposed Action alternative for comparison purposes. Under the No Action Alternative, snags are projected to increase over time. By 2050, snag densities would be expected to exceed Forest Plan standards.

Table WL-6: Snag densities

	Snags 10-20" dbh per acre	Snags >20" dbh per acre	Total snags per acre
Forest Plan Standard	**NA**	**2.39**	**2.39**
Existing Condition – No Action	6.4	1.4	7.8
Proposed Action in 10 Years	6.6*	1.3*	7.9*
No Action in 50 Years	9.0	2.6	11.6
Proposed Action in 50 Years	7.5*	2.3*	9.8*

*Snag estimates for Alternative 2 do not reflect the effects of retaining untreated patches in harvest units; retention of these patches of trees would continue to provide avenues for snag creation. Values would likely be higher.

In the short- to mid-term, the No Action alternative would have minimal effects on the MIS species for dead wood habitats including 10 PCE species and the pine marten. Habitat would remain unchanged in the short- and mid-term. Snag and downed wood used by these species would have the same availability, distribution, and density described in the existing condition section. Dead wood habitat would remain stable for species such as the pileated woodpecker, downy, and hairy woodpeckers, and other species identified at the beginning of the section. These habitats would continue to provide snags for foraging and nesting, as well as higher canopy closures and near ground level canopy development that provides protection from predators. Populations would remain the same.

In the long-term, disease and insects would increase foraging and nesting habitat for these species. Table WL-6 indicates that by year 50, snag levels would be expected to meet or exceed Forest Plan standards and exceed historic levels reported by Matz. Populations would likely respond positively to these increases. Although snag habitat would be expected to increase, DecAID tolerance levels would be expected to remain around the 30%-50% or lower, as described in the existing condition section. Increases in canopy could have additional benefits to pileated woodpecker and pine marten and adverse effects to white-headed woodpeckers; canopy cover effects are discussed in detail in the Old Growth Habitat section. The red-naped sapsucker, Williamson's sapsucker, and downy woodpecker could show a slight negative effect to habitat due to continued decline in aspen habitats. Deciduous habitats only comprise a small portion of the analysis area, so no changes to existing populations would be expected.

Higher fuel loads would increase the chance of a high severity wildfire within the analysis area. A fire of this magnitude and severity would more dramatically affect snag and downed wood densities; snags would be much higher than those displayed in Table WL-6. Stand replacement wildfire would benefit some species (Lewis', black-backed, northern three-toed, and hairy woodpecker, and the northern flicker) while reducing habitat for other species (pileated, white-headed, and downy woodpecker, and the red-naped and Williamson's sapsucker) less associated with fire. Increases in stand densities resulting from continued fire suppression would increase canopy densities. The growth of understory hardwood shrubs required by some PCE species would be inhibited by reduced sunlight reaching the forest floor.

Alternative 2 - Proposed Action

Direct and Indirect Effects

Today, many green timber sales are conducted differently than they were in the past. In the Canyon Creek Project, snags would not be targeted for removal, although incidental snags may be lost during logging to meet operational/safety needs during logging. Project design criteria, such as retaining clumps of live trees around snags and locating landings and temporary roads where there are few or no snags, would help minimize losses. Any losses of snags from construction of 200 feet of permanent road would be considered negligible. Retention of untreated patches of trees would continue to provide avenues for snag creation.

Prescribed burning would be expected to have the most effects on snags. Snags can be both lost and recruited during burning. Design features would be incorporated into burn prescriptions to minimize the effects to existing snags. This “snag exchange” may increase local woodpecker viability if fire created snag recruitment exceeds loss. Because most of the mortality would be in trees smaller than 10” dbh, most of the benefits would be to foraging habitat rather than nesting habitat. The proposed action would result in the most immediate increase in foraging habitat.

At the analysis area scale, the loss of large snags from harvest would be expected to be minor due to the number of acres being treated and the fact that snags would not be targeted for removal. Snags felled for safety during logging operations would impact 2%-10% of the existing snags in the treatment units, and less than 1% at the landscape level. Table WL-6 predicts snag densities 10 years following treatment. As suspected, the number of 10-20 inch dbh snags would increase (6.4 snags per acre to 6.6). The number of large snags could decrease slightly (1.4 snags per acre to 1.3). It is believed that these snag levels are somewhat underestimated. Snag estimates do not reflect the effects of retaining untreated patches in harvest units; retention of these patches of trees would continue to provide avenues for snag creation. Snag levels would likely be higher. Although the analysis area remains below Forest Plan standards, additional level of impact would not be expected to adversely affect PCE populations in the analysis area. At the analysis area scale, the levels of snags greater than 20” dbh would be expected to be similar to historic snag levels (Matz 1927).

Table WL-6 indicates that in the long-term (50 years), snag levels would increase, although at slightly lower levels than predicted for the No Action alternative. This would be expected given proposed thinning treatments would be designed to help reduce the levels of insect and disease operating in the project area. By year 50, total snag levels would be expected to exceed Forest Plan standards; large diameter snags could be slightly deficient (2.3 snags per acre rather than 2.4), although it is believed that these values are somewhat underestimated as discussed in the previous paragraph. Snags would exceed historic levels reported by Matz (1927) and increases would better reflect levels in DecAID. Because of proposed treatments, large diameter trees would be plentiful and a portion could be converted to snags to supplement naturally-occurring levels and address any shortfall.

Forest Plan standards for green tree replacements would be met following treatments. Sufficient snag replacement trees would be available to meet future needs in all treatment units. Although snag habitat would be expected to increase, DecAID tolerance levels would be expected to remain around the 30%-50% or lower, as described in the existing condition section.

Burning activities would be conducted to ensure little or no net loss of down logs. Logs may be charred, but effects would meet Forest Plan standards that require that no more than 3 inches of the log diameter, 1.5 inches on either side of a log, be consumed. Logs would be expected to increase as existing or created snags fall.

Prescribed fire activities would occur in Riparian Habitat Conservation Areas (RHCAs). Ignition of prescribed fire is proposed on about 61 acres within RHCAs and would occur under strict burn prescriptions. In other burn blocks, fire from upslope burning units, would be allowed to back into RHCAs. Design criteria would include retention of at least 95% of stream shade. Burning intensities would be lower than in areas outside RHCAs; therefore, effects as described previously would also be lower. Burning activities would mimic low intensity fires that are characteristic of natural burning patterns that tend to occur in riparian areas. This technique would result in a patchy distribution of burned and unburned areas. Using these techniques, mortality of understory trees would occur in burned patches but few overstory trees would be killed. Little to no effect on riparian hardwood trees and shrubs would be expected. Therefore, species that use deciduous trees and shrubs such as the Williamson’s sapsucker, red-naped sapsucker and downy woodpecker would not be affected,

In the short- to mid-term, the Proposed Action would have positive effects on most PCE species because of the increase in snag habitat from prescribed burning. Because most of the trees killed would be small trees, benefits would be primarily to foraging habitat. Species that would benefit include black-backed woodpecker, three-toed woodpecker, Lewis’ woodpecker, white-headed woodpecker, downy woodpecker, hairy woodpecker, northern flicker, Williamson’s sapsucker, and red-naped sapsucker. Black-backed and three-toed woodpeckers tend to use smaller snags for nesting, so benefits may be slightly higher for these species. Although snag habitat would be expected to increase, DecAID tolerance levels would be expected to remain around the 30%-50% or lower, as described in the existing condition section. Habitat increases would not be expected to change populations.

The Proposed Action would have a slightly negative impact to pileated woodpecker and pine marten habitat. Snag habitat for these species would increase, but treatment would also degrade (char) down log habitat and reduce cover. Effects to cover are discussed in the Old Growth section. Combined changes in cover and dead wood habitat would not be expected to affect population viability.

In the long-term, disease and insects, although reduced compared to the No Action alternative, would continue to increase foraging, nesting and denning habitat for dead wood associated species. Populations would likely respond positively to these increases.

During project operations (logging, noncommercial thinning, machine work, burning, changes in snow mobile routes) degrees of disturbance and displacement of dead wood associated species would be likely. Overall, disturbance from activities would be limited in time and place, and therefore, would not be expected to change populations of species at the landscape level.

Cumulative Effects

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

Past timber harvest projects were generally very intensive, focusing upon the removal of the larger, more valuable ponderosa pine, Douglas-fir, and western larch trees (green tree replacements). Likewise, merchantable snags and downed wood were also removed, burned, or otherwise disposed of. The extensive road network in the analysis area (largely a result of past harvest) has impacted snag densities by increasing accessibility of the area to firewood cutting. Firewood cutting has impacted snag habitat in close proximity to open roads. Fire suppression has resulted in dense, multi-strata stands; snag and down log densities are generally higher in these stands than less dense ponderosa pine stands.

Current trends indicate that snags and down log numbers are increasing due to reduced harvest over the past decade and increased retention levels required by Regional Forester's Eastside Forest Plans Amendment #2. In addition, the closing of roads has reduced the amount of snags cut for firewood. Any future thinning or prescribed underburning would be designed to retain a suitable snag and down wood component. Such management strategies are expected to improve habitat for cavity dependent species.

Appendix C lists additional thinning/burning projects expected in the future. The effects of these projects on snags and down wood habitat are expected to be similar to effects described for the Canyon Creek project. Harvest would fell only incidental snags for safety reasons and landing/temporary road construction. Future underburning activities have the potential to both consume existing snags and downed logs and to create new snags. Design features would be included to minimize consumption of existing habitat. Overall, snags and down logs would be expected to stay about the same or increase.

The 1986 Scalp Fire, 1988 Table Mountain Fire, 1994 Cabin Fire, and 1996 Wildcat Fire burned 4,660 acres within or adjacent to the analysis area. These fires created an immediate pulse of snags that provided additional snag habitat. Salvage of the Scalp, Table Mountain, and Cabin Fires reduced habitat, although prescriptions were designed to leave some snag and down wood habitat. These post-fire habitats are old enough that many of the remaining snags are now on the ground as down logs. The Wildcat Fire was not salvaged and continues to provide high levels of snags and increasing down wood habitat. Snag estimates in the existing condition section reflect snag levels in those fires areas that overlap the analysis area.

Private lands typically do not provide large diameter snags. In the past, adjacent landowners have generally salvaged damaged or dying trees to capture their economic value before they decay to a level where they no longer have a market value. Timber management has favored harvest of large diameter trees because of their higher economic value; removal of overstory trees releases smaller trees that are then managed over the next harvest cycle. Public firewood cutting is expected to continue along open roads.

Cumulatively, management activities across the Forest are distributed sufficiently to minimize disturbance impacts at the population levels. Seasonal restrictions are applied on a project by project basis as needed.

Due to the low level of effect that is expected under the No Action and Proposed Action alternatives, it is not expected that adverse cumulative effects on snag and downed wood habitat and the species that depend on these habitats would result when combined with the residual and anticipated effects of past, present, and reasonably foreseeable future activities. Future snags projections indicate a gradual increase in snags over time. Populations of species associated with dead wood habitats would be maintained.

Northern Goshawk - Existing Condition

Goshawk is a species specifically identified in the Regional Forester’s Eastside Forest Plans Amendment #2. They utilize a wide range of mature and immature forest habitat types. In general, goshawks, nest in mature and old forest stands of relatively large trees with closed canopies (>50%) and an open understory. On the Malheur National Forest, a 30-acre nest area and a 400-acre post-fledging area (PFA) are established for each territory.

Three known goshawk territories exist in the project area: Fawn, Starr Camp, and Vance. Two additional goshawk territories are located outside but adjacent to the project area: Table Mountain and Big Canyon. These territories have been monitored annually to determine reproduction success. In 2005, taped goshawk calls were broadcasted in habitat throughout the remainder of the project area to determine if additional habitat was being used; calls did not illicit a response and therefore, no additional territories were designated.

Effects to habitat were analyzed for the project area (22,700 acres) and the analysis area (57,761 acres). Future old growth was projected 10 years after treatment and 50 years after treatment. See Old Growth Section. Effects to known goshawk territories were analyzed for Post-fledging Areas (PFAs) within the project area.

Northern Goshawks - Environmental Consequences

Alternative 1 - No Action

Direct and Indirect Effects

Under the No Action alternative, habitat for northern goshawk would increase as stand density and canopy cover increases. Populations would not be expected to change in the short- to mid-term, and could potentially increase in the long-term. See the Old Growth Section of this Chapter for additional effects on goshawks and their preferred nesting habitat.

Fire hazard would remain high in the project area as discussed in the Fuels section of this EA. Long-term development of old growth could be diminished if stand development is disrupted by epidemic bark-beetle activity (likely) or severe fire effects (possible).

Alternative 2 – Proposed Action

Direct and Indirect Effects

Under the Proposed Action alternative, there would be a reduction in nesting habitat for the northern goshawk. Thinning and prescribed underburning is intended to reduce understory cover and open up stands, shifting stands towards historic conditions. About 300 acres (13%) of secondary habitat would be treated, degrading habitat in the units treated. The acres affected would be considered incidental at the analysis area level. Primary and secondary habitat would remain plentiful; stand growth projections indicate habitat would increase in the long-term. Construction of temporary roads would fragment mature and old growth habitat; however, roads would be decommissioned when project work is completed. Less than a 1/2 mile of temporary road would be constructed in these habitats. Construction of 200 feet of permanent road would avoid primary and secondary habitat. See the Old Growth Section of this Chapter for additional effects on goshawks and their preferred nesting habitat.

The Fawn PFA would be treated under the Proposed Action alternative; the Starr Camp and Vance PFA's would not be treated. The Fawn PFA is located adjacent to the public/private boundary. The Proposed Action alternative identified elevated fire hazards immediately adjacent to the boundary, including stands in the PFA. Units 317 and 328 and a portion of units 314 and 316 would be commercially and/or precommercially thinned to reduce the fire hazard within the existing PFA. About 95 acres (22%) of the PFA would be treated; the 30-acre nest area would not be treated. Stands to be treated are mid-seral stands classified as Stem Exclusion Closed Canopy (SECC). These stands currently do not provide nesting habitat for goshawks, but they likely provide foraging habitat.

Harvest within the Fawn PFA would alter foraging habitat by reducing canopy and possibly shifting prey assemblages from canopy gleaners to open forest type birds. More open stand conditions would create foraging habitat that would permit this raptor to detect and acquire prey species more efficiently. Because goshawks will prey on primary cavity excavators, retention of dead wood habits will help improve goshawk foraging habitat. Goshawks prey on a variety of small mammal species as well. Adult goshawks foraging in the area would not likely be disturbed by project activities.

Research (Reynolds et al. 1992 and Marshal 1992) varies on conclusions as to the effects of harvest in and adjacent to nest stands and whether or not goshawks will use these stands following harvest. Several studies (Marshal 1992) have suggested that selection harvest of trees can reduce nesting; however, goshawk management recommendations by Reynolds et al. (1992) do not exclude timber harvest. Local monitoring of goshawk territories is inconclusive on this subject; some territories have remained active from year to year despite adjacent treatments. Treatment within the Fawn PFA would follow Reynold’s recommendations because this project is in a wildland urban interface, stands are overstocked and a severe fire hazard, and PFA stands are close to the public/private boundary, treatment in the PFA. Annual goshawk monitoring would be conducted to validate effects to nesting goshawks.

Prescribed burning could also reduce cover, but generally burning kills smaller trees and would have minimal effect on canopy cover. As with timber harvest, seasonal restriction would be applied to burning activities if nesting goshawks are identified.

Known goshawk territories would be monitored annually for goshawk activity. If active nests are identified within or immediately adjacent to the project area, management activities would be prohibited within ½ mile of the nest sites from April 1 to September 30 to avoid disturbing goshawks during the breeding season. The alternative snow mobile route avoids known PFAs.

Proposed treatments would reduce the hazards associated with insect epidemics and stand-replacement fire. Old growth would more likely persist into the future than under the No Action alternative. Restoring natural vegetation conditions and fire regimes would make these habitats far more self-sustaining for associated wildlife species. Known goshawks territories would be maintained; seasonal restrictions would be applied as needed to minimize disturbance during the reproduction season. Primary and secondary habitat would remain plentiful; stand growth projections indicate nesting habitat would increase in the long-term. Overall, proposed timber management and prescribed burning would contribute positively toward the viability of this species.

Cumulative Effects

The area considered for cumulative effects to nesting habitat is the Vance Creek, East Fork Canyon and Upper Canyon Creek subwatersheds. All of the activities in Appendix C have been considered for their cumulative effects on northern goshawk. The following discussion focuses on those past, ongoing and reasonable foreseeable future activities that may contribute adverse effects to the species or its habitat.

Nesting habitat is typically the limiting factor for goshawks. Past timber harvest reduced mature and old growth habitat preferred for nesting and fledging. Since 1993, the Forest Plan as amended has directed the Malheur National Forest to conduct timber sales in a manner that moves stands towards OFMS and OFSS structural stages, and timber sales planned since that time should not have contributed to loss of mature and old growth forest. Future thinning and burning projects listed in Appendix C would adhere to this management direction.

Adjacent private lands have been logged. In the past these timber stands have generally not provided nesting habitat for goshawks. These stands are not being managed for old growth conditions, and therefore are not expected to provide nesting habitat in the future.

Forage is not considered a factor limiting goshawk population viability in the area, and consequently cumulative changes to foraging habitat, whether positive or negative, would not contribute to a measurable change in goshawk populations.

Goshawks are highly sensitive to disturbance during the breeding season. When seasonal restrictions on management activities were disregarded in the past, breeding success may have been reduced. Since 1990, seasonal restrictions on activities within ½ mile have been regularly used in the vicinity of occupied nests. Known goshawk territories are to be monitored annually; if monitoring identifies occupied nesting habitat, seasonal restrictions would be applied to all management activities.

In the short- to mid-term, the No Action alternative would not contribute to cumulative losses of old growth because stands would not be treated. In the long-term, the No Action alternative, by forgoing action, could negatively contribute to the loss of old growth and associated species if a stand-replacing event such as wildfire occurs.

In the short- to mid-term, the Proposed Action would contribute to a potential reduction in nesting habitat. In the long-term, proposed treatments would reduce the hazards associated with insect epidemics and stand-replacement fire. Old growth would more likely persist into the future than under the No Action alternative. Restoring natural vegetation conditions and fire regimes would make these habitats far more self-sustaining for associated wildlife species. Known goshawks territories would be maintained; seasonal restrictions would be applied as needed to minimize disturbance during the reproduction season. Primary and secondary habitat would remain plentiful; stand growth projections indicate nesting habitat would increase in the long-term. Cumulatively, management actions would not be expected to reduce population viability.

Blue Grouse - Existing Condition

Blue grouse prefer coniferous forests with a mixture of deciduous trees and shrubs near edges, openings and meadows. They use large mistletoe infected Douglas-fir trees, generally located within the upper 1/3 of slopes, as winter roosts. The Forest Plan requires the maintenance of winter roost habitat.

Blue winter grouse habitat has been mapped in the Vance Creek and Upper Canyon Creek subwatersheds. About 355 acres of field-verified winter roosting habitat is located in the Vance Creek subwatershed with scattered patches of winter roosting habitat located in the Upper Canyon Creek subwatershed. Habitat has not been formally mapped for the East Fork Canyon Creek subwatershed. However, Douglas-fir dominated stands comprise 22% of the project area and it can be expected that a majority of these acres are infected with some degree of mistletoe and that these infestations are providing habitat for blue grouse.

Blue grouse have been documented in the Vance Creek and Upper Canyon Creek subwatersheds. The current distribution and abundance of this species in the project area is unknown.

Blue Grouse - Environmental Consequences

Alternative 1 - No Action

Direct and Indirect Effects

Under the No Action alternative, there would be no direct or indirect effects to winter roost habitat. Habitat conditions would remain the same in the short- to mid-term. Over the long-term, increased stand densities and related stress could result in increased mistletoe and therefore increased winter roost habitat. Populations of blue grouse would be maintained. During project operations (logging, noncommercial thinning, machine work, road work and use, burning, use of alternative snow mobile routes) degrees of disturbance and displacement of wildlife are likely. Seasonal restrictions in winter range for deer and elk would also reduce effects to blue grouse. Overall, disturbance from activities would be limited in time and place, and therefore, would not be expected to change populations of blue grouse at the landscape level.

Alternative 2 – Proposed Action

Direct and Indirect Effects

Under the Proposed Action, harvest of trees potentially providing winter roost habitat would occur. As directed by the Forest Plan, design features would be incorporated into harvest prescriptions to maintain winter roost habitat. Populations of blue grouse would be maintained.

Cumulative Effects

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

On Forest Service lands, future thinning and prescribed burning activities described in Appendix C would be designed to meet Forest Plan standards for winter roost habitat. Treatment on private land is uncertain, but generally, timberlands are intensively managed and mistletoe trees removed. Cumulatively, management activities across the Forest are distributed sufficiently to minimize disturbance impacts at the population levels. On Forest Service lands, future thinning and prescribed burning activities described in Appendix C would be designed to meet Forest Plan standards for winter roost habitat. Treatment on private land is uncertain, but generally, timberlands are intensively managed and mistletoe trees removed.

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

Threatened, Endangered and Sensitive (TES) Wildlife Species - Existing Condition

Table WL-7 displays the TES wildlife species that have habitat within the project area. There is no habitat present to support the presence of the pygmy rabbit (*Brachylagus idahoensis*) or bufflehead (*Bucephala albeola*); they are not addressed in this document.

Threatened, Endangered and Sensitive (TES) Wildlife Species - Environmental Consequences

Direct, Indirect and Cumulative Effects

Table WL-7—Terrestrial Wildlife Species.

Species	Status	Occurrence	Alternative 1 – No Action	Alternative 2 – Proposed Action
Gray Wolf *Canis lupus*	E	HD/N	NE	NE
Northern Bald Eagle *Hailaeetus leucocephalus*	T	HD/D	NE	NE
North American Lynx *Lynx canadensis*	T	HD/S	NE	NLAA
American Peregrine Falcon *Falco perigrinus anatum*	S	HD/S	NI	NI
California Wolverine *Gulo gulo luteus*	S	HD/D	NI	MIIH
Pygmy Rabbit *Brachylagus idahoensis*	S	HN/N	NI	NI
Pacific Fisher *Martes pennanti*	S	HD/N	NI	MIIH
Western Sage Grouse *Centrocercus urophasianus phaios*	S	HD/S	NI	NI
Gray Flycatcher *Empidonax wrightii*	S	HD/S	NI	NI
Bobolink *Dolichonyx oryzivorus*	S	HD/S	NI	NI
Upland Sandpiper *Bartramia longicauda*	S	HD/S	NI	NI
Tricolored Blackbird *Agelaius tricolor*	S	HD/S	NI	NI
Bufflehead *Bucephala albeola*	S	HN/N	NI	NI

E = Federally Endangered
T = Federally Threatened
S = Sensitive species from Regional Forester's list
HD = Habitat documented or suspected with the planning area or near enough to be impacted by project activities
HN = Habitat Not within the project area or affected by its activities
D = Species Documented in general vicinity of project activities
S = Species Suspected in general vicinity of project activities
N = Species Not documented and not suspected in general vicinity of project activities
NE = No Effect
NI = No Impact
NLAA = May Effect, Not Likely to Adversely Affect
MIIH = 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

Table WL-7 displays the overall effects determination for all alternatives. Further information on the effects of proposed activities on TES species can be found in the Canyon Creek Terrestrial Wildlife Biological Evaluation (Appendix G).

Landbirds including Neotropical Migratory Birds (NTMB) - Existing Condition

Neotropical migratory birds breed in temperate North America and spend the winter primarily south of the United States-Mexico border. Of the 225 migratory birds that are known to occur in the western hemisphere, about 102 are known to breed in Oregon and about 82 are known to breed on the Malheur National Forest. They include a large group of species, including many raptors, cavity excavators, warblers and other songbirds, with diverse habitat needs spanning nearly all plant community types and successional stages. Long-term population data on many of these birds indicate downward population trends although not all species populations are declining (Sharp 1996, Saab and Rich 1997, Altman 2000, USFWS 2002). Habitat loss is considered the primary factor in decline of neotropical migratory birds.

In 2000, the Oregon-Washington Chapter of Partners in Flight published its Northern Rocky Mountains Bird Conservation Plan (Altman 2000). The Plan provides conservation recommendations for the various species of landbirds that occupy the Oregon and Washington portions of the Interior Columbia Basin. The Plan identified the following priority habitats for landbird conservation: old-growth dry forest, old-growth moist forest, riparian woodland and shrubland, and unique habitats including alpine and subalpine forests, shrub-steppe, montane meadow and aspen habitats. The Conservation Plan also identified burned old forest as a limited habitat due to fire suppression. Many of the avian species/habitats identified in the Northern Rocky Mountains Bird Conservation Plan (Altman 2000), are also addressed in the USFWS's Birds of Conservation Concern (USFWS 2002).

Table WL-8: Neotropical Migratory Birds – Focal Species found in the Project Area by Habitat Type and Acres of Habitat

Habitat Type	Habitat Feature/Conservation Focus	Focal Species
Dry Forest Types	Large patches of old forest with large trees and snags - i.e., Old Forest Single Stratum (OFSS)	White-headed woodpecker
	OFSS with interspersions grassy openings and dense thickets	Flammulated owl
	OFSS - open understory with regenerating pines	Chipping sparrow
	Patches of burned old forest	Lewis' woodpecker
Riparian Woodland	Large snags	Lewis' woodpecker
	Canopy foliage cover	Red-eyed vireo
	Understory foliage and structure	Veery
Riparian Shrubland	Dense willow/alder shrub patches	Willow flycatcher
Montane Meadow	Wet/dry meadows	Upland sandpiper
Aspen	Aspen large trees/snags with regeneration	Red-naped sapsucker
Steppe Shrublands	Steppe shrublands	Vesper sparrow

Table WL-8 lists only those priority habitats that are in the project area and which could be affected by project implementation. The table describes habitat type, habitat feature, and associated focal species. Existing condition and effects discussions will focus more on changes to priority habitats and less on the individual species that use these habitats. Alpine, subalpine, old growth moist forest and post-fire habitats are either not in the project area, or are not affected by this project. Old growth was analyzed at the subwatershed or analysis area level; riparian, meadow, aspen and shrub steppe habitats were analyzed at the project area level. Short-term, mid-term and long-term definitions are defined at the beginning of the report.

The following sections describe the existing conditions of priority habitats in the analysis area. As stated previously, only those priority habitats that could be affected by this project will be discussed. While the Forest has not conducted official NTMB surveys in the project area, the Oregon Breeding Bird Atlas (Adamus et al. 2001) includes observational data for this area. Much of the data for the Malheur National Forest was obtained from local biologists and ornithologists. Most NTMB species that are expected in the project area were recorded within the atlas' hexagons for the area. Based on a review of the District's wildlife database and observations made during field reconnaissance, there is a high confidence level that species discussed in this report are currently present in the area.

Dry Forests

The hot dry and warm dry biophysical environments refer to the dry ponderosa pine dominated habitats and the dry mixed conifer habitats, i.e., conifer stands of ponderosa pine, Douglas-fir, and/or grand fir. Over 80% of the analysis area is in the warm dry and hot dry biophysical environments.

The Conservation Strategy (Altman 2000) identifies four habitat components of the dry forest types that are important to landbirds: OFSS, OFSS with patches of regenerating pines, OFSS with grassy openings and dense thickets of small trees, and burned habitats (see Table WL-7). Large-scale declines in OFSS have raised concern for such species as the white-headed woodpecker, flammulated owl, chipping sparrow, white-breasted nuthatch, pygmy nuthatch, Williamson's sapsucker, and Lewis' woodpecker. These bird species have likely suffered some of the greatest population declines and range retractions (Altman 2000).

OFSS habitat is quite deficit in the analysis area, particularly in the warm dry and hot dry biophysical environments. In the analysis area, OFSS occurs on 1% of the warm dry and hot dry biophysical environments. Historically, this habitat type occurred on 15-55% and 20-70% of the warm dry and hot dry biophysical environments, respectively. Currently, Young Forest Multiple Strata (YFMS) and Understory Re-Initiation (UR) habitats with low canopy coverage (<30% canopy closure) likely provide the canopy openings, dense thickets of small trees, and regenerating pines used by flammulated owl or chipping sparrow. A query of habitat data in the Forest GIS database identified about 1,750 acres of potential habitat for these species. Post-fire habitats for species such as the Lewis' woodpecker are rare in the analysis area. The 1988 Table Mountain Fire burned about 600 acres, but many of the fire-killed trees were salvaged and most of the post-salvage snags have since fallen to the ground. The 1996 Wildcat Fire is partially in the analysis area. Because the fire is in the Strawberry Mountain Wilderness, no salvage occurred; many snags are still standing and likely provide habitat. Fire suppression has nearly eliminated the influence of this disturbance factor in the analysis area.

Riparian Woodlands and Shrublands

Riparian woodlands and shrub habitats are typified by the presence of hardwood tree and shrub species, along with associated wetland herbaceous species. Water is obviously an important component of these habitats, whether it is in the form of standing wetlands, spring and seeps, or flowing water (rivers and streams). Although these habitats generally comprise only a small portion of the landscape, they usually have a disproportionately high level of avian diversity and density when compared to surrounding upland habitats.

The Conservation Strategy (Altman 2000) identifies three habitat components within the riparian woodlands and one within the riparian shrub habitats that are important to many landbirds. They include large snags, canopy foliage cover, understory shrub cover, and dense shrub patches (see Table WL-7). In addition, the Conservation Strategy identifies aspen and montane grasslands as unique habitats important to landbirds. In the Canyon Creek area, many of these habitats are associated with riparian areas or ephemeral draws, so they are included in this section.

Within the project area, riparian woodlands and shrublands are generally associated with Category 1 streams (16 miles) and Category 2 streams (21 miles), and include segments of the Canyon, Vance and Fawn Creeks and Alder Gulch. Large-diameter snags remain below Forest Plan standards, limiting habitat for Lewis' woodpecker (see the Primary Cavity Excavator section). Priority hardwood habitats include cottonwood, aspen, willow and alder. All four of these components have been influenced by past management activities, including timber harvest, livestock grazing and fire suppression.

Few cottonwood trees exist and those that do exist are primarily on private lands. There is little historical data to indicate whether this species ever actually occupied much of the area. Due to the limited extent of cottonwood, this discussion will not focus on Lewis' woodpecker/cottonwood snag habitats in the riparian discussion. Effects to Lewis' woodpecker are discussed in the Primary Cavity Excavator section and Landbird section – Dry Forest Habitats.

Vegetation along streams in the project area is highly variable. The Fisheries section describes stream shading in detail. Only a few small streams have stands of large trees with closed canopies stretching along most of their length. Most streams have a patchy distribution of forest and non-forest, open vegetation types along their length. Dense willow and alder canopies historically dominated riparian shrublands. Today, shrubs condition is variable and likely not at their maximum potential. Habitat is available for species such as the red-eyed vireo, veery, and willow flycatcher.

Montane meadows comprise less than 1% of the analysis area. Wet meadows are particularly rare due to the geography of the area; when they are found they are usually relatively small riparian meadows scattered throughout the area. Upland sandpiper are the focal species for montane meadows. The species is not reported in the project area, but is associated with Bear Valley, immediately south of the project area.

Small, remnant aspen stands are scattered over approximately 75 acres of the project area. Stand size ranges from <1acre to 8 acres in size. Stands are found in Category 1, 2 and 4 streams and ephemeral draws. Most aspen stands are old and decadent, exhibit poor vigor, and lack regeneration. Due to fire suppression, conifers are encroaching on these stands and compete for water and light. Heavy grazing by domestic livestock and browsing by deer and elk often inhibit hardwood regeneration. Habitats are declining for such species as red-naped sapsucker.

Riparian conditions have likely affected such landbird species as Lewis' woodpecker, red-naped sapsucker, downy woodpecker, red-eyed vireo, willow flycatcher, veery, willow flycatcher, ash-throated flycatcher, tree swallow, house wren, Swainson's thrush, calliope hummingbird, song sparrow, spotted towhee, western wood pewee, warbling vireo, American redstart, orange-crowned warbler, and mountain chickadee. Landbird species that could benefit from improvements in riparian habitat include almost every bird species residing or migrating through Oregon.

Shrub-steppe Habitats

Shrub-steppe habitats are comprised primarily of dry woodlands, shrublands and grasslands. Dry woodlands/shrublands/grasslands comprise approximately 6% of the analysis area. Size ranges from 1 acre to 312 acres. Small openings are also scattered throughout the forested areas, and can include both grasslands and shrublands. Shrub species include sagebrush as well as mountain mahogany and bitterbrush; these areas provide additional habitat for landbird species that use dry shrub-steppe habitats. Livestock grazing, fire and road construction have impacted habitat quality. Conifer encroachment along the edge of openings may have reduced the extent of these habitats. Species that use these habitats include vesper sparrow, Brewer's sparrow, lark sparrow, and long-billed curlew.

Landbirds including Neotropical Migratory Birds (NTMB) - Environmental Consequences

Landbirds, including neotropical migratory birds (NTMB), were analyzed based on the high priority habitats identified in the Oregon-Washington Chapter of Partners in Flight, Northern Rocky Mountains Bird Conservation Plan (Altman 2000). Some neotropical migratory birds respond positively to logging, precommercial thinning and prescribed burning, while others respond negatively. The following sections summarize the effects of the project on the high priority habitats listed in Table WL-7.

Alternative 1 – No Action

Direct and Indirect Effects

Dry Forests

With the implementation of Alternative 1, there would be no direct effects to the various neotropical migratory/landbird species inhabiting the project area. Habitat modifications would not occur, nor would individuals be directly affected, as no activities are proposed under this alternative. Habitat conditions would remain limited in the short- and mid-term as described in the existing condition section. Species distributions, densities, and overall population levels would remain relatively unchanged in the short- and mid- term.

The quantity and quality of habitat of OFSS habitats is currently poor due to past management and other factors within the analysis area. OFSS occurs on 1% of the warm dry and hot dry biophysical environments. Historically, this structural stage occurred on 15-55% and 20-70% of the warm dry and hot dry biophysical environments, respectively. Stands thinned within the last 20 years would be expected to develop into OFSS over time. In 50 years, FVS projects that 9% of the warm dry biophysical environment and 15% of the hot dry biophysical environment would classify as OFSS.

Indirectly, the implementation of the No Action alternative would affect some neotropical migratory bird species in the long-term. By selecting this alternative, opportunities to create and enhance OFSS habitats for adapted species would be foregone. In 50 years, the No Action alternative would still not meet HRV for OFSS.

As described in the existing condition section, habitat for the white-headed woodpecker, flammulated owl, chipping sparrow, white-breasted nuthatch, pygmy nuthatch, Williamson's sapsucker, and Lewis' woodpecker is lacking throughout the analysis area. Habitat would increase, but would still not meet HRV in 50 years.

Riparian Woodlands and Shrublands

With the implementation of the No Action alternative, there would be no direct effects to the various neotropical migratory/landbird species that utilize riparian areas. Riparian conditions would be as described in the existing condition section. Snags would likely remain limited. Riparian cover would likely remain static or improve. Meadow conditions are likely to remain the same. Mature aspen trees would continue to decline and regeneration would be low or nonexistent. By forgoing prescribed burning, riparian areas would remain at high risk to stand replacing fire that could eliminate habitat.

Riparian conditions would continue to affect use by riparian landbird species such as Lewis' woodpecker, red-naped sapsucker, downy woodpecker, red-eyed vireo, willow flycatcher, veery, willow flycatcher, ash-throated flycatcher, tree swallow, house wren, Swainson's thrush, calliope hummingbird, song sparrow, spotted towhee, western wood pewee, warbling vireo, American redstart, orange-crowned warbler, and mountain chickadee.

Shrub-steppe Habitats

With the implementation of the No Action alternative, there would be no direct or indirect effects to shrub-steppe habitats or to the landbird species that use them. Habitat conditions would be as described in the existing condition section. Species such as vesper sparrow, Brewer's sparrow, lark sparrow and long-billed curlew would be expected to continue to use the area.

Alternative 2 – Proposed Action

Direct and Indirect Effects

During project operations (logging, noncommercial thinning, machine work, road work and use, burning, use of alternative snow mobile routes) degrees of disturbance and displacement of wildlife are likely. Disturbance and displacement of wildlife away from forestry operations depends upon the season of the year and the tolerance of the species and individual. Overall, disturbance from activities would be limited in time and place, and therefore, would not be expected to change populations of species at the landscape level. The Forest Plan requires protection for raptors during the reproduction periods. Seasonal restrictions for nesting raptors would be applied in active territories for this project.

Dry Forests

Under the Proposed Action alternative, treatments in warm dry and hot dry biophysical environments would shift stands towards OFSS. Post-treatment, 3% of the warm dry biophysical environment and 6% of the hot dry biophysical environment would classify as OFSS. In 50 years, FVS projects that 16% of the warm dry biophysical environment and 25% of the hot dry biophysical environment would classify as OFSS. The analysis area would meet HRV for OFSS.

Following treatment, many stands or forest patches would closely resemble desired conditions: a large-tree, single-layered canopy with an open, park-like understory dominated by herbaceous cover with scattered shrub cover and pine regeneration. In the short-term, stands would still not have the requisite number of large diameter trees to classify as old growth, but desired species such as the white-headed woodpecker would still be expected to respond favorably. Design requirements would retain non-thinned patches for species such as the flammulated owl and chipping sparrow. Common flickers, pileated woodpeckers, Williamson’s sapsucker, northern goshawks and hairy woodpeckers currently using young to mature ponderosa and mixed conifer stands would also be expected to continue using habitat in the project area.

Burning and thinning treatments conducted in the spring can affect landbirds during the breeding season. The Wildlife Specialist Report includes an effects analysis. The analysis concludes that effects to avian populations would be minimal due to avian ecology, the number of acres treated in any one year, the mosaic nature of burning, and the recovery rates of ground vegetation.

Temporary road construction would reduce habitat in the short-term. The Proposed Action alternative would construct 2 miles of temporary road. Roads would be ripped and seeded when work is completed. Conifers would likely seed in on most sites but may take 10 to 30 years to become reestablished. Acres of habitat affected would be considered incidental compared to habitat acres being treated by harvest and prescribed burning. Construction of 200 feet of permanent would have negligible effects on habitat.

Restoring natural vegetation conditions and fire regimes would make dry forest habitats far more self-sustaining for priority landbird species. MIS or priority landbirds that would directly benefit from treatment include the white-headed woodpecker, flammulated owl, chipping sparrow and Lewis’ woodpecker.

Riparian Woodlands and Shrublands

Precommercial thinning, pile burning and prescribed burning would be conducted in riparian areas, i.e., Riparian Habitat Conservation Areas (RHCA's). Design features would retain untreated patches to maintain nesting, foraging and security cover. Precommercial thinning would have a greater impact than burning, but the number of acres being treated is considered incidental. Burning activities would mimic low intensity fires that are characteristic of natural burning patterns in riparian areas. Meadows would be generally avoided. Some mortality of understory trees would occur in burned patches, with only a few overstory trees being killed. Created small openings in the canopy may induce establishment of shrubs, grasses and forb species, benefiting such species as Lewis' woodpecker, red-eyed vireo, veery and willow flycatcher. The occasional killing of a large, overstory tree would provide additional snag habitat for species such as the Lewis' woodpecker. Aspen stands have not been targeted for treatment, but where prescribed fire boundaries include aspen stands, design features would be used to protect mature trees. Fire can both kill seedlings and saplings as well as induce new suckering; the low intensity nature of the planned burns is unlikely to change aspen conditions. Aspen stands would continue to decline as described in the existing condition and No Action section. Commercial harvest units, landings and temporary roads would not be located in RHCA's, avoiding adverse impacts.

Shrub-steppe Habitats

Prescribed fire is not proposed in any larger expanses of open shrublands or grasslands, although a small amount of light burning may occur along the fringes of these habitats and in small inclusions scattered throughout the forested areas. In fringe areas, any shrubland areas burned would do so in a mosaic of burned and unburned patches. Unburned islands of sagebrush can retain habitat features vital to associated species, such as vesper sparrow. In studies in Idaho, (Smith 2000), prescribed burns killed bout 50% of the shrubs; total bird abundance declined significantly in the first year after fire, and then rebounded in years two and three to levels similar to those in unburned areas. Scattered loss of shrubs is not expected to have significant impacts on shrub-steppe habitats or the landbird species that use them. Species such as vesper sparrow, Brewer's sparrow, lark sparrow and long-billed curlew would be expected to continue to use the area.

Cumulative Effects

Old growth was analyzed at the subwatershed or analysis area level; riparian, meadow, aspen and shrub steppe habitats were analyzed at the project area level. All of the activities in Appendix C have been considered for their cumulative effects on neotropical migratory birds. The following discussion focuses on those past, ongoing and reasonable foreseeable future activities that may contribute adverse effects to the landbirds or their habitat.

Habitat loss is considered the primary factor in decline of neotropical migratory birds. Previous sections identified high priority habitats for conservation of neotropical migratory birds: old-growth dry forest including burn habitats, riparian woodland and shrubland, montane meadow, aspen habitats, and shrub-steppe habitats. For the Canyon Creek Project, the Northern Rocky Mountains Bird Conservation Plan (Altman 2000) was the primary source used to determine target species for management. Restoring historic habitats is assumed to be the best strategy for assuring local viability of landbird species.

In the Canyon Creek project area, bird species that historically preferred open, park-like ponderosa pine forests and mixed conifer stands have been negatively affected by forest management practices that emphasized removal of large diameter trees, fire exclusion or suppression, and continuous or long-term grazing (Altman 2000). These practices produced a closed forest of dense, young to mid-aged trees with limited understory diversity, fragmented landscapes and, removed much of the structure that provided diversity at the stand-level and at the landscape-level.

Cumulatively, this project combined with other recent and ongoing prescribed burning and understory thinnings would help restore open dry forest habitats, benefiting the landbird species that use them. All ongoing projects have considered design features in the Northern Rocky Mountains Bird Conservation Plan (low intensity/low severity burns, retention of snags and large trees, and mosaic patterns with refuge areas of untreated habitat among others), which should allow for restoration while reducing short-term impacts on nesting birds.

Cumulative effects on mature and old growth coniferous forest, particularly OFSS habitats, are discussed in the Old Growth section, and conclude that the Proposed Action alternative would have varying positive effects for mature and old growth habitat and for the species that use those habitats. Cumulative effects to snags and down logs are discussed in the Primary Cavity Excavator Species section. This project includes design features to protect snags and down logs; overall, changes in dead wood habitats would be considered incidental.

Riparian vegetation within and adjacent to the project area has been altered by a variety of management activities, including timber harvest, road construction, mining and livestock. Many years of livestock grazing, primarily earlier in this century, concentrated use in riparian areas. Livestock grazing also negatively affected grasslands by reducing native species' abundance and diversity. Fire suppression allowed encroachment of conifers, which shaded out hardwoods such as aspen. The condition of some riparian areas and grasslands has been improved by new management practices and restoration activities in more recent years, but many are still not fully restored to conditions that are most suitable for associated native wildlife species. The Canyon Creek project would have minimal adverse effects on riparian habitats; therefore, cumulative effects to riparian habitats would also be considered minimal.

Shrub-steppe habitats have probably changed due to 100 years of fire suppression. Other conifer species have encroached on these habitats, reducing their size. On residual acres, juniper density probably has increased. Livestock grazing, primarily early in the century, may have caused changes in shrub, grass and forbs composition or abundance. Under the Canyon Creek Project, prescribed burning avoids most of these habitats; design features have been included to minimize effects in forest openings.

Future projects would have to abide by existing management direction to maintain or enhance mature and old growth habitat, maintain snags and down log standards, and protect or enhance riparian areas, grassland and woodland communities. Future planning will consider potential effects to neotropical migratory birds.

Cumulatively, management activities across the Forest are distributed sufficiently to minimize disturbance impacts at the population levels.

The proposed action proposes few activities within riparian areas, aspen stands, shrublands and grasslands, habitats considered a high priority for landbird conservation. Restoration of dry forest habitats, particularly OFSS habitats, would improve conditions for landbirds that rely on these habitats. Cumulatively, this project when combined with future thinning and burning projects would not be expected to reduce viability of any landbird species including neotropical migratory species; rather, proposed management would likely improve species richness.

Consistency With Direction and Regulations

The Forest Plan directs continued review of DOG/ROG areas, with adjustments to boundaries as appropriate to ensure suitable levels of old growth habitat are provided for species dependent upon them and to ensure those units meet Forest Plan Standards and Guidelines. Under the Canyon Creek Project, the Forest Plan would be non-significantly amended to switch DOG 236 and ROG 236. The existing ROG 236 is currently providing the better old growth habitat. Management activities within ROG's meet Forest Plan direction, as amended.

Regional Forester's Eastside Forest Plans Amendment #2 (USDA 1995) amended the Forest Plan to manage late and old structure (LOS) stands within the Historic Range of Variability (HRV). Under the Canyon Creek Project, harvest and prescribed burning projects were designed to move the project area towards the historic balance of OFSS and OFMS. In addition, Amendment #2 directs land managers to maintain connectivity between LOS habitats to allow the free movement of old growth wildlife species. This project establishes connectivity corridors between LOS within the project area and to LOS in adjacent subwatersheds. Amendment #2 gives the Forest Service flexibility to modify or forgo connectivity direction for projects that address safety and health concerns (USDA 2006). In units 62, 90, 95 and 536, harvest treatments would reduce canopy cover below the upper 1/3 of site potential. Connectivity standards would not be met on 104 acres, or 3% percent, of established connectivity corridors. These units are within ¼ mile of the public/private boundary and are considered high priority for fuels reduction to protect private property.

Big game habitat would be modified. Satisfactory cover, already below Forest Plan standards, would be further reduced. Only Upper Canyon Creek summer range would maintain satisfactory cover in excess of standards. Total cover in Vance Creek winter range would drop slightly below standard. A non-significant Forest Plan amendment would be required to reduce cover below standards. In a 2003 letter to the Eastside Forests, the Regional Office provided direction encouraging Forests to use site specific Forest Plan amendments to move the landscape towards HRV (USDA FS June 11, 2003). Harvest treatments would occur primarily in warm dry and hot dry biophysical environments. These stands are considered outside HRV, i.e., overstocked and likely unsustainable given the high risk of uncharacteristically severe fire and insect epidemics.

Snags do not meet Forest Plan standards as a result of past management. Down logs, on average, do meet standards. In the Proposed Action alternative, design features have been incorporated to protect existing snags and large down logs that contribute to the Forest Plan standards. Snags would not be targeted for removal, although incidental snags may be lost during logging to meet operational/safety needs during logging. Project design criteria, such as retaining clumps of live trees around snags and locating landings and temporary roads where there are few or no snags, would help minimize losses. Retention of untreated patches of trees would continue to provide avenues for snag creation. Prescribed fire would likely increase snags although most would be smaller in diameter. Only incidental losses of additional dead wood habitats would be expected.

For northern goshawks, the Proposed Action alternative is consistent with the Forest Plan and the Regional Forester's Eastside Forest Plans Amendment #2. Nest stands would be protected. Known territories would be monitored annually for nesting activity. If nest sites are active, management activities would be prohibited within ½ mile of the nest sites from April 1 to September 30 to avoid disturbing goshawks during the breeding season.

For blue grouse, the Proposed Action alternative includes design features to protect winter roost habitat as directed by the Forest Plan.

The Proposed Action alternative has been designed to enhance landbird richness. The Proposed Action is consistent with the 1918 Migratory Bird Treaty Act (MBTA) and the Migratory Bird Executive Order 13186. The Proposed Action was designed under current Forest Service policy for landbirds. The Northern Rocky Mountains Bird Conservation Plan (Altman 2000) and the U.S. Fish and Wildlife Service's Birds of Conservation Concern (USFWS 2002) were reviewed for effects disclosure. The Proposed Action alternative was designed to protect or enhance priority habitats for landbird species, including neotropical migratory species.

The Proposed Action is consistent with the Endangered Species Act (see Appendix G, Wildlife Biological Evaluation). The Proposed Action is expected to have No Effect on threatened and endangered species and No Impact on sensitive species. Based on these effects calls, consultation with the US Fish and Wildlife Service was not considered necessary.

Irreversible and Irretrievable Commitments

The project as described would not result in any irreversible or irretrievable effects to the wildlife resource. The project moves habitat conditions towards HRV.

Soil

Regulatory Framework

The Malheur National Forest Plan meets all legal and regulatory requirements for soil conservation. Forest Service Manual R6 Supplement No. 2500.98-1, section 2520.2 says objectives of soil management are "To meet direction in the National Forest Management Act of 1976 and other legal mandates. To manage National Forest System lands ... without permanent impairment of land productivity and to maintain ... soil ... quality. .... Soil quality is maintained when soil compaction, displacement puddling, burning, erosion, loss of organic matter and altered soil moisture regimes are maintained within defined standards and guidelines." So if an action maintains detrimental impacts within the standards and guidelines of the Forest Plan, legal requirements for soil conservation would be met.

LRMP Forest-Wide Standards 101 and 125-129 relate to soils.

Analysis Methods

A soil assessment was done on almost all tractor units to determine how much past and ongoing activities have impacted soils, and to determine what design elements are necessary to protect the soils. These assessments reveal all impacts from past and ongoing activities, including timber harvest, landings, roads, livestock grazing, fuel treatments, and Off Road Vehicles (ORV's). The field sheets are in the Analysis File.

The assessment was done in two phases. In the first, two contract soil scientists assessed many stands in fall 2003. The senior contract soil scientist, with a Ph.D. and more than 35 years experience in forests of the western United States, provided guidance to a second soil scientist with several years experience in a variety of Pacific Northwest forests. The project soil scientist accompanied the contract soil scientists for sampling on two stands to check on the technique used. In the second phase, the project soil scientist trained two technicians to do the soil assessments, and they assessed the rest of the tractor units in summer and fall 2005, with the exception of four units (176. 209, 349, 582). Existing condition in these four stands was estimated as being similar to that in nearby stands with similar soil types and similar appearance on aerial photos. Further details on the sampling procedure are given in Appendix I.

The project soils specialist has formed professional judgments on the probable effects. Professional judgments are based on monitoring, personal observation (including observation in similar areas, and in this area), scientific literature, the Malheur Land and Resource Management Plan (Forest Plan) Environmental Impact Statement, and professional contacts. These judgments are summarized in the "Quantitative logging effects on detrimental soil conditions" part of Appendix I. The prediction of quantitative effects does rest on a number of assumptions.

Spatial boundaries for soil effects are proposed unit boundaries. Unless otherwise stated, effects are described for the time period immediately after the proposed actions, when effects are maximum.

Existing Condition

Soil Types

Soils in this area developed over a variety of bedrock types such as basalt, andesite, tuff, breccia, sedimentary rocks (graywacke, shale, siltstone, mudstone), serpentine, and peridotite. Most soils developed from bedrock have more than 35% gravel and coarse fragments.

The effect of topography explains some of the variation of soil over this landscape. For example, south facing slopes that have a high amount of solar radiation lack the moisture needed for weathering. This often results in shallow soils that can only hold enough moisture to support drought tolerant herbs and shrubs. In contrast, north facing slopes are protected from the sun's rays. Moisture stays in the ground longer, providing conditions needed for both weathering and increased vegetative growth.

Several thousand years ago, an eruption of Mt. Mazama (the Crater Lake volcano) blanketed the area with volcanic ash. Presumably, the ash settled evenly over the Canyon Creek watershed. In the ensuing years the ash was redistributed over the landscape by wind and water erosion. Where vegetation was sparse (such as south facing slopes) the ash was essentially eroded away. In other areas, where vegetation could re-establish itself, the ash was protected by vegetative cover. In some areas the ash remains fairly intact as a surface layer while in other areas it is mixed with the underlying soil.

The addition of the ash greatly increased the productivity of the soils. Ash has a much higher water holding capacity than most other soils. In many areas, the addition of ash doubled or tripled the water available for plant use. The ash is more easily displaced than the non-ash soil.

Most precipitation falls as winter snow, but some intense summer storms also occur. Mass movement is uncommon in this relatively dry climate. Low soil moisture and relatively short, cool growing seasons are growth limiting factors for vegetation and are rate-limiting for soil development.

The Soil Resource Inventory (SRI) of the Malheur National Forest (Carlson, 1974) is the best available basic soil information for the project area. The SRI contains maps, tables and narrative descriptive information about the soil properties and features, and their hazards, limitations and productivity potentials. This map was made for large-area planning, and mapped at the scale of one inch per mile. Because of this limitation, the SRI map was modified somewhat for the soils map (Map 4 in Appendix B), to better reflect the true distribution of the soils. Map 4 shows slope and vegetation because they are the two main factors affecting soil erodibility. Steeper soils and soils that lack forest cover are the most erodible. In addition, mixed conifer vegetation indicates ash soil (Table S-2). However, Map 4 still contains some inaccuracies due to the scale of the map. For instance, some relatively small areas of forest are shown as non-forest, and vice versa.

Table S-2 shows some key soil characteristics. Appendix I contains a general characterization of the soil types and hazard ratings.

Table S-2. Key Soil Characteristics

Soil	Vegetation†	Parent Material	Slope (%)	Soil Depth (in)	Volcanic ash depth (in.)	Erosion Hazard‡
3	moist & dry meadow	valley fill	0-15	36 +	variable	L-M
7	non-forest	variable	15-100	< 15	0	L-H
8	PIPO	variable	15-100	12 +	0	L-H
9	PIPO & mixed	variable	15-100	12 +	8-12	L-H
10	mixed	variable	15-100	15 +	15-24	L-M
31	PIPO	sedimentary	0-30	20-40	0	L-M
32	PIPO & mixed	sedimentary	30-70	18-30	6-12	M
33	PIPO	sedimentary	30-70	12-24	0	M-H
34	JUOC & PIPO	sedimentary	10-70	6-12	0	VH
35	Sagebrush	sedimentary	30-70	4-8	0	VH
36	mixed	sedimentary	30-70	24-36	12-18	M
41	PIPO	basalt & andesite	0-30	12-30	0	L-M
42	PIPO & mixed	basalt & andesite	0-30	12-36	6-12	M
43	PIPO	basalt & andesite	30-70	12-30	0	M-H
44	JUOC	basalt & andesite	30-70	8-15	0	VH
45	Sagebrush	basalt & andesite	30-70	4-12	0	VH
46	JUOC & PIPO	basalt & andesite	0-30	8-15	0	M-H
47	Sagebrush	basalt & andesite	0-30	4-12	0	H
48	PIPO & mixed	basalt & andesite	30-70	18-48	6-12	M
81	PIPO	tuff & breccia	0-30	24-72	0	M-H
82	PIPO & mixed	tuff & breccia	0-30	24-12	12-18	L
95	PIPO & mixed	serpentine	0-30	12-24	4-10	L
96	PIPO	serpentine	0-30	12-24	0	M-H

† JUOC = western juniper; mixed = mixed conifer; PIPO = ponderosa pine
‡ H=High; L=Low; M=Moderate; VH=Very High

Field observations on soil types

Generally, there was agreement between conditions observed in the field and the SRI. The field observations revealed two exceptions. The first is that the depth of volcanic ash is somewhat less than is typical for some of the landtypes. For example, the ash thickness in areas mapped Landtype 32 often was similar to Landtype 33 or 31, depending on slope. Landtype 36 often was similar to Landtype 32 or 33 for ash thickness and mixing. There were some similar situations for Landtypes 48 and 82 where the ash was mixed or nearly absent so it was more like Landtypes 41 or 43. In some cases, stone contents and rock outcrop were higher than would be typical for a landtype. For example stand 150108 is on soils mapped as Landtype 48, but coarse fragments range from 40 to 60 percent. In general, the volcanic ash thickness appears to be a little thinner that is typical for the map unit as described in the SRI. Within the area, the soils generally have thinner layers of ash than is typical for soils a little further north on the Malheur and Umatilla National Forests, or on gentler slopes to the west of the project area.

In general, the field observations confirms that the soils are generally stony, and relatively shallow where juniper and scattered pine occurs. Where mixed conifer and denser stands of pine occur, the soils generally are observed to be moderately deep or deep. However, the investigators noted that these soils often are stony or have rock exposures on the surface.

The soil scientists' observations generally support the Soil Resource Inventory ratings of potential for compaction, displacement and erosion for most of the soils. All of the soils from sedimentary rocks are rated low for compaction hazard and moderate to high for displacement hazard. The soils forming from basalt, andesite, breccia, tuff, serpentine, and peridotite have a wide range in compaction, displacement and erosion hazard.

Soil Detrimental Impacts

The results of the soil assessments on tractor units are presented in Appendix I, "Expected Effects on Detrimental Soil Conditions", Alternative 1. Detrimental impacts on the units range from 0% to 19% and average 5%. All units are below the Forest Plan standard of 20%. The majority of the impacts are compaction and associated puddling, although some displacement also exists. Erosion in forested areas is negligible, and detrimentally burned soil is also negligible. The assessments reveal all impacts on proposed tractor units from past and ongoing activities, including logging, roads, grazing, fuel treatments, firewood gathering, and Off Road Vehicles (ORV's) as described in the cumulative effects Appendix C.

In most units, existing skid trails and landings could be used again as needed. Many of the soils are not suited for subsoiling. This is because the soils are either too stony, too shallow, or on slopes that are too steep.

One possible reason that most of the units exhibit relatively low detrimental conditions is that many of these soils have very high gravel, cobble, and stone contents that provide strength to the soils. Another possible reason is that many of the soils in this area are relatively dry during the summer, and resist the forces placed on them by ground based equipment. They are also covered with snow during much of the winter, which helps protect the soil during winter logging.

Changes in vegetation are sometimes apparent where ground based equipment has been used, even where the impact is not classified as detrimental. It is most common to find grass as the dominant vegetation on skidtrails. In some cases, it was noted that there were few trees, or trees were small, in skidtrails 30 years after harvest.

Organic Matter & Nutrients

Decades of fire suppression have resulted in heavier litter layers on most soils than would occur under the natural frequent fire regime. In some stands, there is also an accumulation of down woody debris and scattered slash. Soil nutrients have become more abundant in litter and duff than in the 1800's. If moderate or high severity fires do occur, there is a potential for more loss of nutrients than under a frequent, low severity fire regime.

Nitrogen has accumulated in the litter and duff since fire suppression became effective, so that nitrogen levels are higher than in the 1800s. Fire usually decreases the amount of nitrogen on the land, although easily available (to plants) nitrogen often increases for one to a few years. Significant fires have not burned in the area for many decades, so the loss of nitrogen during fires has not occurred, and nitrogen has increased as nitrogen from the atmosphere accumulates in the organic matter of biomass, forest floor, and soil. It is possible that easily available nitrogen is less abundant now due to the immobilization of nitrogen in the litter and duff.

Environmental Consequences

The effects of either alternative on mass movement, detrimentally burned soil, and soil microbes would be so small as to be negligible. Therefore, they are not described below. Effects on mass movement would be negligible because soil stability ranges from moderately stable to very stable (Appendix I). Effects on detrimentally burned soil would be negligible because even sever wildfires or slash pile burns cause very little detrimentally burned soil. Effects on soil microbes would be negligible because the microbial communities would continue to perform their functions as at present.

Alternative 1 – No Action

Direct and Indirect Effects

Under this alternative, no additional soil will be compacted, puddled, or displaced. No additional soil will be eroded by ground disturbing activities. No organic matter or nutrients would be removed.

Cumulative Effects

Effects Under Both Alternatives

Existing impacts include the impacts from all past and ongoing actions. Quantitatively, existing impacts are shown under Alternative 1 in the "Expected Soil Conditions After Proposed Activities" in Appendix I. Past actions include logging, roads, fire suppression, grazing, fuel treatments, firewood cutting, and Off Road Vehicles (ORV's), as described in Appendix C.

Root action, animals that burrow in the soil, and freezing water will gradually loosen compacted soil over the course of decades.

Ongoing and foreseeable future actions listed in Appendix C that are inside the units, such as grazing, firewood cutting, and ORV use, would continue to compact a negligible amount of soil, at about the same rate as in the past. This compaction would be counter-balanced by recovery from similar impacts in the past, so the level of detrimental impacts from these ongoing and foreseeable actions would remain at about current levels. Actions outside the units do not affect the soil inside the units.

If a wildfire occurs, the hazard of erosion would greatly increase on severely burned areas due to inadequate ground cover and possibly hydrophobic soil. In addition nutrients and organic matter would be lost.

Effects of Alternative 1

As shown in Appendix I, existing detrimental impacts range from 0% to 19% and average 5% of each unit. Natural recovery would slowly decrease impacts over decades.

As described in the "Fire and Fuels" section of Chapter 3, the hazard of a severe crown fire is higher under this Alternative than under Alternative 2. If a wildfire occurs, hazard of erosion would greatly increase on severely burned areas. Therefore the hazard of erosion is higher under Alternative 1.

Alternative 2 – Proposed Action

Direct and Indirect Effects

Roads

During temporary road construction and use, soil may be eroded from the road surface. Observations by the project soil scientist in this and similar areas indicate that the sediment would be deposited within 20 feet of the edge of the road. The loss of productivity from erosion would be minor compared to the loss from displacement and compaction.

On subsoiled temporary roads, productivity lost to compaction would be restored during decommissioning; perhaps 1/2 of the area of the temporary roads would still be detrimentally impacted after subsoiling, due to displacement and untreated compaction. This would amount to about 3 acres. These detrimental impacts would recover over the course of several decades.

The 200 feet of new road construction to access private property would take less than 0.2 acre of soil out of production.

Tractor Logging

Skidding on steep slopes or unsuitable land often causes displacement. Water bar construction also often causes displacement. Skidding also bares soil, decreases infiltration, and channels overland flow, and thus can accelerate erosion. This acceleration occurs especially on steep slopes and on soil where ground cover would be slow to recover, including shallow soils. As described in Appendix I, Quantitative Logging Effects on Detrimental Soil Condition section, sites that have steeper slopes are expected to be more impacted than sites with flatter slopes. It is not feasible to log these small inclusions by skyline or helicopter. The experience of the project soil specialist indicates damage on widely spaced skid trails on slopes less than 45% is acceptable because only moderate amounts of displacement occur, and because of the small size of the area affected.

Displacement and erosion from steep slope skidding would be limited, because slopes steeper than 35% occupy a small proportion of tractor units and because extensive ground cover in forests absorbs sediment. Design measures, including directional felling and winching, would also help to limit displacement and erosion. Usually erosion of skid trails decreases through one to three years, until it stops. Decreased productivity due to severe displacement and erosion can last hundreds of years. But, design elements would keep displacement and erosion to a minimum, within acceptable levels. Design elements that effectively control displacement and erosion include prohibitions on skidding on steep slopes (>45%), limitations on skidding in draws, and seeding and water bar requirements (see Chapter 2). The same slope limitations apply to all soil types because ash soil on steep slopes is easily displaceable, and non-ash soil on steep slopes is relatively easily erodible.

Another place that erosion could occur is where a tractor unit receives runoff from shallow soil, grassland or shrubland above the unit during heavy thunderstorms. The design element that requires a 50-foot no-equipment zone and seeding of skidtrails would adequately control this hazard.

Skidding would cause negligible sediment export from the units, despite sediment movement within units as described in the preceding paragraphs. Sediment normally is deposited less than 15 feet down slope from skid trails as the water is slowed by ground cover and percolates into the soil.

Except for areas that happen to be harvested under winter conditions, much of the skidtrails would be compacted, and some of the soil tracked only once or twice would be compacted. As described in Appendix I, Quantitative Logging Effects on Detrimental

Soil Condition section, moist soil or ash soil are probably more susceptible to compaction than dry or non-ash soil. Rocky soil is less susceptible. Compaction usually lasts more than 20 years; some compaction lasts more than 50 years. Appendix I details the calculations used to predict detrimental impacts, most of which are compaction, and presents the results of the calculations. If the unit happens to be harvested over deep snow or on deeply frozen soil, compaction would be about 0.5%. Design measures that are effective at limiting compaction include designating skidtrail locations in a planned manner, requiring skidtrails to be widely spaced, reusing existing skidtrails where appropriate, prohibiting skidding under wet conditions, allowing skidding only under dry or winter conditions in certain units, allowing only low ground pressure machinery off of skidtrails, and requiring skidtrails to be subsoiled in certain units. These design measures would keep compaction to a practical minimum and indicate the Forest Plan standard would be met in most units without subsoiling. For instance, Davis and coworkers (2001) examined several units on the Summit Fire, where similar design measures were used, and found no unit where standards appeared to be violated.

Puddling is associated with compaction, and statements about compaction also apply for puddling.

Landings are severely impacted. Design elements that encourage re-use of appropriately located landings, and subsoiling of landings, would keep these impacts to a minimum.

Subsoiling

Subsoiling of skidtrails is planned for units 230, 504, and 510 because they are expected to exceed 20% detrimental impacts without subsoiling. Site-specific observations indicate most of the soil in these sub-units is suitable for subsoiling in terms of slope, depth, and stoniness, but there are inclusions of unsuitable soils. Subsoiling would mostly, but not entirely, loosen compacted soil. Subsoiling skidtrails would reduce detrimental impacts by about 6% of the area of a unit. This decrease is will ensure these sub-units would meet the Forest Plan Standard.

Landings would also be subsoiled where suitable. Because landings occupy only a small proportion of land (perhaps 3% of a unit), and because parts of landings occupied by slash would not be subsoiled, and because much of the detrimental impact on landings is due to displacement as well as compaction, subsoiling landings would decrease detrimental impacts by about 1% of a unit.

Subsoiling bares soil, forms channels, makes soil particles more easily detachable, and disrupts roots, thus raising the risk of erosion for a few years. However, subsoiling also increases infiltration which decreases the risk of erosion. This increased infiltration, and the subsoiling design elements, means that sediment production from erosion due to subsoiling would be negligible.

Skyline and Helicopter Logging

Skyline logging causes much less displacement, erosion, and compaction than tractor logging - detrimentally affecting about 1 - 2% of the area of a unit. Logs that drag during skyline logging can displace soil and concentrate erosive runoff in furrows. Required cross drains would divert runoff from the furrows, so the amount of erosion would be negligible, and soil would be unlikely to leave the unit.
Detrimental impacts of helicopter logging would be negligible, outside landings, because no heavy equipment would be used on soil.

Grapple Piling

A design element in Chapter 2 requires grapple piling equipment to have a low ground pressure, to operate on dry soil, and to operate on skid trails where possible. With this design element, the project soils specialist expects grapple piling would compact about 1% of each unit where it is used. Feller bunchers of similar ground pressure operating off skidtrails compacted about 1.5% of a unit (McNeil 1996). This would be in addition to impacts caused by harvest.

Other Activities

Precommercial thinning, reforestation, hand piling, or handline construction would not cause any detrimental impacts, because they do not involve heavy equipment.

Summary of Detrimental Impacts

As shown by the difference between Alternative 1 and Alternative 2 in Appendix I, increases in detrimental impacts range from 2 to 14%, and average 10% of each unit.

Prescribed Burning

Soil effects from prescribed burning would be minor. Ground cover would decrease, especially during fall burns. However, burning would take place so as to avoid decreasing ground cover below LRMP standards, so erosion would not be significant.

Organic Matter and Nutrients

Logging would remove nutrients and organic matter in logs, and fuel reduction treatments would remove nutrients and organic matter during burning. Prescribed burning would make nutrients more available for 1 to a few years, although there would be a total loss in the long run. The removal, especially removal of nitrogen, may decrease site productivity a few percent on some sites. However, on many or most sites, productivity likely is not limited by nutrients or organic matter. Also, a relatively small amount of nutrients would be removed, because wood has a low concentration of nutrients (compared to foliage, small branches, and the remaining forest floor), and because many trees would be left. Removing organic matter and nutrients by logging and fuel control would move many sites back toward their fertility status before Euro-Americans arrived, because nutrient and organic matter loss in fires was common then. Little dead wood existed before fire suppression became effective, because fires burned it up. These high fire frequency ecosystems persisted for thousands of years with low levels of forest floor and dead wood, so these ecosystems are adapted to low levels of organic matter, so removal of the excess organic matter would have only a small adverse effect.

Cumulative Effects

See Alternative 1, Cumulative Effects, Changes Under Both Alternatives section for a description of changes that would occur under both alternatives.

Detrimental impacts from the proposed operations (temporary road construction, harvest, subsoiling, fuels control) add to past actions. Appendix I shows what the expected site-specific condition would be. For Alternative 2, detrimental impacts would range from 8% to 19%, and average 15% of each unit.

If a wildfire occurs, hazard of erosion would greatly increase on severely burned areas due to low ground cover and possibly hydrophobic soil. However, fuels treatment would decrease the hazard of a severe crown fire occurring and the proposed fuels treatments would decrease soil fire severity (Vihnanek & Ottmar 1993), so Alternative 2 would decrease the hazard of erosion, compared to Alternative 1.

Watershed

Regulatory Framework

An extensive regulatory framework is included in the Watershed Specialist's Report. This framework contains a review of Forest Plan, as amended, standards for riparian areas, streams, and water quality. Generally speaking, Forest Plan Amendment 29 standards are considered stricter than PACFISH; these standards are discussed in more detail in the Fisheries Specialist's Report. The Clean Water Act delegates authority for regulating water quality to the Oregon Department of Environmental Quality (ODEQ). Discussion of how this project affects water quality, including the application of water quality standards established by ODEQ, is found in the Environmental Consequences section. The application of Best Management Practices (BMP's) to project activities to control non-point source pollution is summarized. Additional discussion of BMP's is included in the Watershed Specialist's Report and appendices. Because a Total Maximum Daily Load (TMDL) plan regarding water pollutant management is scheduled for completion in 2007 by ODEQ and the Forest Service is expected to prepare Water Quality Restoration Plans (WQRP's) in conjunction with the publication of a TMDL, the actions that are included in this analysis which may be incorporated into a WQRP are summarized in the appendices of the Watershed Specialist's Report.

Analysis Methods

Analysis methods are summarized in the Watershed Specialist's Report. Numerous sources of field data were reviewed, evaluated, interpreted and summarized. Sources of data include riparian and stream surveys from the 1990s, soil assessments conducted in 2003-2005, informal stream evaluations in 2004 and 2005, the 2003 Canyon Creek Watershed Analysis, the 2006 Canyon Creek Roads Analysis, the Oregon Department of Environmental Quality web site, resource data provided by other interdisciplinary team members, and personal observations and professional knowledge of the local area.

The project area is divided into nineteen, mostly independently draining sub-drainages because of local differences in soils, drainage patterns, natural hydrologic conditions, past impacts, and, consequently, hydrologic response (see Watershed Specialist's Report). Information from various sources is assessed and integrated into condition summaries for each sub-drainage using local professional experience and professional judgment. Conditions of hillslopes ephemeral draws and valley bottoms, Riparian Habitat Conservation Areas, Management Area 3B, stream banks and channels, water flows, water quality, and interactions among these conditions are integrated in the sub-drainage assessments. Legacy effects from historic and more recent activities, effects of roading, and the application or lack of application of Best Management Practices (BMP's) to activities are also incorporated.

An index value called "watershed hazard", based on the integrated assessments, is identified for each sub-drainage in the Watershed Specialist Report. Watershed hazard is one topic used to describe watershed existing condition and effects on watershed conditions and processes by alternative in this document.

Watershed hazard is defined as the intensity or magnitude of watershed response to particular events with the potential to affect watershed function detrimentally. Since watershed functions often rely on the condition of connections between watershed features, such as those between streams or between stream channels and floodplains, increases in connectivity or the potential for increased connectivity are used as the primary basis for evaluating watershed hazard by sub-drainage. Concentration of run-off can result in accelerated erosion and in the transport of sediment, downslope or down channel, particularly under the climate and soil conditions of the project area. The exposure of mineral soil often increases watershed linkages. While no threshold for detrimental impacts to watershed functioning has been defined per se, the Forest Plan, as amended (PACFISH), requires that no adverse effects occur to RHCA's. The Forest Plan also requires that activities meet the Clean Water Act.

Low (L) hazard represents resiliency to rare, large run-off events such as those associated with intense storms. Resiliency gradually declines through the major classes (Medium (M), High (H), Very High (VH), and the gradations between them symbolized by "+", "-", and ranges such as "L-M". Patchy (P) or Uniform (U) distribution of factors was evaluated since these characteristics also affect the size of watershed response.

For the purposes of this summary, the variety of potential direct and indirect effects is considered and evaluated collectively using the concept of "watershed hazard". This summary also addresses the range of potential effects which may result under a range of run-off and fire scenarios. The range of scenarios includes both common or routine (small), and rare or infrequent (medium/large) storms and run-off events along with the absence/presence of uncharacteristic fire. Routine run-off events are expected to be the peak events in 80% of the years (< five year events); medium/large events are expected to be the peak events in 20% of the years (> five year events).

For the purposes of this discussion, two general categories of fire behavior described in the Fuels Specialist Report are considered. Uncharacteristic fire in vegetation typical of the project area is often the result of accumulations of fuels through time and across the landscape (fuel continuity). These fuel loads are considered greater than those typical of the area prior to European-American settlement. While uncharacteristic fire often burns with in a coarse mosaic of fire intensities, a greater portion of the affected area often burns with medium and high intensity due to the accumulation of fuels than when fires are considered "characteristic" of some vegetation types. The Fuels Specialist Report provides a more detailed description of uncharacteristic fire.

The term "low intensity fire" is used to describe the high frequency, low severity fire typically associated with most of the project area before the arrival of European-American. When the majority of the burned area experiences low intensity fire, the overall fire behavior is usually described as low intensity. A small amount of the area may burn with medium or high intensity (Agee, 1993). Even when fuel loads are generally typical of low intensity fire, local accumulations of medium to heavy fuels may burn severely.

Existing Condition

Watershed Hazard

Additional discussion of ecological conditions affecting watershed processes is found in the Watershed Specialist's Report. "Watershed hazard" is used to qualitatively integrate and summarize the number, magnitude, intensity, and distribution of factors affecting watershed condition. Watershed hazard is based on integrated assessments of the existing conditions of nineteen sub-drainages in the project area. The watershed hazard assessments are based on narrative summaries compiled for each sub-drainage. They also incorporate professional experience and judgment regarding watershed response in the project and similar areas. The summaries are included in the Watershed Specialist Report. Watershed hazard for the nineteen sub-drainages is summarized in Table WA-1. The factors contributing to the rating estimate are listed in the Watershed Specialist Report. Watershed hazard varies among the nineteen sub-drainages because of the natural distribution of soils and channel types, past disturbance history caused by anthropomorphic activities, and fire hazard. Watershed hazard also increases with increasing size and intensity of natural disturbance events.

Table WA-1. Summary of Watershed Hazard Existing Condition under various natural disturbances for 19 Sub-drainages.

Natural Disturbance	Watershed Hazard Rating								Total
	L	L+	M	M+	H	H+	VH	VH+	
Absence of Fire/Large Run-off Event	4	0	8	1	6	0	0	0	19
Uncharacteristic Fire/Small Run-off Event	2	0	10	1	6	0	0	0	19
Uncharacteristic Fire/Large Run-off Event	0	0	3	1	0	6	9	0	19

(L=low, M=moderate, H=high, V=very, "+" = intermediate class)

Eight or more factors contribute to the condition of three sub-drainages (Road Gulch, East Gulch, and Vance Creek and Other Tributaries). Five or six factors contribute to the conditions of eight sub-drainages and four or fewer factors contribute to the condition of the remaining eight sub-drainages. Although the number of factors may often be indicative of watershed hazard, qualitative assessments of the intensity, magnitude or distribution of these factors were considered in determining the ratings. Consequently the nine sub-drainages rated VH (Upper Canyon East Side Tributaries, Dry Soda Gulch, Sugarloaf Gulch, Road Gulch, Bear Gulch, Vance Creek South Fork, Vance Creek and Other Tributaries, and Corral Gulch and Canyon Creek Small

Tributaries) for uncharacteristic fire combined with a large run-off event are affected by three to ten factors, depending on the intensity, magnitude, or distribution. For instance, only three factors are considered primary in rating watershed hazard in the Corral Gulch and Canyon Creek Small Tributaries sub-drainage where the proportion of sensitive soils is relatively high and the distribution of these soils tends to be continuous. One sub-drainage (East Gulch) with eight influencing factors was rated H, rather than VH, for uncharacteristic fire combined with a large run-off event because logging impacts are scattered and localized and much of the lower riparian areas were rated as being in “good” condition in riparian condition surveys.

Most sub-drainages are a mosaic of soils which vary in surface erosion hazard although some tend toward somewhat more erosive soils (for instance, Upper Canyon East Side, Sugarloaf, Alder Gulch, Corral Gulch and Small Tributaries). Stream channel types throughout the project area generally tend toward sensitive types (CCWA 2003). Flows in some channels do not access the floodplain regularly; these channels are considered entrenched in fine valley soils (Rosgen channel type G or channels which are transitional with this channel type). Other channels have steep gradients (Rosgen type A and Aa+) according to the Canyon Creek Watershed Assessment (CCWA 2003). Portions of most stream channels show varying amounts of stream bank disturbance as described in the watershed specialist’s report. Some streams have experienced gullying from intense run-off events (Road Gulch and Alder Gulch (tributary)), some of which are as recent as the mid-1990s. Past activities, logging and grazing, have affected hillslope and riparian function.

Roads are an important factor in assessing watershed hazard because they can increase run-off by capturing subsurface flow and by concentrating and channeling run-off, causing erosion and sedimentation. Culverts may plug without maintenance, creating conditions under which small erosion events become large (Road Gulch and others). The Fisheries and Roads sections and the Watershed Specialist Report provide detailed road data by subwatershed.

The portion of the mainstem of Canyon Creek with the lowest gradient and the largest amount of floodplain lies between the confluences of the Middle Fork of Canyon Creek, just above the project area, and Berry Creek, just below the project area. This portion is characterized as a depositional reach because high stream flows access the floodplain where they slow, spread, and deposit sediment. Below Berry Creek, Canyon Creek tends to be constrained by the narrow valley or is channelized. This portion is characterized as a transport reach which moves sediment rapidly downstream. The lower portion of Vance Creek, above the Highway 395 crossing also has a relatively wide floodplain although the channel itself is entrenched and eroding, reducing access to the floodplain and depositional functioning.

Water Quality

Canyon Creek is included on the Oregon Department of Environmental Quality's (ODEQ) Clean Water Act Section 303(d) List of Water Quality Impaired Waterbodies (List) (Oregon, 2004). The reason for the listing is summer rearing temperature for salmonid fish. The East Fork of Canyon Creek, which receives a small amount of runoff from the project area, but mostly drains the Strawberry Wilderness, is also on the List for the same reason. The Middle Fork of Canyon Creek (above the project area) and Vance Creek are included in the ODEQ water quality database but are not included on the 303(d) list. A TMDL for the Upper John Day Sub-basin is scheduled for completion in 2007.

Wetlands, Floodplains, and Municipal Watersheds

Wetlands and floodplains are located within the project area as described in the Watershed Specialist's Report. No municipal watersheds are located within the project area although Byram Gulch, a municipal watershed for Canyon City drains into Canyon Creek below the project area.

Riparian Habitat Conservation Areas (RHCA's):

Standard PACFISH RHCA's are applied to this project. RHCA widths are based on PACFISH stream categories and are defined for one side of the stream. The RHCA width is 300 feet on either side of fish-bearing streams; 150 feet on either side of perennial streams or around large wetlands (>1 acre); and 100 feet on either side of intermittent streams or around small wetlands (< 1 acre).

Typically the vegetation in the outer portions of RHCA's (ranging from the outer 50% to 80% of RHCA's) in the project area is similar in ecoclass to the vegetation which occurs on the adjacent hillslope. Because of the lower slope position, vegetation in the outer RHCA's may tend toward the moister end of the variation associated with specific upland ecoclasses. Typically 20-50% of RHCA width (inner zone) is vegetated with riparian species, species that are transitional between riparian and uplands, or plant communities in which shifts to drier species have occurred due to physical alterations to floodplains or stream channels.

The valleys and, consequently, the riparian portions of RHCA's along most of Canyon or lower Vance creeks on either National Forest or private land tend to be wide, usually at least 10 to 20 times as wide as stream width (bankfull). The valleys and riparian areas along the small tributaries tend to be narrower and are often less than ten stream widths (bankfull) wide. Forest stand, canopy continuity, and woody fuel conditions in the hillslope portion of these RHCA's tend to be similar to or greater than those on the adjacent hillslope (outside the RHCA's) except where previous harvest has occurred. The condition of streamside riparian vegetation is variable as described in the Watershed Specialist Report. Although cover does not meet Amendment 29 standards along some stream segments (See Fisheries Report), small trees along some of these segments are believed to occur more densely than prior to European-American settlement, partially due to the historic exclusion of fire. Due to the density of trees, stand conditions are conducive to the development and spread of insects and diseases which may kill the trees, as described in the Vegetation Report. Fuel loads in some RHCA's are also considered to be elevated and range from medium to high due to the presence of many small trees. These small trees, either alive or dead, are classified as ladder fuels in the Fuels Specialist's Report. Canopy closure is more continuous. These conditions would contribute to intense fire and severe burning in these areas and to the spread of fire as described in the Fuels Specialist's Report.

Environmental Consequences

Alternative 1 – No Action

Direct and Indirect Effects

Watershed Hazard
Under Alternative 1, no activities are proposed. The portion of watershed hazard attributed to some detrimental soil conditions like compaction would continue to recover as described in the Soils Specialist Report. The absence of proposed activities is expected to result in a mosaic of conditions, given the existing state of the hillslopes, valley bottoms, riparian areas, and stream channels and the presence of active erosion and soil recovery processes,. Watershed functions may be enhanced, exacerbated, or maintained, depending on the specific characteristics of the sub-drainages, as summarized in Table WA-2.

Table WA-2. Summary of Changes in Watershed Hazard over Time under a Variety of Run-off and Fire Intensity Conditions for Alternative 1.

Size of Run-off Event	Fire Behavior	
	Absence of Fire	Uncharacteristic Fire
Common	Slight increase locally due to presence of accelerated erosion in areas of previous disturbance and lack of road maintenance. Also slight increase due to consumption of locally heavy fuel loads and resulting mineral soil exposure in selected RHCA's and adjacent to previous areas of disturbance.	Increase due to exposure of mineral soil and changes in other soil characteristics caused by intense fire in addition to previous disturbance.
Rare	Increase due to concentrated overland flow occurring on previously exposed mineral soil or other adverse conditions or to the increased connections among previous disturbance or natural areas of concentration resulting from increased overland flows.	Greater increase due to exposure of mineral soil and changes in other soil charcteristics caused by intense fire, concentrated overland flow, and the interactions among these factors.

Sub-drainage response to disturbance or to recovery of disturbance also depends on inputs to the hydrological system such as the size of storms or run-off events. Run-off events are not always correlated with storm events, depending on ground conditions or on the duration of the disturbance and the time-span of recovery. The effects on watershed hazard under several disturbance scenarios are summarized in Table WA-3.

The most likely effect on watershed hazard under Alternative 1 is little or no change across the landscape compared to the Existing Condition since neither rare (medium/large) run-off events nor uncharacteristic fire are likely to occur in a given year. Effects associated with rare, medium/large run-off events and uncharacteristic fire are discussed because 1) of the uncertainty surrounding their occurrence, 2) in the event that either one or both occur, effects on watershed hazard and on cumulative watershed effects may be substantial and 3) potential rare and substantial effects are of such great interest to the public that disclosure of the effects of unlikely events is warranted.

Table WA-3. Summary of Watershed Hazard for Alternative 1 at year 1 under various natural disturbances for 19 Sub-drainages.

Natural Disturbance	Watershed Hazard Rating								Total
	L	L+	M	M+	H	H+	VH	VH+	
Absence of Fire/Large Run-off Event	4	0	8	1	6	0	0	0	19
Uncharacteristic Fire/Small Run-off Event	2	0	10	1	6	0	0	0	19
Uncharacteristic Fire/Large Run-off Event	0	0	3	1	0	6	9	0	19

(L=low, M=moderate, H=high, V=very, "+" = intermediate class)

Table WA-3 is a summary of watershed hazard ratings determined for Alternative 1, year 1, for the nineteen sub-drainages in the project area. Six and nine sub-drainages have ratings of H+ or VH, respectively, for the combination of uncharacteristic fire and a large run-off event occurring. These ratings are the same as the existing condition ratings since little change is expected to occur naturally in one year and no activities are proposed.

These effects are expected to continue with areas that are recovering from disturbance such as some riparian areas and some areas of soil disturbance continuing to recover over the next decade to several decades. Other areas where raveling or other chronic erosion is occurring would be expected to continue to erode at the current rate most of the time. These patterns would continue until either an uncharacteristic fire burns (see Fuels Specialist Report) or a rare run-off event occurs, after which watershed hazard would be expected to increase due to the exposure of mineral soil or the expansion of the drainage system due to erosion.

Some sub-drainages are expected to exhibit slightly different patterns of response from the majority, depending on the occurrence of large run-off events or uncharacteristic fire. For instance, watershed hazard in Bear Gulch is not expected to increase under large run-off events in the absence of fire because both the uplands and riparian areas are well-vegetated. If the ground cover were removed and many of the trees killed in an uncharacteristic fire, the hazard associated with bare mineral soil, hydrophobic soils, and over dried, powdery (flocculated) soils would be expected to increase for small run-off events and to increase substantially (to VH) for large run-off events. Other sub-drainages (Lower East Side Small Tributaries and West Side Small Tributaries) are not expected to show increases in watershed hazard unless both uncharacteristic fire and a large run-off event occur because of vegetation patterns and because few hazard factors are common enough to interact and result in hazard increases above the baseline low hazard rating. Other sub-drainages (Vance Creek and Other Tributaries and Corral Gulch and Canyon Creek Small Tributaries) show a continuous increase in hazard ratings as disturbance intensifies, indicating several chronic factors are present. These chronic conditions would be likely to become connected by overland flows which exceed the often limited infiltration capacity of the soils.

At year 5, the pattern would be very similar although it is expected that recovery in four sub-drainages (Wickiup Creek, Sugarloaf Gulch, Sloan Gulch, East Gulch) in particular would have progressed sufficiently so that the watershed hazard might approach a very low rating. Logging and grazing effects are among the primary factors affecting watershed hazard. Other factors such as the presence of naturally sensitive soils in low amounts relative to other sub-drainages or of recovering riparian areas would buffer effects from other factors such as roads also contribute to improvement in hazard rating.

About two hundred feet of the road to access the private (Morris) property would not be built on National Forest lands. As a result, an additional road on private land in Sugarloaf and West Side Upper Small Tributary sub-drainages would be constructed for substitute access to facilitate commercial thinning and other fuels treatments. New road construction would be several times longer than the 200 feet proposed in Alternative 2, based on map evaluations and initial permit discussions. The road would be located in areas where sediment and runoff are difficult to control. Although fuels treatment would be likely to reduce run-off and sediment transport from private land if uncharacteristic fire occurred, the presence of the road would off-set some portion of those benefits. Watershed hazard would increase under rare run-off events (unrelated to fire) due to the presence of a new road.

The ground disturbance associated with temporary roads would not occur. Watershed hazard in Alder Gulch, Fawn Creek, Vance Creek-Other Tributaries, East Gulch, Road Gulch, and Canyon Creek East Side sub-drainages would not increase as a result.

No change in water yield or runoff regimes are expected because no activities are proposed. Changes may occur in the event of uncharacteristic wildfire, resulting in generally in more rapid run-off following snowmelt or precipitation.

Water Quality

Water quality (temperature) would not be expected to change under the common run-off events. Under rare events, caused by either storms or following fire, channel erosion may occur in Vance Creek that would lead to bank erosion and shallow, wide streamflow in summer and, possibly, warmer water. Channel widening is unlikely in upper Canyon Creek under these conditions due to the accessibility of the floodplain.

Following uncharacteristic wildfire, mineral soil would be exposed increasing the likelihood of erosion and sediment until ground cover throughout the sub-drainage recovered. Loss of shade associated with uncharacteristic fire (see RHCA discussion) would probably cause increases in stream temperature.

Wetlands, Floodplains, and Municipal Watersheds

Wetland and floodplain conditions would remain a function of legacy activities. Wetland and floodplain vegetation may be burned off temporarily following uncharacteristic wildfire but would be expected to fully re-grow the following season. Mineral soil would be exposed increasing the likelihood of erosion and sediment affecting the water quality until ground cover throughout the watershed recovered.

Riparian Habitat Conservation Areas (RHCA's):

The most likely effect under Alternative 1 is little to no change in RHCA condition since neither rare (medium/large) run-off events nor uncharacteristically intense fire are likely to occur in a given year. Riparian vegetation condition would be maintained or improved as other or on-going management activities are implemented with BMP's. Fuel loads would slowly accumulate as described in the Fuels Specialist Report. Insect and disease would become more common, likely resulting in mortality. For instance most trees in several stands in RHCA's on intermittent tributaries and in outer portions of RHCA's of fish-bearing creeks would be expected to die due to stand density (see Fuels Specialist Report). Alternative 1 would be consistent with PACFISH standards FM 1 and 4 since conditions would generally be maintained or improved. In the event of a rare run-off event, channel and valley bottom erosion is likely to affect riparian conditions and processes in the inner RHCA's of some sub-drainages as shown in the Watershed Hazard discussion.

Numerous small dead trees and other vegetation conditions would contribute to heavy fuel loads as described in the Fuels Specialist Report. In the event of uncharacteristic fire, the outer portions of some perennial RHCA's and the inner and outer portions and stream banks of some intermittent RHCA's are likely to burn severely, exposing mineral soil and possibly forming hydrophobic soils (see Soils Section). Exposed mineral soils and hydrophobic soils increase watershed hazard and may result in delivery of sediment and increased run-off into streams or onto the outer portion of the Canyon Creek valley bottom. Locally severe fire would be expected in some RHCA's in the following sub-drainages: Bear Gulch, Lower Canyon Creek Small Tributary, Alder Gulch, Vance Creek and Other Tributaries, and Corral Gulch and Small Tributaries in the presence of wildfire. Locally severe fire may also occur in other RHCA's depending on the pattern of burning. Most trees in some RHCA's would be killed, providing relatively small coarse woody debris within ten years, and delaying the growth and recruitment of large woody debris for decades. Cover in many of the RHCA's would be reduced until forest stands are re-established (see Vegetation Section). Some larger trees may be killed and would provide large woody debris for future recruitment earlier than in the absence of fire.

Uncharacteristic fire that enters the downstream portions of RHCA's is likely to burn intensely up drainages due to the topographic “chimney” effect. This pattern of burning is likely to result in localized severe burn in RHCA's where down or standing fuel loads are heavy. It is likely that some or all of the riparian vegetation in the inner RHCA’s would be burned to the root collar or crown, temporarily removing shade along perennial streams and killing the drier vegetation found along intermittent streams. Re-sprouting of riparian vegetation is likely during the next growing season with shade recovery occurring in one to ten years, depending on riparian species present (sedges or shrubs). Vegetation along drier intermittent stream banks would be similar to that described for upland vegetation.

Cumulative Effects

Cumulative effects are variable based on the number of sub-drainages affected by run-off events or uncharacteristic fire. Run-off from common events, in the presence or absence of local fire or in the absence of uncharacteristic fire in one to a few (three to five) of most of the sub-drainages, is not expected to deliver increased sediment or flow to Canyon Creek.

Rare run-off events which span more than a few (three to five) sub-drainages either in the absence of fire or following fire are likely to contribute visibly increased flow and sediment to Canyon Creek. Some common storm events occurring immediately after uncharacteristic fire, before ground cover recovery, may also be likely to contribute visibly increased flow or sediment. The increased flow and sediment likely to result from events which are centered above the Vance Creek confluence are likely to be distributed onto Canyon Creek floodplains above Berry Creek, saturating floodplain storage and depositing sediment. A small portion of the run-off may reach the John Day River due to conditions in lower Canyon Creek. The distribution of increased flows and sediments from events in which Vance Creek and Other Tributaries and Vance Creek South Fork sub-drainages are involved (or from events in which most of the lower sub-drainages are involved with variable input from Vance Creek) is likely to be more variable, depending on exact conditions of stream flow in Canyon Creek. In general a portion of the increase would be expected to reach the confluence of Canyon Creek to the John Day River because of the variously channelized or naturally constrained reaches of Canyon Creek below the project area. Some portion of increased flow and sediment would be distributed across the floodplain and channel features above Berry Creek, before the Canyon Creek valley is constrained or the stream is channelized. Inputs to the John Day River may be observable at low flows but are unlikely to be tracked during periods when river flow is high; the pattern of river and other tributary streamflow may be different from that of Canyon Creek based on stream gauge comparisons presented in the CC WA (2003).

Uncharacteristic fire from the project area combined with similar fires in other portions of Canyon Creek Watershed or along the adjacent ridges could possibly influence the spread of wildfire to the Byram Gulch Municipal Watershed or other unburned portions of Canyon Creek Watershed.

Alternative 2 – Proposed Action

Direct and Indirect Effects

Watershed Hazard

Effects under Alternative 2 would depend on such factors as sub-drainage existing conditions, the time period considered, whether an uncharacteristic fire occurs, and the size and timing of runoff events. Tables WA-4 and WA-5 summarize effects under a range of run-off and fire intensity scenarios at years 1 and 5. Year 5 was chosen because of the effect of ground cover recovery, as described in the Soils Specialist's Report.

Table WA-4. Summary of Changes in Watershed Hazard under a Combination of Two Run-off and Fire Intensity Conditions at Year 1 for Alternative 2.

	Absence of Fire	Uncharacteristic Fire
Common Run-off Event	Slight increase due to magnitude of ground disturbing activities compared to non-ground-disturbing fuel treatments and local stand improvements in RHCA's, allowing for BMPeffectiveness.	Slight increase overall due to magnitude and certainty of ground disturbing activities compared to beneficial effects of fuels treatments in event of uncharacteristic fire and no change in network efficiency.
Large Run-off Event	Increase due to magnitude of ground disturbing activities with potential for increase in network efficiency compared to non-ground-disturbing fuel treatments and local stand improvements in RHCA's, allowing for increased drainage efficiency due to increased connections among disturbed areas.	Increase overall due to magnitude and certainty of ground disturbing activities compared to beneficial effects of fuels treatments in event of uncharacteristic fire and to increase in drainage network efficiency with larger run-off.

Table WA-5. Summary of Changes in Watershed Hazard under a Combination of Two Run-off and Fire Intensity Conditions at Year 5 for Alternative 2.

	Absence of Fire	Uncharacteristic Fire
Common Run-off Event	Similar to No Action due to ground cover recovery.	Decrease due to ground cover recovery, treatment of local conditions, and fuels treatments, slightly countered by very small increase from new road construction
Large Run-off Event	Similar to Alternative 1 due to ground cover recovery.	Decrease due to ground cover recovery, treatment of local conditions, and fuels treatments, slightly countered by very small increase from new road construction

The most likely effect on watershed hazard under Alternative 2 is little or no change across the landscape compared to the Existing Condition since BMP's associated with the proposed activities are expected to control most run-off and sediment transport under common run-off events. Because the proposed activities would be implemented in sub-drainages which have been previously disturbed by management activities, including roading at densities in excess of five miles/square mile, a slight probability exists that previous disturbance would become connected to ground disturbance associated with the proposed actions.

While these connections would be expected to extend channels headward, runoff is not expected to be concentrated enough to cause accelerated erosion or to deliver increased sediment to live streams in most locations under common rainfall events. Hazard increases in sub-drainages such as those in Upper Canyon Creek Watershed, Alder Gulch, Fawn Creek, Vance Creek, and others in the Vance Creek Subwatershed where existing disturbance and proposed tractor and skyline harvest are located lower in the sub-drainage. The extended drainage network would also increase watershed hazard associated with future rare run-off events.

Table WA-6. Summary of Watershed Hazard for Alternative 2, Year 1, under various natural disturbances by 19 Sub-drainages.

Natural Disturbance	Watershed Hazard Rating								Total
	L	L+	M	M+	H	H+	VH	VH+	
Absence of Fire/Large Run-off Event	3	0	1	8	1	6	0	0	19
Uncharacteristic Fire/Small Run-off Event	2	0	2	8	2	5	0	0	19
Uncharacteristic Fire/Large Run-off Event	2	0	2	8	1	6	0	0	19

(L=low, M=moderate, H=high, V=very, “+” = intermediate class)

Table WA-7. Summary of Watershed Hazard for Alternative 2, Year 5, under various natural disturbances by 19 Sub-drainages.

Natural Disturbance	Watershed Hazard Rating								Total
	L	L+	M	M+	H	H+	VH	VH+	
Absence of Fire/Large Run-off Event	3	1	8	1	6	0	0	0	19
Uncharacteristic Fire/Small Run-off Event	2	0	10	1	6	0	0	0	19
Uncharacteristic Fire/Large Run-off Event	2	0	10	1	6	0	0	0	19

(L=low, M=moderate, H=high, V=very, “+” = intermediate class)

The watershed hazard ratings for some sub-drainages increase to H or VH at year one, for some scenarios, indicating that accelerated erosion is likely to occur. Run-off may be concentrated and delivered to Canyon Creek if rare run-off events occur, especially before BMP's are implemented. Generally the reasons for increases in watershed hazard are ground disturbance related to tractor yarding, skyline yarding on some soils, landings, and temporary roads. Road condition is expected remain the same, or possibly be improved, resulting in essentially no change to watershed hazard.

Under the post-treatment fuel conditions, sufficient ground cover to prevent most concentration of run-off and sediment transport is expected to remain following proposed burning. Similarly, wildfire which enters or is initiated in the area is expected to remain on the ground and burn with lower intensity in treated areas (see fuels report). Consequently, sufficient ground cover to control runoff and sediment transport is expected to remain following fire. Local areas of concentration may develop in the small amount of area where fire may burn with moderate to high intensity (Agee, 1993) and potentially exposes mineral soil, increasing slightly opportunities for the drainage network to extend. Run-off from these areas is expected to be controlled by downslope ground cover which typically remains following low intensity burns.

These increases in watershed hazard would be expected to persist for up to five years, until ground cover recovers as described in the Soil Specialist Report but would diminish gradually during this period as ground cover increased. Ground cover recovery is considered to be the most important factor influencing infiltration in disturbed soils during common run-off events.

The presence of increased disturbance resulting from fuel treatments would increase watershed hazard during rare run-off events for up to five years until ground cover recovers as described in the Soil Specialist report. Once ground cover recovered and assuming that no new areas of accelerated erosion develop during the recovery period, watershed hazard would be expected to return to pre-activity levels. Although other kinds of soil disturbance would persist as described in the Soil Specialist Report, the implementation of BMP's reduces the likelihood of connections developing between disturbance associated with the proposed actions and existing disturbance beyond the five year period allotted for ground cover recovery. For example, the location of compaction, puddling and displacement on hillslopes, generally away from ephemeral draws (except where crossings are designated and otherwise additionally mitigated), isolates soil disturbance from most interactions with pre-existing conditions or natural factors affecting run-off concentration. Under these BMP's additional compaction would not occur in draws, gullying would not be likely to occur as an effect of the proposed actions, and future gullying, resulting from concentrated run-off, would be limited to draws previously compacted. The implementation of no-equipment buffers below areas of thin soils (“scabs”) provides similar protection under conditions where concentrated flows are also likely to occur. In addition since rare (medium/large) run-off events are unlikely to occur in a given year, the increase in watershed hazard is unlikely to result in adverse effects.

Watershed hazard is expected to increase slightly in the short term, for up to five years, under the most common run-off events. Some activities such as those associated with ground-based and skyline systems and the construction of selected temporary roads would increase the exposure of mineral soil and the potential for drainage linkages to develop. Installation and use of temporary roads to five units would result in new disturbance or the interruption of the recovery cycle of previously decommissioned roads. Use of three additional temporary roads off the upper 6510 road would have little impact on watershed hazard initially since these roads were not fully decommissioned at the time the official classification changed. Restoration of these temporary roads would decrease watershed hazard. Placing a temporary road on top of a previously decommissioned road to unit 320 (in East Central Small Tributaries sub-drainage) would set recovery of that road back about 10 years. Improvement in RHCA stand conditions are expected to reduce watershed hazard locally. Considering the effects of all the activities, watershed hazard is expected to increase for up to five years until ground cover recovers to Forest Plan standards. This increase in hazard is considered to be acceptable since it is directly related to Forest Plan standards for soils.

Some activities may increase or maintain existing levels of watershed hazard. Although substantial road maintenance is proposed, implementation is determined by conditions on-the-ground at time of haul. Hauling over frozen or dry roads is unlikely to result in amelioration of existing road drainage conditions.

The construction of 200 feet of the road to private (Morris) property would enable more timely treatments of fuels on private lands adjacent to the project area. Treatment of these stands would reduce watershed hazard after about five years for reasons similar to those described for the proposed actions. Construction of this road would eliminate the need for a longer road, part of which would be in the RHCA for Canyon Creek, to remove timber on private land. The location of the proposed ridgetop road meets criteria that indicate that watershed hazard is unlikely to be negatively affected.

Watershed hazard is reduced about five years after implementation as ground cover recovers to slow run-off from common events and trap sediment. Large run-off events tend to exceed the potential of ground cover to slow run-off and trap sediment. Disturbance associated with past activities would continue to recover except where recovery is interrupted as described above. Proposed yarding increases watershed hazard less than that used in past harvest because BMP's and design elements direct implementation onto side slopes, out of the more sensitive ephemeral draws. Compaction in draw bottoms, typically resulting from past practices, tends to increase watershed hazard under large run-off events because of opportunities for erosion to be initiated and accelerated due to soil structure changes. Locating skid trails on sideslopes also permits drainage control to be effective.

Under Alternative 2, at years 1 and 5, naturally ignited fire, if not controlled, is expected to burn in a mosaic of mostly low intensity, limiting the exposure of mineral soil to about 10% of the burn area or less. These areas of mineral soil would temporarily raise watershed hazard for up to five additional years, until ground cover re-established.

Comparing Tables WA-6 and WA-7 with WA-3 and the narrative description of out-year effects for Alternative 1 displays how watershed hazard would be reduced over time under Alternative 2 compared to Alternative 1 under conditions like those associated with uncharacteristic fires and large run-off events. Watershed hazard is expected to be reduced under Alternative 2 because removal of fuels typically results in reduced fire behavior which often reduces the area where uncharacteristic fire occurs. Reduced fire behavior results in less severe effects to soil. Less severe effects to soil typically results in less erosion and sediment delivery to streams compared to uncharacteristic fire behavior. Because fuels would be reduced and low intensity fire would be expected over much of the project area, with a reduction in uncharacteristic fire behavior, watershed hazard is expected to be reduced in nine subwatersheds immediately after treatment (year 1). The return to low intensity fire behavior would be expected to counter the effects of ground disturbing activities in the event of wildfire. Watershed hazard would be reduced in up to 15 sub-drainages at year 5 because ground cover on disturbed areas would have recovered. The watershed hazard in the other four sub-drainages would remain at low to moderate levels.

No measurable changes in water quantity or runoff regime are expected because less than 30% of the vegetation in the project area would be cut (Troendle 1982). In addition, in eastern Oregon, it appears that more than 30% of a watershed vegetated with mixed conifer or lodgepole must be cut before changes in water quantity or runoff regime are measurable (Helvey & Fowler 1995). Cutting higher proportions is probably required to result in similar responses for watersheds vegetated with drier plant associations typical of the project area; the project treats less than 30% of the watershed.

Water Quality

No effects on water quality or 303(d) listed streams are expected because none of the proposed actions are expected to remove vegetation which shades streams. Proposed actions to improve stand conditions by pre-commercial thinning would remove vegetation only from the outer portions of fish-bearing and intermittent RHCA's. Prescribed burning and hazard tree felling would not reduce shade sufficiently to cause a measurable change in temperature because very few trees near perennial streams would be killed, and in most cases shade would not be reduced because shade from surviving trees overlaps shade from killed trees.

Other parameters which may affect water quality also affect watershed hazard; and since no changes are expected in watershed hazard along perennial or fishbearing streams, no changes in water quality are expected.

Wetlands, Floodplains, and Municipal Watersheds

Wetland and floodplain vegetation is not expected to burn severely during a low intensity wildfire. Wetlands are not expected to be affected by the proposed activities because the implementation of PACFISH RHCA's is expected to be sufficient in extent to protect wetland functions. Proposed actions are expected to move watershed functioning toward the natural potential after five years by reducing watershed hazard; consequently floodplain function is not expected to be reduced compared to the existing condition. The confluence of Byram Gulch, the Canyon City Municipal Watershed, is located downstream of the project area so the Watershed would not be adversely affected by the proposed activities (ground disturbing or burning activities).

Riparian Habitat Conservation Areas (RHCA's)

Prescribed burning in RHCA's is not expected to expose mineral soil due to the design elements described in Chapters 1 and 2. Consequently prescribed burning not expected to contribute to watershed hazard or detrimentally affect stream or riparian condition.

Under Alternative 2, small material (<9 in. d.b.h.) would be thinned from selected stands (about 60 acres in six units) in the outer part of RHCA's along Vance Creek, Canyon Creek, and some other streams. Fuels would be hand piled and burned. The small amounts of mineral soil expected to be exposed following pile burning in RHCA's are not expected to connect into areas that concentrate run-off and increase erosion risk due to the design elements described in Chapters 1 and 2. These elements would result in dispersing burning though time and allow for recovery of ground cover between ignitions of closely spaced piles. Thinning would result in healthier stands in which large trees would be expected to live and grow more rapidly than under the existing condition as described in the Vegetation Section, providing large woody debris for future recruitment. Fire hazard would also be reduced, likely resulting in low intensity fire burning in treated areas. In the event of wildfire entering these RHCA's, little mortality would be expected. Prescribed fire could be used routinely to maintain healthy stand conditions. Vegetation in the inner portion of RHCA's is not expected to be affected by the proposed activities as they would be implemented at least 25 feet away and because of higher humidities found in these areas. Future prescribed fire or wildfire would be expected to burn with low intensity. It is unlikely that low intensity fire would fully consume organic matter on the soil surface and expose mineral soil so erosion hazard would not be changed. Low intensity fire is not expected to burn wetter riparian vegetation; it would naturally die out within the inner RHCA's. Conditions in other RHCA's**,** where fuels would not be treated (such as wildlife corridors) and fuel loads would remain high, would be similar to those described for Alterative 1, resulting in higher severity burns locally. Consequently the proposed activities in RHCA's are consistent with PACFISH standards FM1 and 4 because they would maintain or improve conditions in RHCA's.

Cumulative Effects

The list of past, on-going, and foreseeable activities displayed in Appendix C of this EA (Cumulative Effects) was reviewed for inclusion in the discussion of cumulative effects.

Since direct or indirect adverse effects are expected to remain within unit boundaries under common events, adverse cumulative effects from this activity are not expected. Run-off from rare events would be likely to behave overall as described for Alternative 1. Rare run-off events occurring between years 1 and 5 are likely to result like those described for Alternative 1. Although additional flows and sediment may reach Canyon Creek following rare run-off events before year 5, as shown by the increase in watershed hazard, possible increases in run-off are not likely to be measurable because of the magnitude of the response expected from the existing conditions under Alternative 1 and the variability associated with watershed parameters.

Reduction in fire behavior in the project area may influence fire behavior and reduce watershed hazard within and in adjacent areas. Because fire behavior is expected to change from uncharacteristic to low intensity, the proposed activities, combined with previous treatments in the Little Canyon Mountain Project (BLM), uncharacteristic wildfire is less likely to enter Byram Gulch Municipal Watershed from adjacent areas.

Similarly, the probability that uncharacteristic wildfire would enter the East Fork, Middle Fork, and headwaters of Canyon Creek is reduced. The proposed activities break up the continuity of fuels and limit fire spreading between the Canyon Creek Watershed and the Upper Silvies Watershed to the south.

Consistency with Direction and Regulations

The project is consistent with the Clean Water Act, other applicable laws and related regulations and with the Malheur National Forest Plan, as amended, because it would not measurably increase watershed effects over the existing condition.

Irreversible and Irretrievable Commitments

The project as described will not result in any irreversible or irretrievable effects to the watershed resource since effects are expected to be limited in distribution and to recover as soil conditions recover. Thus this project is consistent with guidelines for watershed included in the Forest Plan.

Fisheries

Introduction

This section summarizes the species and status of fish present in the Canyon Creek Wildland Urban Interface (WUI) Project area as well as existing conditions for aquatic species and their habitat. This report builds on conclusions from soils and watershed sections and determines direct, indirect and cumulative effects on aquatic species and their habitat.

Regulatory Framework

The Executive Order 12962 of 1995 (aquatic systems and recreational fisheries) requires federal agencies to conserve, restore, and enhance aquatic systems to provide for increased recreational fishing opportunities nationwide. The Order requires federal agencies to evaluate the effects of federally funded actions on aquatic systems and document those effects relative to the purpose of this order.

The two principle laws relevant to fisheries management are the National Forest Management Act of 1976 (NFMA) and the Endangered Species Act (ESA) of 1973, as amended (16 U.S.C. 1531 et seq.). Direction relative to fisheries is as follows:

NFMA requires the Forest Service to manage fish and wildlife habitat to maintain viable populations of all native and desirable non-native wildlife species and conserve all listed threatened or endangered species populations (36CFR219.19).

ESA requires the Forest Service to manage for the recovery of threatened and endangered species and the ecosystems upon which they depend. Forests are required to consult with the U.S. Fish and Wildlife Service (USFWS) or the National Marine Fisheries Service (NMFS) if a proposed activity may affect the population or habitat of a listed species.

The Malheur National Forest Land and Resource Management Plan (Forest Plan) as amended (USDA 1990), provides direction to protect and manage resources. The Specialist report sites a detailed list of the portions of the Forest Plan relevant to fisheries and fisheries habitat requirements. In addition Forest standards and guidelines along with relevant laws are cited. Of special interest are Forest Plan amendment 29 and PACFISH (1995). Recommendations regarding fisheries habitat within the Canyon Creek WUI project area would adhere to this regulatory framework.

Vance Creek and Canyon Creek, both fish-bearing streams, are protected by 600-foot wide (total width) RHCA's (as defined within PACFISH). Neither East Fork Canyon Creek nor Wall Creek are within the project area; they are located within the Strawberry Mountain Wilderness. However, an unnamed intermittent tributary to East Fork Canyon is partially located within the project area. RHCA widths along other streams in the project area vary depending on whether streamflow is perennial or intermittent (see Watershed section).

All three subwatersheds in the Canyon Creek WUI Project area meet the three criteria for PACFISH Key Watersheds. The intent of designating Key Watersheds is to provide a pattern of protection across the landscape where habitat for anadromous fish would receive special attention and treatment. Priority within these watersheds would be to protect, or restore habitat for listed stocks, stocks of special interest or concern, or salmonid assemblages of critical value for productivity or biodiversity. Criteria considered to designate Key Watersheds are:

1. Watersheds with stocks listed pursuant to the ESA, or stocks identified in the 1991 American Fisheries Society report as “at risk” or subsequent scientific stock status reviews; or
2. Watersheds that contain excellent habitat for mixed salmonid assemblages; or.
3. Degraded watersheds with a high restoration potential.

Analysis Methods

The analysis area encompasses all fish habitats that have the potential for effects from the Canyon Creek WUI project. Based on topography, drainage patterns and the effects analysis, the project analysis area includes the following streams: Vance Creek to its confluence with Canyon Creek and Canyon Creek from Wickiup Campground downstream to approximately the mouth of Berry Creek. The watershed hazard ratings for some sub-drainages increase at year one, indicating that there may be erosion during rare run-off events (gully washers). The risk may exist for up to five years until ground cover recovers as described in the Soil Specialists Report. Once ground cover recovered the watershed hazard is expected to return to pre-activity levels.

The project area lies within three subwatersheds within the Canyon Creek Watershed of the Upper John Day River (main stem) subbasin. Information was compiled from the Canyon Creek Watershed Analysis (2003), stream surveys based on Region 6 Stream Survey protocol (1993), Malheur National Forest Geographic Information System, and from the PBS aquatic species and habitat existing condition report. The Existing Condition was evaluated qualitatively, based on the principles of applied fisheries and watershed science, professional judgment and knowledge of the area. Where data gaps existed (e.g., Data available from some earlier stream surveys was not available to adequately type streams based on Rosgen stream classification or to quantitatively determine the percent of particles less than 2mm).

Unknown and Unavailable Information: Stream conditions on private land within and downstream of the analysis area are generally unavailable; however, because much of the land is visible from existing roads, the land use practices are readily observable.

Existing Condition

Aquatic Species

The Canyon Creek watershed is home to populations of Mid-Columbia summer-run steelhead (*Oncorhynchus mykiss*), Inland Columbia Basin redband trout (*O. mykiss gairdneri*), westslope cutthroat trout (*O. clarki lewisi*), and Mid-Columbia spring-run Chinook salmon (*O. tshawytscha*) and is listed by Buchanan (1997) as historic habitat for bull trout (*Salvelinus confluentus*). However, there is a small population of brook trout (*S. fontinalis*), an introduced species, located in approximately 4 miles of the headwaters of Canyon Creek. There are no other brook trout in Canyon Creek. Columbia spotted frogs may also be present within the watershed.

Management Indicator Species, Threatened, Endangered and Sensitive Species

Management Indicator Species (MIS) are species of vertebrates and invertebrates whose population changes are believed to best indicate the effects of land management activities. Forest Plan Standard 61 (p. IV-32) lists species and gives direction to provide for habitat requirements of MIS species. Aquatic MIS in the project area for the Canyon Creek WUI project include cutthroat trout, rainbow/redband trout and steelhead trout.

Threatened and endangered species are listed under the ESA; whereas, sensitive species are identified by the Forest Service Regional Forester. An endangered species is an animal or plant species that is in danger of extinction throughout all or a significant portion of its range. A threatened species is an animal or plant species that is likely to become endangered within the foreseeable future throughout all or a significant portion of its range. A sensitive species is an animal or plant species for which species viability is a concern either a) because of current or predicted downward trend in population numbers or density, or b) because of current or predicted downward trends in habitat capability that would reduce a species' existing distribution. Forest Plan Standard 62 (p. IV-32) gives direction to meet all legal and biological requirements for the conservation of threatened and endangered plants and animals. Standard 62 states, "Assess all proposed projects that involve habitat changes or disturbance and have the potential to alter the habitat of threatened, endangered or sensitive plant and animal species." When threatened or endangered species or habitats are present, follow the required biological assessment process, according to the requirements of the ESA (Public Law 93-205). Forest Plan Standard 64 further states, "Meet all consultation requirements with the US Fish and Wildlife Service and state agencies". Effects to aquatic threatened, endangered, and sensitive species are analyzed in the Canyon Creek WUI Project Aquatic Biological Evaluation (Appendix F).

Four threatened, endangered and sensitive (TES) salmonid species and one sensitive amphibian species are found in the Canyon Creek WUI project area:

- Summer-run steelhead of the Middle Columbia River Distinct Population Segment (DPS) are listed as threatened under the ESA and their critical habitat was designated on September 2, 2005 including mainstem Canyon Creek and Vance Creek within analysis area. They are also on the State of Oregon sensitive species list.

- Spring-run Chinook salmon of the Middle Columbia River Evolutionarily Significant Unit (ESU) are listed on the Region 6 sensitive species list; they are also covered under Essential Fish Habitat (EFH) for consultation with the NMFS under the Magnuson-Stevens Fishery Conservation and Management Act (MSA).
- Redband trout are considered the native, resident form of rainbow trout and they are on the State of Oregon and Region 6 sensitive species lists.
- Westslope cutthroat trout are on the State of Oregon and Region 6 sensitive species lists.
- Columbia spotted frogs are also on the State of Oregon and Region 6 Sensitive Species lists.

Brook Trout

Brook trout (S. fontinalis) is the most adaptive of the char species. This species prefers cool water but is thermally tolerant (Behnke 2002). Brook trout are the least specialized of the fish species in the Canyon Creek watershed. Brook trout are currently limited to a relatively small area on Canyon Creek, upstream of the project area. The distribution of this population was limited on the downstream end by the Canyon Meadows dam until January 1997 when the floodgates were opened completely on the dam due to concerns about stability and safety. This allowed downstream movement of brook trout. In 2005, the Forest Service and ODFW in cooperation with Oregon Trout and Central Oregon Flyfishers implemented a project to attempt to eradicate brook trout from the watershed. After this initial attempt it was decided that it would be impossible to completely eradicate brook trout from this watershed. The eradication effort has been put on hold until more information can be gathered on the effectiveness of the 2005 effort. For a more detailed description of life cycle and habitat requirements for the Brook Trout, see the specialist report.

Summer-run Steelhead Trout

The Mid-Columbia River steelhead trout (*O. mykiss*) is named for the timing of their adult spawning run. The name "summer" refers to the time of year the fish enter the Columbia River for migration to the middle portion of the Columbia River, between Mosier Creek in Oregon and the Yakima River in Washington. First time spawning fish are generally 4-5 years old. Individuals are capable of spawning more than once before they die, though spawning more than twice is rare. Adult steelhead trout in this DPS spend up to one year in fresh water prior to spawning. These fish can utilize headwater areas for spawning purposes and require clean gravels with nearby resting pool habitat during the three to six week spring spawning period. Juveniles spend 1-4 (generally 2) years in fresh water before migrating to the ocean as smolts. While in the fresh water rearing stage, young steelhead prefer a water temperature range between 10-13° C, adequate pool habitat, and cover in the rearing streams.

Most steelhead trout spawning and rearing occurs in the second to fourth order streams in a forested environment. Even when small streams are not accessible to migrating fish, because of barriers or steep gradients, they are vitally important to the quality of downstream habitats. Adults begin to move into Canyon Creek as early as January, with the largest influx occurring from April through June (ODFW 2004). The peak spawning period is late April and early May (ODFW 2004). Unlike other salmonids, steelhead do not necessarily die after spawning. However, only 1% of steelhead survive to spawn a second time (Behnke 2002).

Redband Trout

Inland Columbia Basin redband trout (*O. mykiss gairdneri*) have the most extensive area of all game fishes in the Blue Mountains. They are in the smallest headwater areas as well as in the largest rivers of the Blue Mountains.

Inland Columbia Basin redband trout are assumed to be the resident form of the anadromous steelhead. Most redband trout spawning and rearing occurs in the second to fourth order streams in the forested environment. Even when small streams are not accessible to migrating fish because of barriers or steep gradients, they are vitally important to the quality of downstream habitats. Their distribution within the proposed project area and habitat needs, are similar to the steelhead. However, redband trout spawning may occur in areas with insufficient flow for steelhead spawning.

Spring-run Chinook Salmon

Chinook salmon (*O. tshawytscha*) exhibits two behavioral forms: ocean-type and stream-type. Ocean-type Chinook salmon juveniles migrate to the ocean within the first year of life; whereas, stream-type juveniles typically spend one or more years in fresh water before migrating to the ocean. In the Canyon Creek watershed, Chinook salmon are of the stream-type form. For a more detailed description of lifecycle and habitat usage see the specialist report.

Westslope Cutthroat Trout

The John Day River basin has been identified as one of six major river basins in which westslope cutthroat trout (*O. clarki lewisi*) reside. Three life-history forms are found in this species: resident (lives in small streams), fluvial (migrates between small streams and rivers), and adfluvial (migrates between lakes and streams). The resident form of westslope cutthroat trout is found in the Canyon Creek watershed; although, historically cutthroat may have been of the fluvial form in Canyon Creek and its tributaries (Shepard et al. 2003). Spawning typically occurs between April and June when water temperatures range between 43°F and 48°F (6°C to 9°C), and these fish rarely live longer than four years (Behnke 2002).

The westslope cutthroat trout differ from other fish in their relatively small size and their feeding habits. These species specialize as invertebrate feeders and, consequently, do not compete directly with more piscivorous (fish-eating) species like bull trout (Behnke 2002). In addition to habitat degradation, hybridization with nonnative rainbow trout and displacement by brook trout in small streams represent the common biological threats to the species (Behnke 2002). In the Canyon Creek watershed, the cutthroat is considered a genetically unaltered species illustrating greater than 99% genetic purity. Consequently, they have been identified as a core conservation population (Shepard et al. 2003).

Columbia Spotted Frog

The Columbia spotted frog (*Rana luteiventris*) is on the Regional Forester's Sensitive Species List and is a candidate for Federal listing under the ESA. Spotted frogs are highly aquatic and are rarely found far from permanent water. Breeding habitat is usually in shallow water in ponds or other quiet waters along streams. Breeding may also occur in flooded areas adjacent to streams and ponds. Adults may disperse overland in the spring and summer after breeding. Habitat has been degraded by past management activities, such as livestock grazing, road construction along streams, and timber harvest adjacent to streams, lakes ponds, springs, and marshes.

The spotted frog is considered present in all subbasins on the Malheur National Forest. It is assumed this species is widely distributed in the project area. Limited habitat surveys have been conducted specifically for spotted frogs; however, habitat probably exists along most low gradient (less than 2%) perennial and some intermittent streams within the project area. No survey records or sightings are recorded from the project analysis area.

Distribution

Information on species occurrence (i.e., presence/absence) was obtained from the Canyon Creek Watershed Analysis and conversations with Forest Service and Oregon Department of Fish and Wildlife (ODFW) biologists. Salmonids are present in all subwatersheds of Canyon Creek; however, these species are primarily restricted to Canyon Creek and larger perennial tributaries (Map 3.1 in Canyon Creek Watershed Analysis). Non-salmonid fish species are also found distributed throughout the watershed, but no data are available on these species. Malheur mottled sculpin (*Cottus bendirei*), identified as sensitive on the Regional Forester's sensitive species list and indicated as being present in the Malheur National Forest, is not found in the John Day River Basin (Markle and Hill 2000). Bull trout (*S. confluentus*) were historically present in the Canyon Creek watershed but are now absent.

Vance Creek Subwatershed

Fish distribution in the Vance Creek subwatershed is known only for Vance Creek itself. Both steelhead and redband trout are known to occur in the lower 2 miles of Vance Creek, with only redband trout being found upstream from that point. Chinook salmon may be found in Canyon Creek from the mouth upstream to approximately East Gulch, however, this portion of Canyon Creek flows entirely through private land inholdings, within the project area. The abnormally cool water temperatures measured in Vance Creek make it a potential candidate for fisheries restoration. Only a ¼ mile section of steelhead/redband trout spawning habitat on Vance Creek is not exclosure fenced. A field survey conducted in May 2000 showed this section contains only marginal anadromous spawning gravels in small (less than 20-foot) sections; the remaining habitat is small gravel or fines composed mostly of volcanic ash.

The May 2000 field survey indicated vegetation in the RHCA along Vance Creek is in very good condition; alder, dogwood and hawthorn form a dense thicket for at least 6 to 8 feet on either side of the stream and providing good shade to provide cool water and overhead cover to provide security for fish. There is spotty accessibility to cattle due to this “wall” of vegetation. Cattle cross Vance Creek in several places where there are breaks in the shrub/tree “wall” but there is no sign of over-utilization of vegetation and little bank damage at the crossings as they are armored.

Upper Canyon Creek Subwatershed

Westslope cutthroat trout, steelhead, and redband trout are found in Canyon Creek on Forest Service land and private land inholdings within the project area. Available data indicate fish do not occur in any of the tributaries to Canyon Creek within the Canyon WUI project area in this subwatershed.

Habitat

The quality of fish habitat is affected by conditions within the stream channel and riparian areas along the channel. This section presents information on riparian and instream conditions. Stream surveys have been completed on four streams within the analysis area; however, only Vance Creek and Canyon Creek are Category 1 streams.

PACFISH RMO's and Forest Plan Amendment 29 DFC's

Important aquatic habitat elements as defined by PACFISH and/or Forest Plan Amendment 29 include: 1) pool frequency, 2) water temperature/stream shading, 3) large woody debris, 4) bank stability, 5) width to depth ratio, and 6) embeddedness. These habitat elements are important in maintaining aquatic habitat function and health. Stream survey information was analyzed to compare existing habitat conditions to Forest Plan Riparian Management Objectives (RMO)/Desired Future Condition (DFC) for aquatic habitat. (See specialist report for more information).

Pool Frequency

Pool frequency is a gage of aquatic habitat diversity, and is an indicator of the degree to which streams are capable of supporting a varied and complex community of fish species. Pools are important for providing rearing habitat for juvenile fish and cool-water refuge areas for adult fish during periods of low flow and elevated temperatures. Pool spacing varies by channel morphology (Rosgen 1996). Deep pools also provide important habitat for adult Chinook salmon and steelhead trout.

Pool habitat can be reduced where management activities result in reductions of pool forming elements (e.g. LWD), changes in bedload (e.g. large increases in fine sediment), or changes in channel morphology (e.g. widening or straightening).

Stream surveys indicate that the Forest Plan DFC/RMO for pool frequency is not being met in Vance Creek and Canyon Creek (See specialist report for more information).

Water Temperature/Stream Shading

Water temperature influences the metabolism, behavior, and health of fish and other aquatic organisms. Fish can survive at temperatures near extremes of suitable temperature ranges. However, growth is reduced at low temperatures because all metabolic processes are slowed. At the opposite extreme, growth is reduced at high temperatures because most or all energy from food must be used for maintenance needs. Fish are also more susceptible to diseases near the extremes of a species suitable temperature ranges.

The Forest Plan water temperature standard is for no measurable increase in maximum water temperature, and maximum water temperatures below 64°F within migration and rearing habitat and below 60°F within spawning habitats (PACFISH RMO). In general, juvenile and Chinook salmon, redband trout, and juvenile steelhead will occupy water that is from 55 to 64°F. Upper lethal temperatures range from about 75°F for steelhead to about 80°F for Chinook salmon. Mean maximum water temperatures are above the suitable range for salmonid species present during summer months in Canyon Creek within the analysis area (Table FI-1).

Table FI-1. Average maximum stream temperatures in the Canyon Creek WUI Analysis area.

Stream	Location	Years Analyzed	Mean 7 Day Mean Max Temp (°F)
Vance Creek	Near USFS Bdy.	1999-2000	54.3
Canyon Creek	At USFS Bdy.	1999-2000 2002-2005	74.2

Riparian stream shading is critical in regulating water temperature extremes and providing instream cover against predation. Stream temperatures increase following disturbance to riparian vegetation (i.e., harvest, grazing, or fire) (Beschta and Taylor 1988). Given the high temperatures found within the Canyon Creek watershed and the importance of riparian vegetation in regulating extreme temperatures, it is important to identify stream reaches that are limited in shade and ultimately may be limited in providing quality instream habitat to fish species. In addition, it is known that shade from conifers and deciduous trees and shrubs functions differently. In winter, cold temperatures can be moderated by conifer shade acting as thermal cover.

Vegetation along streams in the project area is highly variable. Only a few streams have stands of larger trees with closed canopies stretching along most of their length.

Most streams have a patchy distribution of forest and non-forest/open vegetation types along their length.

Vance Creek

The Vance Creek subwatershed is dominated by stream reaches with low stream shading. Of the 12.8 miles of stream examined within the Vance Creek subwatershed, over 60% was rated as having low stream shade Four of 10 reaches examined had over 80% of their stream length rated as having low stream shade. Only Fawn Creek and the lower portion of Vance Creek have any portion of the reach rated as high. In general, stream shading along Vance Creek involves a patchwork of stream cover separated by areas of exposed stream channel. One of the tributaries to Vance Creek has mixed vegetative cover, and the other major tributary is completely exposed to direct sunlight. Despite the low to moderate shade cover, lower water temperatures are found in Vance Creek. The lower temperatures may be attributed to the presence of springs or subsurface flow. Stream shade for most other streams within the subwatershed may be a limiting factor for moderating stream temperatures.

Upper Canyon Creek

Three of the six reaches within this subwatershed have over 90% of their stream length rated as low stream shade. None of the reaches have any length rated as high. Stream shading along Sugarloaf Gulch is a mix of segments with low and moderate shade. The lower reach of Wickiup Creek has moderate levels of stream shade; whereas, the upper reach 100% of its length having little to no stream shade. Likewise, the portion of Canyon Creek within the project area has little or no shade. Overall, stream shading in the Upper Canyon Creek subwatershed is low

Large Woody Debris

LWD plays an important role in forested stream reaches. LWD aids in dissipating stream energy, trapping sediment and the formation of pools and associated aquatic habitat.

Quantity of LWD in streams can be altered by removal of streamside trees for timber production or salvage of instream pieces. Timber has been harvested from areas adjacent to streams in the project analysis area. In extreme cases, large increases in peak flows and/or large increases in channel width can result in destabilization of instream pieces and subsequent transport downstream thus resulting in a decrease in LWD.

Riparian forests, especially individual trees that are within ½ to ¾ tree length of the stream channel, produce LWD that is recruited into a stream where it creates critical habitat features for aquatic species. The Malheur National Forest recognizes the role of LWD. Forest Plan Amendment #29 specifies a range in the number of pieces of LWD to be maintained for each mile of stream in certain ecotypes. In this analysis, the current condition of the riparian zones was rated with respect to near-term (10 to 20 years) LWD recruitment potential.

Vance Creek Subwatershed

The Vance Creek subwatershed offers little potential for near-term LWD recruitment. There are no riparian zone stands in this subwatershed that have a high LWD recruitment potential. Most stream reaches in the subwatershed have 100% or nearly 100% of the reach rated as low LWD recruitment potential. Only 2 of 14 reaches examined have a moderate LWD recruitment potential exceeding 14% of the area within the reach. Based on this analysis, Vance Creek subwatershed is not expected to produce or transport appreciable amounts of LWD in the near term. Stream surveys indicate that the Forest Plan DFC/RMO for LWD quantity is being met in Vance Creek.

Upper Canyon Creek Subwatershed

Four of the seven reaches examined within the Upper Canyon Creek subwatershed in the project area have over 80% of the area rated as low recruitment potential. Only Sugarloaf Gulch has over 70% high recruitment potential, and the lower reach of Wickiup Creek has moderate potential for LWD recruitment. Overall, this subwatershed has a low potential to recruit LWD. Stream surveys indicate that the Forest Plan DFC/RMO for LWD quantity is not being met in Canyon Creek.

Embeddedness/Fine Sediment

Composition of the stream substrate is an important feature of aquatic habitat. Cobble and gravel substrates provide habitat for a diverse assemblage of benthic macroinvertebrates as well as eggs and early life stages of numerous fish species. Macroinvertebrates represent a substantial portion of the diet available to various fish species.

Filling of interstitial spaces (i.e. the gaps between rocks on the stream bottom) with fine sediment (particles < 2 mm in size) eliminates habitat for many macroinvertebrates. Fish eggs and early life stages can also be buried and smothered when interstitial spaces are embedded with fine sediment. Winter habitat for juvenile salmonids is also lost as interstitial spaces are embedded with fine sediment.

Increases in fine sediment can occur from both increases in transport of fine sediment from upland areas and from destabilized stream banks. Increases can result from both episodic sources such as wildfires or from chronic sources such a native surface roads. Episodic sources normally result in short-term increases that return to pre-disturbance levels through recovery processes. Chronic sources can result in long-term changes of stream channels and aquatic habitat. Numerous roads in the project area have been identified as potential sources of fine sediment based on field reviews and professional judgment (see Watershed Section and Map 3.5 in Canyon Creek Watershed Analysis).

Embeddedness data is no longer collected during Region 6 stream surveys. Instead, stream substrate data is collected using pebble count procedures. Either methodology can be used to estimate the amount of fine sediment in streams. Adverse impacts to macroinvertebrates and fish can occur where fine sediment exceeds 20% of the surface area of the streambed or embeddedness exceeds 20%. Stream surveys recorded whether measured units were embedded to a degree greater than 35 percent, not greater than 20 percent, therefore it is not possible to determine whether Vance Creek or Canyon Creek meet Forest Plan DFC. However, stream surveys indicate that approximately 62 percent and 18 percent of the measured units were embedded greater than 35 percent in Vance Creek and Canyon Creek, respectively. (See specialist report for more information).

Width-to-Depth Ratio

The Forest Plan DFC/RMO for width-to-depth ratio is based on wetted width and depth. A large wetted width-to-depth ratio indicates a wide shallow stream channel morphology. Wide shallow streams are prone to increases in stream temperatures due to their high surface area to volume ratio. Shallow streams also provide little habitat for fish, due to the lack of water depth.

Width to depth ratios can be increased by increases in peak flows, direct bank alteration, or increases in sediment or a combination of these factors. Conversely, reductions in these factors can lead to reductions in width to depth ratios. Canyon Creek exceeded the Forest Plan DFC/RMO for width-to-depth ratio in 1993. Vance Creek met the width-to-depth ratio RMO/DFC in 1993.

Bank Stability

The Forest Plan DFC for stream bank stability is for 90% of the banks to be stable. Channel types differ in their sensitivity to management activities due to differences in bank erosion potential and the influence of streamside vegetation on bank stability. Data available from the 1993 stream surveys was not adequate to type streams based on Rosgen stream classification; therefore channel typing was not done on Vance Creek or Canyon Creek. Riparian Area Pace Transect surveys were conducted in 1993 and determined that streambank stability in Vance Creek did not meet Forest Plan DFC and Canyon Creek was right at the standard.

Fish Passage Barriers and Stream Improvements

Within the Canyon Creek WUI project boundary, only two culverts were identified as potential barriers to fish passage based on a recent survey of culverts within the watershed. These culverts present barriers to juvenile but not adult salmonids and would be replaced as a separate future project (see cumulative effects section). Naturally low stream flows and water withdrawals can block fish from accessing critical rearing and spawning habitat. In 1991 three log weirs were installed on private land on Canyon Creek to provide adult Chinook salmon holding habitat. Those log weirs are still functional and may help to provide deep pools which spring Chinook salmon may hold in throughout the summer months until they spawn in September. Without such deep pools in which to hold in, Chinook salmon may not be able to get up to spawning habitat due to low flows when spring Chinook move upstream into Canyon Creek from the mainstem John Day River. These weirs also benefit steelhead by providing rearing habitat for juveniles. In 2006 an irrigation dam on private land on Canyon Creek was replaced to improve fish passage.

Environmental Consequences

Alternative 1 - No Action

Direct and Indirect Effects

Temperature
With no vegetative treatments or prescribed burning in riparian areas, there would be no short term effect on water temperature. Riparian areas within this project area are not large enough to act as fire breaks for higher intensity wildfires. Because fuels would remain untreated under this alternative, all streams in the area with existing conifer or hardwood shading would be at risk for losing shade and incurring increasing summer water temperatures in the future due to an increasing risk, over time, of a high intensity, stand replacement wildfire. Increased width-to-depth ratios from sediment pulses following such a wildfire could raise stream temperatures by increasing the surface area exposed to solar radiation. Additionally, the immediate water temperature increase resulting from a high intensity fire as it burns through a riparian area (over the stream) can lead to direct mortality of fish and spotted frogs. Mean maximum water temperatures are already above the suitable range for salmonids in Canyon Creek (Table FI-1).

Ongoing road maintenance activities located within RHCA's would not reduce existing stream canopy cover sufficiently to adversely affect streamside shading or water temperature. Considering the risk of high intensity wildfire under the no action alternative, this is a no effect in the short term, and a potential adverse effect in the long term.

Sediment
The activities with the highest potential for affecting sediment input to streams are related to road maintenance, or a lack thereof. Road related impacts most likely to contribute high sediment inputs would be plugged culverts leading to washed out road fills, undersized culverts at stream crossings leading to high water velocities and subsequent erosion at culvert outlets, or sediment channeled on road surfaces and routed through road-side ditches and cross-drain culverts to streams. Under this alternative, there would be no road management activities other than routine road maintenance. This can be considered a no effect, or no change from the existing condition, in the short term, however, at existing funding levels road maintenance is not expected to keep up with all needs. This alternative would not do anything to reduce impacts of the existing road system. It would be expected that sedimentation from existing roads would increase over time, unless other projects are implemented to address these impacts.

The quality of fish habitat could be reduced in the long-term because fuels would remain untreated under this alternative. A high intensity, stand replacement wildfire could result in a scale and severity of effects that is uncharacteristic of this habitat type. Such a wildfire may transport fine ash, remove soil cover, kill bank-stabilizing plant roots, and potentially increase water run-off rates. The quality of fish habitat would decline until vegetation along burned portions of streams recovered (an estimated 5-10 years). Indirectly, given the risk of a high intensity, stand replacement wildfire under the no action alternative, a higher erosion potential exists for a certain period following such an event. Intense storm events (greater than a six year event) immediately following a wildfire that burned in steep terrain and had large areas of high severity burn may result in concentrated run-off, resulting in more sediment transport directly into fish bearing streams and potentially resulting in increased width-to-depth ratios. This could result in adverse effects in the long term.

Stronghold populations of salmonids are associated with higher-elevation forested lands and the proportion declines with increasing road densities (Quigley et al. 1996). The higher the road density, the lower the proportion of subwatersheds that support strong populations of key salmonids. Specifically, Quigley et al. (1996) shows a strong correlation with road densities of 2 miles/mile^2 or higher and reduction of strong populations of salmonids. Further reductions of strong salmonid populations were identified at densities of 3 miles/mile^2 and 4 miles/mile^2 or greater. Roads in the project area that occur within 100 feet of streams or cross streams commonly impact fish and fish habitat more than roads located in uplands.

Table FI-2: Road/Stream Interaction Information

Subwatershed	Entire Subwatershed (Public & Private)			
	Total Road Miles	Road Miles within 100 ft. of Cat. 1-4 Channels	Stream Crossings on Roads	Total Road Density Mi/ Mi^2
Vance Creek	113	18	172	3.88
East Fork Canyon Crk	1.3	0.1	3	0.05
Upper Canyon Crk	125	20	181	3.44
Total	**240**	**38**	**356**	**N/A**

*Note: Rounding road miles during calculations may result in minor (0.1) mile discrepancies.

Road densities would remain above 3 miles/mile^2 in Vance Creek and Upper Canyon Creek subwatersheds and the miles within 100 feet of Category 1-4 channels would remain high (Table FI-2). There are slightly over 38 miles of roads that likely impact streams due to proximity (100 feet or less). This alternative would not change road densities or location in the project area. Road densities and roads in close proximity to streams would remain at detrimental levels in all subwatersheds except for East Fork Canyon Creek which is primarily wilderness.

In summary, there is an increasing risk, over time that this alternative may result in adverse effects to Mid-Columbia steelhead and aquatic habitat, because of increasing impacts from the existing road system and from the risk of high intensity, stand replacement wildfire. However, due to the fact that none of the Critical Habitat indicators are likely to be degraded under this alternative, but there may be minor affects that are considered insignificant, the Malheur National Forest has made the determination that this alternative is “Not Likely to Adversely Affect” Mid-Columbia Steelhead Critical Habitat or Chinook salmon Essential Fish Habitat (seeTable FI-3).

As noted by Dunham et al. (2003), the effects of wildfires depend on a variety of factors including their timing, location, area, extent, and intensity. Other factors include the characteristics of the ecosystems and the species affected along with other indirect physical and ecological linkages. While such events can cause short term negative effects, such as those listed below, over long time periods the resulting habitat conditions may be more productive then in areas where natural disturbance has been suppressed (Dunham et al. 2003). Wildfires can have a number of detrimental effects to stream channels such as decreasing stream channel stability, increasing discharge and affecting discharge variability, altering coarse woody debris delivery and storage, increasing nutrient availability, increasing sediment delivery and transport, increasing solar radiation and altering water temperature regimes (Dunham et al. 2003). In cases where natural stream processes are already impaired such as Vance Creek and Canyon Creek, the recovery of the stream ecosystem from the effects of fire is likely to be slower, more sporadic, and potentially incomplete (Minshall 2003). These future impacts could reach a magnitude of "Likely to Adversely Affect" for steelhead. The short term water temperature increase due to a high intensity fire burning through the riparian area could lead to direct mortality of fish in the stream at that time. These impacts would not cover a large enough area to result in a WIFV determination for redband trout, Chinook salmon, westslope cutthroat trout, or Columbia spotted frog (see Table FI-3 definitions).

Cumulative Effects

All of the activities in Appendix C have been considered for their cumulative effects on aquatic TES species. The following discussion focuses on those past, ongoing and reasonable foreseeable future activities that may contribute adverse effects to aquatic TES species or their habitat.

Common to both alternatives

Since the 1850s the Canyon Creek watershed has been subjected to a variety of land-use practices. Practices have included beaver trapping, mining, fire suppression, road construction, timber harvest and grazing activities on public and private land. These activities have reduced aquatic TES species habitat quality and complexity in and adjacent to project area streams.

Historically, fire has been the most widespread disturbance in the Canyon Creek watershed (CCWA 2003). Wildfires within the watershed would have had a higher frequency of occurrence prior to European settlement of the area, but fires would generally have been of lower intensity than under a fire-suppression strategy. Sediment inputs would probably have been more frequent due to this fire pattern but would have been short-lived as vegetation returned quickly to the burned areas (CCWA 2003). Recent fires that have occurred in the analysis area have burned approximately 1,466 acres since 1986. Areas of high mortality have been planted with native conifers. Wildfire suppression may have altered natural disturbance regimes that contribute to watershed structure and function (CCWA 2003). Fire exclusion has caused the build-up of fuels, overstocking of trees, and has created a situation where the possibility exists for a high intensity, stand replacement wildfire. With a probable historic fire-return interval of five to 15 years, as many as 10 fire cycles have been eliminated from this ecosystem (CCWA 2003). Even catastrophic wildfires can burn internally patchy with areas of low to moderate burn severity or islands of unburned vegetation. Evidence suggests that fires and disturbance in general can pose greater threats to fishes when their habitats become fragmented and otherwise altered by human activities (Dunham et al. 2003). Other human influences can interact with fire and when taken cumulatively can negatively affect aquatic TES species (e.g. habitat loss, degradation, fragmentation, and nonnative species invasions, such as the introduction of brook trout into this watershed) (Dunham et al. 2003).

Data on earlier harvests is not available; however logging has been occurring in the watershed since about 1877. Since 1979 timber harvest has occurred on approximately 6,695 acres of Forest Service lands within the analysis area. These harvest activities likely reduced the amount of LWD in perennial streams within the analysis area. The amount of LWD and coarse wood available for delivery from intermittent drainages during storm events was also likely reduced. Precommercial thinning has occurred on approximately 3,606 acres. These activities may have reduced the risk of high intensity, stand replacement wildfire although sediment may have been delivered to stream channels since watershed Best Management Practices were not being implemented at the time.

Approximately 177 miles of road have been constructed in the analysis area for fire suppression, timber harvest, and public access. Many of the roads were built for tractor logging and are near stream bottoms and poorly located in the steeper areas for skyline yarding. Some 66 miles of road have been closed and 15 miles of road have been decommissioned within the analysis area.

Roads can account for most of the sediment problems in a watershed because they are a link between sediment source areas (skid trails, landings, and cut slopes, etc.) and stream channels. They directly affect the channel morphology of streams by accelerating erosion and sediment delivery and by increasing the magnitude of peak flow (Furniss et al. 1991). Wemple (1994) focused on the interaction of forested roads with stream networks in Western Oregon and found that nearly 60% of the road network drained into streams and gullies, and are therefore, hydrologically integrated with the stream network. From a qualitative standpoint, the following assumptions can be used as general indicators of sediment delivery risk associated with roads: 1) the higher the road density the higher the potential for sediment yield increases due to the larger acreage of exposed surfaces, 2) the more drainage ways that are crossed the higher probability that direct sediment introduction will occur, and 3) the greater the distance, or higher on the slope, that the road is from the drainage network, the less probability for delivered sediment to occur (erosion may occur but is less likely to be routed to the stream).

Surface erosion is highly dependant on soils, road surfacing and condition, road grade, traffic volumes, and the effectiveness and spacing of drainage structures. The greatest surface erosion problems occur in highly erodible terrain, particularly landscapes underlain by granitic soils, soils of the Clarno formation, and certain highly fractured or weathered rock types. Studies have found that sediment delivery to stream systems is highest in the initial years after road construction, although raw ditch-lines and road surfaces with little binder can remain chronic sources of sediment. Native surface roads (mostly Maintenance Level 1 and 2 roads) are generally greater chronic sediment sources than surfaced, higher standard roads.

Drainage structure, function, and spacing are keys to minimizing the amount of surface flow, which directly affects surface erosion. The spacing of drain or ditch relief structures depends on the road gradient, road surface and ditch soil types, runoff characteristics, and the effects of concentrated runoff on slopes below the road. Forest Service Handbook and other manuals provide guidelines for drainage structure spacing. Drainage structures should be close together on silt-sand soils with little to no binder on steep slopes and further apart on gravel road surfaces with moderate binder and little to no fines on flat or minimum grades.

The majority of open and closed roads, 56% in the Vance Creek subwatershed and 76% in the Upper Canyon Creek subwatershed, are native surface roads. Native surface roads are more likely to contribute fine sediment to streams that can adversely affect aquatic habitat compared to roads with other surface types. Most native service roads, if used other than during dry or frozen conditions cannot tolerate much traffic without rutting causing other resource problems. Adverse affects to aquatic TES species are more likely to occur where native surface roads are located adjacent to Category 1 streams. High densities of native surface roads in the Vance Creek and Upper Canyon Creek subwatersheds are likely sources for the high fine sediment levels in Vance Creek and Canyon Creek.

Livestock grazing has been occurring in this area since the early days of settlement. Historic sheep and cattle grazing have produced changes in some riparian areas. It is unknown as to the extent that past or historic grazing activities have contributed to degradation of the watershed compared to other management activities. In 1991, 6.5 miles of riparian corridor fence was installed on private land along Canyon Creek and in 1990 approximately 1/2 mile of riparian corridor fence was installed on lower East Fork of Canyon Creek. Because most of Canyon Creek is corridor fenced the effects of open range livestock accessing Canyon Creek and East Fork Canyon Creek have been reduced. Concerns for the aquatic resources in the past 30 to 40 years have led to changes in the grazing strategy and have produced dramatic improvements in most riparian areas throughout the John Day Basin.

Beaver were abundant in the Canyon Creek watershed prior to the arrival of fur trappers (CCWA 2003). Beaver dams trap sediment, reduce water velocity, and can redistribute water as hyporheic flow. The net effect of beaver dams may be to lower water temperatures by increasing bank storage, which leads to increased base flow levels (CCWA 2003).

In 1991 three log weirs were installed on private land on Canyon Creek to provide adult Chinook salmon holding habitat. Those log weirs are still functional and may help to provide deep pools which spring Chinook salmon may hold in throughout the summer months until they spawn in September. Without such deep pools in which to hold in, Chinook salmon may not be able to get up to spawning habitat due to low flows when spring Chinook move upstream into Canyon Creek from the mainstem John Day River. These weirs also benefit steelhead by providing holding habitat for adults and rearing habitat for juveniles.

Currently much of the reductions in shade and increases in sediment load due to past public land management activities including road construction, timber harvest, historic grazing, and previous wildfires is recovering and would continue to recover under either alternative, in the absence of a high intensity, stand replacement wildfire. However, other ongoing road, recreation, special use, hazard tree treatments, private land development, and mining activities on public and private lands taken cumulatively may fragment and maintain less than desirable aquatic conditions within or in proximity to the analysis area.

Cumulative Effects

Continued livestock grazing is unlikely to degrade habitat pathways or indicators at the 5th field HUC level and is unlikely to retard near natural rates of recovery for PACFISH RMO's at either project, subpopulation or watershed-scale in the Upper John Day River subbasin when management practices, proposed actions, Conservation Measures and monitoring are implemented as proposed.

Road maintenance activities if performed on a regular basis would help to ensure that culverts are cleaned out and maintained, waterbars and other drainage features are properly constructed and maintained, and would result in reduced levels of fine sediment entering streams within the analysis area. However, at existing funding levels road maintenance is not expected to keep up with all needs. It would be expected that sedimentation from existing roads would increase over time, unless other projects are implemented to address these impacts.

The Little Canyon Fuels Reduction project is expected to continue on BLM lands on Little Canyon Mountain and fire suppression activities would continue on public and private lands in the analysis area. The effects of fuels reduction within the watershed are likely to reduce the short-term risk of high intensity, stand replacement wildfire. Active fire suppression alone without treatments or prescribed burning would increase the risk of high intensity, stand replacement wildfire in the long-term.

In 2006 an irrigation dam on private land on Canyon Creek was replaced to improve fish passage. Improved fish passage would benefit aquatic TES fish by making it easier for them to migrate to spawning areas and escape warm water areas and move upstream into cooler water refugia.

Commercial and pre-commercial thinning and fuel treatment along three miles of Highway 395 south of Starr Ridge is likely to reduce the risk of wildfire and is likely to benefit aquatic conditions in Bear Gulch and lower Vance Creek.

A new road may still be constructed by a private landowner to conduct vegetation treatments and timber harvest on his property, to reduce the fire hazard, and to improve forest health. If he does not build the 200' ridgetop road in the Proposed Action, the only potential access route located entirely on his property would be near the riparian area of Canyon Creek and may increase the potential to cause sedimentation and other adverse impacts associated with new road construction near fish bearing streams.

The Canyon Creek Culvert Replacement project (not this part of this analysis) would benefit aquatic TES species in Canyon Creek and allow unhindered upstream migration of all life stages of salmonids. Replacement of these culverts would ensure that juvenile salmonids will be able to escape warm water areas and be able to freely migrate upstream to cooler water areas during summer months. Currently, juvenile salmonids are only able to move downstream through the existing culverts, but are not able to migrate back upstream to cool water refugia at these locations.

Alternative 2 – Proposed Action

Direct and Indirect Effects

Temperature

Timber harvest units, landings, and all temporary roads would be located outside of RHCA's under Alternative 2. Restricting these activities to areas outside of RHCA's would prevent adverse impacts to existing stream shading. RHCA widths are sufficient for Category 1 and 2 streams to prevent removal of trees that provide stream shading. Hand thinning and pile burning is planned for Units 132 and Unit 558, along fish bearing reaches of Vance Creek and Canyon Creek, respectively. No thinning would occur within 60 feet of these streams and trees would not be directionally felled into the no cut zone. Hand piles in RHCA's would be located at least 50 feet away from live and intermittent stream channels and not in riparian vegetation.

Prescribed fire activities would occur in RHCA's. Burning activities would mimic low intensity fires that are characteristic of natural burning patterns that tend to occur in riparian areas. This technique would result in a patchy distribution of burned and unburned areas in RHCA's based on the Malheur National Forest's experience with past prescribed burning activities in RHCA's using the same technique. Ignition of prescribed fire is planned within RHCA's on approximately 210 acres and would occur under strict burn prescriptions. In other burn blocks, fire from upslope burning units which is within prescription, would be allowed to back into RHCA's. Design elements include retention of at least 95% of stream shade. The prescribed burning would occur when moisture and climate conditions would minimize the potential for a high intensity burn. Although some mortality of overstory trees may occur, loss of shade which could affect stream temperature is not expected to occur. Prescribed burning is not expected to burn in the moist riparian hardwood communities along Wickiup Creek. Burning in the ponderosa pine communities along Fawn Springs tributary to Alder Gulch is expected to be low intensity and rarely kill trees in this fire adapted community. Burning would be excluded from Vance Creek by the burn boundary which is a road. Longer term beneficial effects could result from increased riparian vegetative vigor, as a result of these low intensity, mosaic burns in riparian areas. In a recent study Beche et al. (2005) found that a fall prescribed fire within the riparian zone of a mixed-conifer forest in El Dorado County, California was patchy in terms of intensity, consumption, and severity. Additionally they found that although 49.4% of all tagged trees (>11.5 cm/4.5 in.) and snags were scorched by the prescribed fire, only 4.4% of all tagged trees were dead one year after the prescribed fire. In general the trees killed by the prescribed fire were small and located near areas of high litter accumulation (Beche et al. 2005).

Water withdrawals for dust abatement during haul activities would occur. Water withdrawals would be in accordance with the 2005 Malheur National Forest Road Maintenance Biological Assessment (BA) and NMFS guidance (with the exception that drafting would be permitted before sunrise and after sunset). Use of these procedures would insure that water withdrawals do not result in a measurable increase in water temperatures.

Sediment

Timber harvest units, landings, and temporary roads would not be located in RHCA's under Alternative 2. Restricting these activities to areas outside of RHCA's would minimize the potential for sediment delivery to fish bearing streams. There would be soil disturbance associated with commercial timber harvest and other proposed activities, primarily as a result of tractor skidding, and subsoiling of skid trails and landings. The risk of sediment from these activities reaching streams providing fish habitat is negligible, due to the likelihood that sediment will remain within unit boundaries as described in the Soils section. In most cases sediment generated from these activities, which has the potential to move off-site during rare large storm events, would be captured in the RHCA buffer.

There is also the potential for generating sediment from non-commercial thinning operations and burning hand piles. The risk of sediment from these activities reaching fish habitat is negligible because they do not involve heavy equipment and design elements have been developed to reduce the risk of sediment delivery to streams.

While high intensity fire has the potential to result in exposed soil, which in turn poses a potential for sediment transport off-site, the design elements for the proposed prescribed burning in this project would minimize that risk. Burn plan prescriptions would include parameters for weather and fuel moisture conditions, percent duff removal, percent mineral soils exposed, and others, which would set the sideboards to keep fire intensity to a level that would not result in soil loss. The ignition and limited use of fire within RHCA's described above would result in a low risk of generating sediment along perennial streams. Hand lines would not be permitted within RHCA's thus reducing the risk of sediment being channeled to intermittent or perennial stream channels. Beche et al. (2005) conducted intense post-prescribed fire monitoring (e.g. pebble counts, longitudinal profiles, cross-sections) and observed little to no change in stream sediment composition 1 year post-fire. Similarly, they observed little to no change in stream channel morphology and no substantial change in erosion or deposition in the surveyed reaches (Beche et al. 2005). The prescribed burning would be expected to burn across Category 4 RHCA's, since these would be dry during the burning operations. However, as mentioned in the Soils section, because burning would take place so as to avoid decreasing ground cover below LRMP standards; the potential for erosion from these areas would not be significant. The potential for some sediment movement in some of these intermittent channels which could reach fish habitat is low, except under rare, intense storm events.

New Road Construction

A new road approximately 200 feet long would be constructed on a ridge top across National Forest Lands to provide access to private property near Unit 570. This access would allow the property owner to conduct vegetation treatments and timber harvest on his property to reduce the fire hazard and to improve forest health. The alternative access route entirely on his property would be located near the riparian area of Canyon Creek and may increase the potential to cause sedimentation and other adverse impacts. This new road is outside of the RHCA. Because of the location and design elements for this road, it is not expected that any sediment generated from the construction or use of this road would reach fish bearing streams. The risk of causing enough sedimentation to Canyon Creek to affect fish habitat is negligible.

Temporary Road Construction

The proposed action includes construction of approximately 2 miles of temporary road (all outside of RHCAs). Approximately 0.8 miles are new temporary road and approximately 1.0 mile is existing roads which were previously decommissioned and would be returned to their existing state after use. Temporary roads are not part of the Forest road system, and they would be "decommissioned" after use. (The treatments applied are the same as decommissioning, but since the roads are never part of the Forest road system, the term does not technically apply.) Similar to the new road construction described above, these are low standard, low profile roads. The main difference between decommissioning these roads and closing the roads as described above is that as needed to assure revegetation of the road surface, the roads would be scarified, or subsoiled. As stated in the Soils section, personal observations by the soil scientist indicate that sediment generated from temporary road construction and use would be deposited within 20 feet of the road edge. Because of the location and design elements for these roads, it is not expected that any sediment generated from the construction, use, or "decommissioning" of these roads, would reach fish bearing streams.

Maintenance
Roads used within the sale area would receive road maintenance at a level commensurate with use. Road maintenance includes several activities that potentially result in sedimentation from the road prism to the ditch line, or the adjacent slope. Typical road maintenance activities could include: blade and shape road including existing drainage dips, grade sags, and waterbars, repair damaged culverts, place rock in some existing drainage dips and grade sags, place rock in wet areas of road, brushing, remove hazard trees, and dust abatement.

Project design elements and protective measures from the 2005 Malheur National Forest Road Maintenance BA would be followed for the replacement, removal, or installation of ditch-relief culverts.

The longer term effects of road maintenance, commensurate with use, are to maintain or improve existing road conditions. Road maintenance, commensurate with use, may decrease chronic sedimentation in some locations. Improving drainage, removing ruts and rills from the driving surface, and adding less erosive surfacing material would reduce detachment and transport of sediment. This is especially important for roads within RHCA’s. Because road maintenance activities would be commensurate with use, it is possible that if winter logging occurs, little to no road maintenance may be necessary and therefore would not occur. Alternatively, if operations occur in the summer, road maintenance, commensurate with use, may occur on all or nearly all of the roads.

Chemical Contaminations/Nutrients
The Forest Service would require a Hazardous Substances Plan and a Prevention of Oil Spill Plan from the contractor to be reviewed and approved prior to implementation of activities including prescribed fire. Refueling and fuel storage sites would be located at least 150 feet away from live streams. Other chemicals used may include saw gas and oil, and fuels used to ignite fires. All have the potential to adversely affect aquatic TES species, if they were to enter nearby stream systems. Handling procedures and spill plans would minimize the risk of potential effects. In the event of the need for fire suppression actions, no chemicals or retardant would be used within 150 feet of water or wetlands. There is minimal risk of an accidental spill from logging equipment, vehicles used to transport crews, equipment, ignition materials, or fire suppression activities in the event of an escaped prescribed burn.

Beche et al. (2005) found that ash deposition from the prescribed fire appeared to have a minimal impact on stream water chemistry with increases in some water chemistry parameters (SO_4^-, total P, CA^{2+}, and Mg^{2+}). It should be noted that their study area had low to moderate hillslopes and so accelerated erosion and ash delivery would not be expected. Most of the areas within the Canyon Creek WUI project area have hillslopes ranging from 35 to 60% (~60% of the watershed) with some slopes as steep as 150% or greater (CCWA 2003). It might be expected that these same water chemistry parameters would also increase with the proposed prescribed burning in this alternative, at least temporarily.

Dust abatement procedures would adhere to the Road Maintenance Specification in the Dust Abatement plan. Lignin sulfonate, magnesium chloride, or water may be used for dust abatement, as needed, during periods of heavier vehicle use associated with commercial timber harvest activities. Chemical dust abatement will be avoided on the 14 miles of commercial haul routes located within RHCAs. When the chemical treatments are used, these treatments are applied in spring-early summer, to provide dust abatement for the operating season. The maximum potential use would be an annual application during the years of commercial timber harvest. Water for application to roads would come from the following designated water sources: Wickiup Campground on Canyon Creek, and near the powder house on Forest Road 3920 on Vance Creek.

Large Woody Debris (LWD)
Approximately 14 miles of commercial haul routes are located within RHCAs. Felling of danger trees for human safety along haul routes in RHCA's has the potential to reduce the supply of LWD to stream channels and therefore pool habitat. Under PACFISH, trees may be felled in RHCA's when they pose a safety risk (PACFISH Standard RA-2). All trees felled for safety reasons would be kept on site in accordance with PACFISH Standard RA-2 to meet woody debris objectives.

Prescribed fire activities would occur in RHCA's. Burning activities would mimic low intensity fires that are characteristic of natural burning patterns in riparian areas. This technique would result in a patchy distribution of burned and unburned areas in RHCA's. Using these techniques, mortality of understory trees may occur in burned patches but few overstory trees would be killed. Fire intensities would not be high enough to consume trees or downed wood large enough to function as LWD (> 20" dbh) in stream channels therefore burning activities would not result in a reduction of pool habitat. Consumption of coarse wood near stream channels greater than 4"dbh would be minimized. The reduction in stocking densities following burning activities would increase the vigor of larger trees in the overstory. Beche et al. (2005) found that prescribed fire did not change the amount or movement of LWD in their study reach relative to unburned streams. They did note, however, that in other less intensely studied reaches snags fell into the stream channel.

Summary

In summary, the risk of sediment from proposed activities reaching streams providing fish habitat is negligible, due to the likelihood that sediment will remain within unit boundaries as described in the Soil Report. In most cases sediment generated from these activities, which has the potential to move off-site during rare large storm events, would be captured in the RHCA buffer.

The effects determination for Alternative 2 is “Not Likely to Adversely Affect” Mid-Columbia steelhead and steelhead Critical Habitat, No Adverse Effect to Chinook salmon Essential Fish Habitat and the effects determination to Forest Service sensitive species is “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” (see Table FI-3).

Cumulative Effects

Continued livestock grazing is unlikely to degrade habitat pathways or indicators at the 5th field HUC level and is unlikely to retard near natural rates of recovery for PACFISH RMO’s at either project, subpopulation or watershed-scale in the Upper John Day River subbasin when management practices, proposed actions, Conservation Measures and monitoring are implemented as proposed. Consequently no cumulative effects on Vance Creek or Canyon Creek are expected to develop from the proposed activities following common run-off events.

Road maintenance activities if performed on a regular basis would help to ensure that culverts are cleaned out and maintained, waterbars and other drainage features are properly constructed and maintained, and would result in reduced levels of fine sediment entering streams within the analysis area. However, at existing funding levels road maintenance is not expected to keep up with all needs. It would be expected that sedimentation from existing roads would increase over time, unless other projects are implemented to address these impacts. Detrimental impacts from the proposed action are not expected to reach fish bearing streams because Forest Plan standards would be met, water quality BMP’s, and other design measures would be in place. Consequently no cumulative effects on Vance Creek or Canyon Creek are expected to develop from the proposed activities following common run-off events.

The Little Canyon Fuels Reduction project is expected to continue on BLM lands on Little Canyon Mountain and fire suppression activities would continue on public and private lands in the analysis area. The effects of fuels reduction within the watershed are likely to reduce the risk of high intensity, stand replacement wildfire.

A related future activity not tied to this proposal, an irrigation dam on private land on Canyon Creek was replaced in 2006 to improve fish passage. Improved fish passage would benefit aquatic TES fish by making it easier for them to migrate to spawning areas and escape warm water areas and move upstream into cooler water refugia. No additional cumulative effects are expected with implementation of the proposed action.

The Canyon Creek Culvert Replacement project (not part of this analysis) would benefit aquatic TES species in Canyon Creek and allow unhindered upstream migration of all life stages of salmonids. Replacement of these culverts would ensure that juvenile salmonids would be able to escape warm water areas and be able to freely migrate upstream to cooler water areas during summer months. Currently, juvenile salmonids are only able to move downstream through the existing culverts, but are not able to migrate back upstream to cool water refugia at these locations. Minor amounts of fine sediment may be generated with the replacement of these culverts, however, because detrimental impacts from the proposed action are not expected to reach fish bearing streams, no cumulative effects on Canyon Creek are expected to develop from the proposed activities following common run-off events.

Of the activities proposed in this alternative, only prescribed burning, pile burning, limited pre-commercial thinning, and certain road maintenance activities could affect sediment input to fish bearing streams. All other activities would occur outside of RHCAs, and associated buffering should be sufficient to trap any mobilized soil resulting from external ground disturbance. Prescribed burning, as described in the direct and indirect effects section, could creep down to streams and remove soil cover and although ground cover would decrease, especially during fall burns, effects from prescribed burning would be minor. Burning would take place so as to avoid decreasing ground cover below LRMP standards, so erosion would not be significant (see Soils report). As a result, the cumulative increase in sediment would be brief and not measurable. Consequently no cumulative effects on Vance Creek or Canyon Creek are expected to develop from the proposed activities following common run-off events.

Consistency With Direction and Regulations (Forest Plan)

Alternative 1 - No Action

Alternative 1 would not be consistent with the following MA 3B and PACFISH standards:

- MA 3B Standard 41: "…Minimize the density of opens roads in this management area by obliterating, revegetating, or closing unnecessary roads or any roads causing significant resource damage."
- PACFISH Standard RF-3c: Determine the influence of each road on RMO's. Meet RMOs and avoid adverse effects on anadromous fish by closing and stabilizing or obliterating, and stabilizing roads not needed for future management activities. Prioritize these actions based on the current and potential damage to listed anadromous fish in priority watersheds, and the ecological value of the riparian resources affected.

Roads that are having known adverse impacts to aquatic resources would remain in their current condition under Alternative 1.

Alternative 2 – Proposed Action

Alternative 2 is consistent with the following applicable MA 3B and PACFISH standards:

- PACFISH RF-2b: Proposed temporary roads and landings are located outside of RHCA's.

- PACFISH RF-3a & b: Roads that will be used for proposed vegetation management activities will have drainage problems repaired and will be brought up to standards prior to haul.
- PACFISH RA-2: Hazard trees felled in RHCA's will be left on site where woody debris objectives are not being met.
- Forest Plan DFC's/RMO's: Activities proposed under Alternative 2 would not retard the attainment of Forest Plan RMO's for aquatic habitat (LWD, replacement LWD, pool frequency, bank stability, width-to-depth ratio, sediment/substrate, shading, and water temperature). Design elements will be used to minimize the amount of fine sediment resulting from proposed activities.
- Design prescribed burn projects and prescriptions to contribute to the attainment of RMO's (PACFISH Standard FM-4).
- Prohibit storage of fuels and other toxicants within RHCA's. Prohibit refueling within RHCA's unless there are no other alternatives. Refueling sites within a RHCA must be approved by the Forest Service and have an approved spill containment plan (PACFISH Standard RA-4).
- Locate water drafting sites to avoid adverse effects to listed anadromous fish and instream flows, and in a manner that does not retard or prevent attainment of RMO's (PACFISH Standard RA-5).
- Design fuel treatment and fire suppression strategies, practices, and actions so as not to prevent attainment of RMO's, and to minimize disturbance of riparian ground cover and vegetation. Strategies should recognize the role of fire in ecosystem function and identify those instances where fire suppression or fuel management actions could perpetuate or be damaging to log-term ecosystem function, listed anadromous fish, or designated critical habitat (PACFISH Standard FM-1).
- [1]PACFISH Standard RF-3c & MA 3B Standard 41: Determine the influence of each road on RMOs. Meet RMOs and avoid adverse effects on anadromous fish by closing and stabilizing or obliterating, and stabilizing roads not needed for future management activities. Prioritize these actions based on the current and potential damage to listed anadromous fish and their designated critical habitat, and the ecological value of the riparian resources affected (PACFISH Standard RF-3c). Roads that are causing resource damage to aquatic habitats are proposed for closing or decommissioning (MA 3B Standard 41).

[1]A roads analysis was conducted in conjunction with this project. It identified roads with erosion problems and other conditions likely to adversely impact aquatic resources. Because the Purpose and Need for this project has been narrowly defined to remove hazardous fuels from the area and manage forest vegetation to reduce the risk of uncharacteristic, severe fire moving from the Forest into private property; the project does not include closing or decommissioning problem roads which were identified in the roads analysis. Road maintenance, commensurate with use, will vary depending on existing road conditions, season of use and other factors

and when accomplished, it would help to ensure that haul roads are kept in an appropriate condition so as to avoid deterioration of conditions and reduce erosion and sediment output from haul roads. Field evaluation shows that some roads currently categorized as closed are no longer closed effectively. Should Alternative 2 be implemented, on completion of the project, any closed roads that are temporarily reopened would be closed effectively - a minor improvement in adherence to these standards.

Endangered Species Act

The Endangered Species Act requires the Forest Service to manage for the recovery of threatened and endangered species and the ecosystems upon which they depend. Forests are required to consult with the USFWS or the NMFS if a proposed activity may affect the population or habitat of a listed species.

The following is a summary of effects determinations for alternatives documented from the Aquatic Biological Evaluation for the Canyon Creek WUI Project (Table FI-3).

Table FI-3 - Threatened, endangered and sensitive (TES) species considered in this analysis of the Canyon Creek WUI project and the effects determination for the No Action and Action alternatives.

Aquatic Species	Status	Alt. 1 No Action	Alt. 2 Proposed Action
Columbia River Bull Trout *Salvelinus confluentus*	T, MIS	NE	NE
Mid-Columbia River Steelhead *Oncorhynchus mykiss*	T, MIS	LAA	NLAA/BE
Mid-Columbia Steelhead Designated Critical Habitat	D	NLAA	NLAA/BE
Chinook Salmon EFH[1]	MS	NAE	NAE
Interior Redband Trout *Oncorhynchus mykiss*	S, MIS	MIIH	MIIH/BI
Westslope Cutthroat Trout *Oncorhynchus clarki lewisi*	S, MIS	MIIH	MIIH/BI
Mid-Columbia River Spring Chinook *Oncorhynchus tshawytscha*	S	MIIH	MIIH/BI
Columbia Spotted Frog *Rana luteiventris*	S, C	MIIH	MIIH/BI
Malheur Mottled Sculpin *Cottus bairdi ssp.*	S	NI	NI

[1]Chinook salmon waters are designated Essential Fish Habitat by the Magnuson-Stevens Act.

See below reference tables for an explanation of the abbreviations used above.

Table FI-4: Federal listing status abbreviations

T	Federally Threatened
S	Sensitive species from Regional Forester's list
C	Candidate species under Endangered Species Act
MIS	Management Indicator Species
D	Designated Critical Habitat
MS	Magnuson-Stevens Act designated Essential Fish Habitat

Table FI-5: Threatened and Endangered Species effects determinations Abbreviations

NE	No Effect
NLAA	May Effect, Not Likely to Adversely Affect
LAA	May Effect, Likely to Adversely Affect
BE	Beneficial Effect

Table FI-6: Sensitive Species determinations Abbreviations

NI	No Impact
MIIH	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
WIFV	Will Impact Individuals or Habitat with a Consequence that the Action May Contribute to a Trend Towards Federal Listing or Cause a Loss of Viability to the Population or Species
BI	Beneficial Impact

Table FI-7: Designated critical Habitat effects determinations Abbreviations

NE	No Effect
LAA	May Effect, Likely to Adversely Affect
NLAA	May Effect, Not Likely to Adversely Affect

Table FI-8: Chinook salmon Essential Fish Habitat effects determinations Abbreviations

NAE	No Adverse Effect
AE	Adverse Effect

Magnuson-Stevens Act

The Magnuson-Stevens Fishery Conservation and Management Act (MSA), as amended by the Sustainable Fisheries Act of 1996 (Public Law 104-267), requires the inclusion of Chinook salmon Essential Fish Habitat (EFH) descriptions in Federal fishery management plans. In addition, the MSA requires Federal agencies to consult with NMFS on activities that may adversely affect EFH.

Recreational Fisheries

Alternative 1 – No Action

Alternative 1 would maintain the current aquatic habitat conditions. The current aquatic habitat conditions are not resulting in reduced recreational fishing opportunities.

Alternative 2 – Proposed Action

Alternative 2 is not likely to impact the quantity, function, sustainable productivity, and distribution of recreational fisheries per Executive Order 12962, Recreational Fisheries.

Irreversible and Irretrievable Commitments

Irreversible effects are not expected. Reduced population viability for steelhead trout, redband trout, Westslope cutthroat trout, spring Chinook salmon, and Columbia spotted frog is not expected. PACFISH established explicit goals and objectives for anadromous fish habitat condition and function. By following PACFISH standards and guidelines as well as design elements specific to this project, it is believed that irretrievable commitment of this resource can be avoided. The goal is to achieve a high level of habitat diversity and complexity through a combination of habitat features.

Botany

Introduction

This biological evaluation describes and displays effects to proposed, endangered, threatened, and sensitive floral species associated with the Canyon Creek Wildland-Urban Interface Project within the Blue Mountain Ranger District of the Malheur National Forest. The analysis and project area for this biological evaluation is indicated on the project area map in Appendix B, Map 1.

Regulatory Framework

The Malheur National Forest Plan (pages IV-32 to IV-33) requires:

- Assess all proposed projects that involve habitat changes or disturbance and have the potential to alter the habitat of threatened, endangered or sensitive plant and animal species.
- Perform biological (field) evaluation for use in planning of proposed projects when sensitive species are present or suspected. Conduct surveys in cooperation with other agencies and groups to document the locations of sensitive species populations and to provide more specific information on habitat requirements and relative management guidelines.

Analysis Methods

To determine which sensitive plant species may be affected by the proposed action, two steps are taken. First, the Forest GIS and sensitive plant database is searched to locate known sensitive plant populations that occur in or near the area of the proposed action. Second, to identify habitats that may harbor sensitive plants, the physical and biological features in the project area are correlated with those in which sensitive plants are known or suspected to occur (Nelson 1985). Specific habitat features for Forest some sensitive plants are described in Sensitive Plants of the Malheur, Ochoco, Umatilla, and Wallowa-Whitman National Forests, (Brooks, et al. 1991), and in site reports of documented species.

Areas of suspected habitat for sensitive plants are identified in pre-field analysis based on aspect, elevation, and ecoclass. A large proportion of potential habitats were surveyed by the controlled intuitive meander method, a survey of the most likely areas and the travel routes walked between high priority sites. All surveys were completed during periods when individual plants could be identified.

Existing Condition

There are no threatened or endangered plant species or associated habitat known to be on the Malheur National Forest. Twenty seven plant species or their habitat are documented or suspected to occur on the forest.

No sensitive plant populations have been documented within the project area, however, potential habitat does exist or is suspected for 15 species on the Malheur National Forest List. Surveys were completed during June and July, 2003 by Nancy Hafer, District Botanist; and Frazier Nichol; Margaret Carey; and Cynthia Kranich, Biological Science Technicians. Surveys were performed within project areas considered to have potential habitat. No sensitive plants were documented within this project area.

These areas include riparian areas on steep slopes in confined drainages, small riparian areas isolated from main animal travel routes, and dry areas that include moderate to steep hillsides and thin soiled or rocky areas. Sparsely forested areas also contain limited potential habitat.

Environmental Consequences

Status of Species, Habitat, and Effects Summary

The following table displays the status of species and habitat within the project area, and effect findings for species suspected or documented on the Blue Mountain Ranger District and are contingent upon implementation of mitigation measures, identified below. The specialist report does not identify any significant impacts or differences between the alternatives.

Table B-1 Sensitive Botanical species

Sensitive Species	Occurrence in Project Area	Habitat Status Within Project Area	Alt 1 (No Action)	Alt 2 (Proposed Action)
Achnatherum hendersonii[1] Henderson's ricegrass	Not Found	Present	MIIH[2]	MIIH
Achnatherum wallowensis Wallowa ricegrass	Not Found	Present	MIIH	MIIH
Astragalus diaphanus var. diurnus South Fork John Day milkvetch	Suspected	Present	MIIH	MIIH
Astragalus tegetarioides Deschutes milkvetch	Not Found	Present	MIIH	MIIH
Botrychium ascendens upswept moonwort	Not Found	Present	MIIH	MIIH

[1] *Achnatherum hendersonii* & *A. wallowensis* are similar species considered under the same common name - Henderson's ricegrass.

[2] MIIH – May impact individuals or habitat but not expected to affect viability.
NI – No impact

Sensitive Species	Occurrence in Project Area	Habitat Status Within Project Area	Alt 1 (No Action)	Alt 2 (Proposed Action)
Botrychium crenulatum crenulate moonwort	Not Found	Present	MIIH	MIIH
Botrychium lanceolatum lance-leaf moonwort	Not Found	Present	MIIH	MIIH
Botrychium minganense Mingan moonwort	Not Found	Present	MIIH	MIIH
Botrychium montanum mountain moonwort	Not Found	Present	MIIH	MIIH
Botrychium pinnatum pinnate moonwort	Not Found	Present	MIIH	MIIH
Calochortus longebarbatus var. peckii long-bearded sego lily	Not Found	Not Present	NI	NI
Camissonia pygmaea dwarf evening primrose	Not Found	Not Present	NI	NI
Carex backii	Not Found	Suspected	MIIH	MIIH
Carex idahoa Idaho sedge (formerly C. parryana)	Not Found	Present	NI	NI
Carex interior inland sedge	Suspected	Present	MIIH	MIIH
Cypripedium fasciculatum clustered lady slipper	Not Found	Not Present	NI	NI
Dermatocarpon luridum silverskin lichen	Not Found	Not Present	NI	NI
Leptogium burnetiae var. hirsutum hairy skin lichen	Not Found	Not Present	NI	NI
Listera borealis northern twayblade	Not Found	Not Present	NI	NI
Lomatium erythrocarpum redfruit desert parsley	Not Found	Not Present	NI	NI
Lomatium ravenii Raven's lomatium	Suspected	Not Present	NI	NI
Luina serpentina colonial luina	Not Found	Not Present	NI	NI
Mimulus evanescens vanishing monkeyflower	Not Found	Not Present	NI	NI
Pellaea bridgesii Bridge's cliff-brake	Not Found	Not Present	NI	NI
Phacelia minutissima least phacelia	Not Found	Suspected	MIIH	MIIH
Pleuropogon oreganus Oregon semaphore grass	Not Found	Not Present	NI	NI
Thelypodium eucosmum arrow-leaved thelypody	Not Found	Suspected	MIIH	MIIH

Effects Common to Both Alternatives

Harsh Site Species (*Achnatherum hendersonii; Achnatherum wallowensis; Astragalus diaphanus var. diurnis; Astragalus tegetarioide, Carex backii*) would not be affected by either alternative since these plants inhabit non-forested or sparsely forested habitat. Increased fire risk from No Action would not increase the risk of damaging such habitat and activities associated with the Proposed Action would not likely occur in these areas.

Cumulative Effects

In the past, road building, yarding, log landing construction, and grazing have probably removed and reduced native vegetation, compacted soils, and altered runoff and moisture retention patterns on some potential habitat.

Effects of Alternative 1 (No Action)

Direct and Indirect Effects

The No Action Alternative would have no direct or indirect effects to undiscovered populations of sensitive plants or potential habitat within riparian or vernal habitats because no ground disturbing activities are proposed that might affect plants or potential habitats. Species include the *Botrychium species, Carex idahoa, Carex interior Phacelia minutissima,* and *Thelypodium eucosmum.*

Cumulative Effects

Because the no action alternative increases vegetation susceptibility to high intensity fire, it may adversely impact riparian species (*Botrychium* and *Carex* species) by affecting habitat: by removing shade, damaging rhizomes, or reducing or temporarily eliminating necessary mycorrhizal associations. In the short or long-term, most sensitive plant species with potential habitat in this planning area benefit from disturbance to establish new and maintain existing populations. Lack of disturbance could reduce the distribution of sensitive plants.

Effects of Alternative 2 (Proposed Action)

Direct and Indirect Effects

Seasonally Moist Habitat

Carex idahoa, *Phacelia minutissima and Thelypodium eucosmum.* The proposed activities could impact individuals or habitat of least Phacelia, but not Idaho sedge. Activities would not contribute to a trend towards federal listing or cause a loss of viability to either species.

> *Carex idahoa* - Because of its habitat, Idaho sedge is not likely to be affected by logging or thinning activities, as long as vehicles and machinery avoid meadows. There is no information about the effects of fire on *Carex idahoa*, but because it grows in the driest associations of meadows, its habitat could be affected. If a fire is low to moderate in severity, the creeping rhizomes will probably survive and sprout after the burn. This sedge's habitat would probably not be negatively affected by prescribed burning. Noxious weeds, knapweeds in particular, can spread rapidly in this species' preferred habitat.

Phacelia minutissima - Timber harvest activities have little effect on least phacelia as long as they avoid wet meadows and riparian habitat. Meadows supporting Veratrum californicum (California false hellebore) should be avoided with vehicles and heavy equipment, even if they dry out late in the season. Prescribed fire is not likely to adversely impact favored habitat. While individual aspen stands might be temporarily altered by fire, the continued presence of spring moisture and the related growth of forbs, shrubs, and hardwoods that can provide the required shade will ensure continuity of habitat. Because the population documented in the upper Camp Creek area has continued to produce new plants after various disturbances, proposed activities would not likely contribute to a trend towards federal listing or cause a loss of viability to the population or species because adaptive management should continue the improved trend in riparian habitat. This may even be a beneficial impact.

Thelypodium eucosmum - The plants ability to seed disturbed ground enables it to tolerate some disruption of its habitat. Increasing competition from exotic plant species may be reducing potential habitat and limiting its abundance.

Riparian Habitat

Botrychium ascenden, Botrychium crenulatum, Botrychium lanceolatum, Botrychium minganense, Botrychium montanum, Botrychium pinnatum, Carex interior. Since no plants have been found within the analysis area, the proposed activities will not impact individuals, may beneficially impact habitat, by providing some degree of disturbance, and will not likely contribute to a trend towards federal listing or cause a loss of viability to the species.

Botrychium species - Ground disturbance, such as soil disruption by logging and yarding activities, would reduce the quality of habitat, and could disrupt needed mycorrhizal connections, and cause direct mechanical damage to above-ground plants during the growing season. Loss of individual above-ground stems, by herbivores, unseasonable frost, or mechanical damage, may not harm plants in the long run, considering that they do not appear above ground every year, and probably rely on nutrients obtained from the mycorrhizal connections to persist.

Along with ground disturbance, changes in moisture availability -such as loss of ground water sources or hydrological changes, are probably the most potentially damaging to moonwort populations. While existing plants may have the capacity to survive droughty periods u their mycorrhizal connections, germination and establishment of new plants require ample moisture.

The effects of fire are not known. Because moonworts are limited to very wet microhabitats in the Blue Mountains, they are unlikely to be directly affected by fire, unless it is severe. However, the death of overstory trees due to burning may remove a necessary mycorrhizal host and impact an entire population, as in those that grow at the edges of meadows around small lodgepole pine. Loss of the shade that many populations favor could also affect long term survival of these species. It is not known what consequences such fire effects might have, or whether an existing population could persist under these circumstances.

Because sites capable of supporting botrychiums are usually classified as riparian, and management activities they should not be affected by harvest activities. For the same reason, prescribed fire is unlikely to damage potential habitat or any plants that may be present. Because the six sensitive species considered here have a broad distribution on the continent, and because more of them are being found each year as intensive surveys are conducted in appropriate habitats, any possible impacts to individuals from this project would not jeopardize the survival of the species as a whole.

Carex interior - Inland sedge grows in very wet habitats that are unlikely to be affected by prescribed fire. If fire did creep into an area where this sedge grows, it would likely only affect the above ground portions of the plant. The rhizomes embedded in wet mud can probably survive all but the most severe fires, allowing the plants to sprout rapidly after a burn. The use of heavy equipment associated with logging and road construction can harm fragile, wet soils on which Carex interior grows. Because of its location in wet areas, its habitat is often protected from mechanical disturbance by Forest Plan standards.

Cumulative Effects

Seasonally Moist Habitat

Carex Idahoa - Historic heavy grazing, including late season use that removed the seed crop may have reduced occurrences of this sedge in NE Oregon. Lowered water tables associated with stream channel degradation, and the loss of beaver created wetlands may have reduced potential habitat.

Phacelia minutissima - Historic heavy grazing and overuse of riparian zones and meadows may have reduced the extent and abundance of least phacelia throughout its range, and may have degraded potential habitat as well. While it can exist in areas of moderate disturbance, its survival on severely impacted soils is in question.

Thelypodium eucosmum - Cattle grazing is the primary threat to *Thelypodium eucosmum* because of its lengthy seed set requirement. Historic overgrazing has probably reduced this species to its current limited occurrences because the plant is so highly palatable. Continued grazing may prevent it from rebounding.Increasing loss of habitat to invading weeds is occurring across the range of this species.

Riparian Habitat

Botrychium species - Loss of undisturbed wet sites capable of supporting botrychiums, whether due to water "developments" for livestock, water uses, or to upstream, upslope hydrologic disturbance can most effectively eliminate potential habitat. The Forest Plan, as amended by PACFISH, should adequately protect potential habitat.

Carex interior - Canopy closure and dense shade from conifers resulting from years of fire suppression may well have reduced potential habitat, and may have caused existing populations to shrink. Heavy domestic livestock grazing and wild ungulate use may have decreased the abundance of this sedge across the landscape. Like other sedges, *Carex interior* remains palatable fairly late in the summer and may become preferred forage when other plants are drying and late season grazing can remove the seed crop, negatively impacting this species' reproduction. Excessive use by ungulates can also harm the fragile, wet soils this sedge inhabits. Water developments such as cattle troughs and ditches for irrigation have decreased wet meadow habitat. Lowered water tables associated with stream channel degradation and loss of beaver wetlands has also reduced wetland habitat that has the potential to support *Carex interior.*

Noxious Weeds

Introduction

The collaborative process raised concerns over the spread of invasive plant species, including noxious weeds. The lands comprising this project on the Malheur National Forest are to be managed to achieve a desired condition as described in the Forest Land and Resource Management Plan (FLMP) and to maintain a healthy ecosystem. Additionally the desired condition requires they are managed so that healthy native plant communities remain diverse and resilient, and damaged ecosystems are being restored.

The Malheur National Forest recognizes and emphasizes the first and most important aspect of noxious weed management is prevention. The most effective strategy against noxious weeds is to prevent them from ever being introduced and established. The primary method to the prevention of noxious weeds is to detect and ameliorate the conditions that cause or favor the presence of competing or unwanted vegetation. Undisturbed or otherwise healthy, vigorous native plant communities are fairly resistant to invasion by weeds. Much of the project area has been actively managed, creating various and many windows of opportunity for noxious weed introduction and establishment. Several noxious weed sites currently exist within or adjacent to the project area.

Once introduced, noxious weeds interfere with achievement of the desired conditions. Therefore, to achieve the desired condition on the land, noxious weeds must be managed. Areas of soil disturbance or plant communities of low health and vigor are more susceptible to weed establishment than areas with healthy, diverse vegetation. Simply killing a weed is an inadequate objective in most situations, especially for large scale infestations. Management must foster a healthy, weed-resistant plant community which consists of a collection of species diverse enough to fill all the niches(Sheley, et, al).

Sometimes considered the “second line of defense” after prevention, early detection and rapid response is a critical component of the Forest’s weed management program. When new weed sites are discovered, a quick response can reduce environmental and economic impacts. With limited resources, effective prevention, detection and rapid response must include education of both administrative personnel, contractors, permittees and the public.

Analysis Methods

Noxious weeds will be discussed based on inventoried and known noxious weed sites that occur in the planning area. Location, site density and size, weed species and characteristics, the potential and rate of spread, along with soil disturbance will be the basis for this analysis.

Regulatory Framework

Site-specific treatment decisions will be based on location, biology and size of the target invasive plant species, site conditions, and integrated resource objectives. Invasive plant treatment projects will be subject to future National Environmental Policy Act (NEPA) and Endangered Species Act (ESA) analysis before being implemented (Invasive Species ROD, 2005).

The Malheur National Forest does not have an approved noxious weed chemical treatment plan. This has limited control to manual and biological treatments. A treatment analysis is currently underway on the Malheur National Forest. With this analysis, the Malheur National Forest hopes to increase the variety of invasive plant control methods available for use, including herbicide application for noxious weed control and management.

For this project, weed risks were evaluated in the planning stage. Risk includes: the spread of existing weed sites, the introduction of new weeds and the transport of weeds from within the project area to new locations.

Existing Condition

Current weed infestations within the Canyon Creek WUI Project area are relatively small in number and size. They are primarily located along roads, old logging units and landings, dispersed recreational sites, rock-pits and other disturbed areas. Twelve Oregon Department of Agriculture and Grant County listed noxious weed species are known to occur within the planning area. They are found in approximately 54 different locations that total approximately eight acres.

The high priority noxious weed species (Grant County “A” Rated) of greatest concern within the Canyon Creek WUI Project area are: Purple Loosestrife, Spotted knapweed, Diffuse Knapweed, Squarrose Knapweed, Houndstongue and St. Johnswort. High priority weeds are considered such because they are invasive, persistent, prolific reproducers and are difficult to eradicate once established. They displace desirable vegetation, but presently occur in infestations at scales which are feasible to treat.

Lower priority weeds (Grant County “B” Rated) known to occur within the planning area are Russian Knapweed, Scotch thistle, Canada Thistle, White Top, Sulfur Cinquefoil, and Dalmatian Toadflax. The “B” rating indicates their present scale of infestation within the county or state is most often unfeasible to treat. In addition, the design measures used to deter the spread and establishment of high priority noxious weeds are effective in the deterrence of lower priority noxious weed species. The present scale of infestations of “B” rated weeds within the Canyon Creek WUI project area is feasible to treat, even with the limited methods the Malheur National Forest has available.

Table NW-1: Known noxious weed occurrence within Canyon Creek WUI Project Area.

Common Name	Acres Within WUI
Canada Thistle	.2
Dalmatian Toadflax	1.3
Diffuse Knapweed	3.6
Houndstongue	.1
Spotted Knapweed	.6
St. Johnswort	.1
Whitetop	.2
Russian Knapweed	.3
Squarerose Knapweed	.1
Purple Loosestrife	.1
Sulfur Cinquefoil	.4
Scotch Thistle	.4
Grand Total	**7.5 ACRES**

(The specialist report contains a more detailed listing, map and classification of these species)

The methods to remove noxious weeds are grubbing or cutting with hand tools/weed eaters, twice during the growing season. Grubbing uses hand tools to cut stems or tap roots below the ground surface (1-2”). Cutting severs heads from the root above the ground level. Both are effective in controlling or slowing the spread of targeted weed species, however may not be effective methods of eradication. Eradication by this method has been successful only on the early stages of infestation. If necessary, some treatment areas are seeded with annual rye or native grass species if available. All weed sites are recorded in a corporate database.

Manual control methods are highly labor intensive and often require repeated treatments within the same or subsequent growing season to be effective. In addition, depending on the site, species, and degree of plant maturity, manual practices may also involve the collection of plant residue by bagging or piling and burning.

Many sites have had various species of biological controls applied to different infestations with varying degrees of success. Individual site records include size of infestation, plant numbers and density, type of treatment implemented, follow-up treatments and effectiveness. Sites monitored since 1989 show that thetreatments have effectively reduced spread or eradicated many of the small sites. Because weed seeds remain viable for many years, monitoring weed sites will be required for several growing seasons, and will determine the extent of follow-up treatments.

A file containing site specific information on all inventoried noxious weed sites is maintained in the Blue Mountain Ranger District Office. All sites have been entered into the Forest TERRA data base and mapped.

Environmental Consequences

Activities Common to All Alternatives

Ongoing Control of Existing Noxious Weeds
Under all alternatives the ongoing noxious weed prevention and treatment activities would continue, along with implementation of the management direction in the Pacific Northwest Region, Preventing and Managing Invasive Plants Final Environmental Impact Statement and Record of Decision. (Some of the standards have a longer phase-in period (see ROD, Appendix 1 for an implementation schedule for each standard). The current noxious weed program involves inventory, monitoring, biological control through the release of approved species specific insect predators, and manual methods through the hand-pulling and clipping of weeds, and use of a gas powered brush cutters.

Alternative 1

Direct and Indirect Effects

Alternative 1 (No Action) provides the lowest level of new disturbance to existing vegetation. In this way Alternative 1 provides the lowest level of risk of new infestation by noxious weeds of the alternatives analyzed. Similarly, "no action", results in the lowest risk of the promotion of the spread and establishment of noxious weeds due to the project disturbance factors. Without disturbance, there would be fewer opportunities for noxious weed introduction and establishment

The direct effects of the No Action alternative also includes the absence of fuels reduction activities and the absence of ground disturbing activities associated with tree harvest or mechanical thinning involved with the Canyon Creek WUI Project. Equipment would not be used in the project area such as road reconstruction and maintenance equipment, tractors for skidding in harvesting systems, logging trucks, feller bunchers, and utility vehicles. Therefore, noxious weed seed would not be transported from existing sites to new sites by these means.

Also with Alternative 1, No Action, fire would not be used as a method to reduce fuels or decrease the potential for high intensity wild fires. There would be no increase in bare soil, no reduction in plant competition or increased light and nutrient levels associated with the use of prescribed fire. The conditions that are favorable for weed species introduction and establishment

Spread of weed seed from the existing sites would be by natural means, as well as spread from normal activities of Forest personnel and varying public uses.

With the No Action Alternative, eliminating ground disturbance resulting from project actions may reduce short term spread and establishment of noxious weeds, maintaining the current vegetative, and watershed condition. However, with no action many of the forested hot-dry and warm-dry biophysical environments will remain outside of the "Historical Range of Variability" (HRV), with overstocked stands that cannot be sustained in the long-term.

Fire exclusion in dry forest ecosystems has led to large catastrophic wildfires, increasing the potential for invasions by weeds and further altering ecosystems. (Harrod, et. al. 2000) These fires result in increased exposure of mineral soil, reduced plant competition, and increased light and nutrient levels-conditions that are favorable to exotic weed species. In addition, fire can reduce or eliminate biological control agents previously released to control invasive species. By creating conditions favorable to rapid expansion of weeds and removing existing barriers wildfires can set the stage for an unprecedented invasion of new weed species and expansion of established weed species. (RMRS-RN-23-7-WWW)

In addition to the direct effect of wildfire on weeds, many fire-suppression related management practices can result in habitat disturbance that promote weed invasion and expansion, as well as increasing the opportunity of new introductions via use of nationwide suppression resources.

Under the No Action alternative present treatment of noxious weeds would continue. This would continue to reduce the risk of subsequent noxious weed invasion

Cumulative Effects

Cumulatively there are a number of activities that occur within the project area which can and do provide a moderate to high probability of the introduction and spread of noxious weed propagules. These reasonably foreseeable future activities include (but are not limited to) motorized and non-motorized recreation, road construction and maintenance, livestock grazing and associated rangeland improvement projects and resource enhancement projects. Although Alternative 1, No Action, removes a disturbance factor which provides a moderate to high risk of noxious weed propagule introduction and spread. it also will not move the project area towards a healthier, resilient, diverse and sustainable ecosystem .

Alternative 2 - Proposed Action

Direct and Indirect Effects

Alternative 2, the proposed action of the Canyon Creek WUI Project is designed to promote a change in species composition and structure to develop healthy, resilient historical vegetation conditions in forested stands while capturing some of the economic value of trees to provide wood products and jobs. The alternative would treat forested stands, using harvest methods to decrease tree density, increase representation of fire-adapted tree species, as well as decrease existing and activity fuel levels. The connected actions of log hauling will require constructing temporary road, and maintaining and reconstructing existing road

Most activities that disturb or create bare soil and increase light levels create favorable conditions for weed introduction, establishment and invasion.

The direct effect of activities in Alternative 2 to the noxious weed situation within the planning area will be creation of bare soil or disturbance of the ground to varying degrees. Ground disturbance will occur under Alternative 2 through use of ground based, sky-line and helicopter harvest methods, temporary road building, road maintenance and reconstruction, and sub-soiling. Ground disturbance creates open seedbeds. Noxious weeds have acquired attributes that allow them to gain a competitive edge over other plants, rapidly invade, establish and dominate disturbed sites. Any operations within the project area that spreads material containing root matter or seeds will spread noxious weeds, i.e. vehicle or equipment travel, road blading or log skidding through invested areas. Likewise, weed seeds or root matter may be transported into the project area on vehicles, equipment, gravel or other material hauled into the project area. This creates the potential for noxious weed introduction of species not currently present in the project area.

Increased travel on roadways may increase the spread of roadside noxious weed sites throughout the planning area, to the planning area from other locations, and from the planning area to areas outside the planning area boundaries. As noxious weeds go to seed in mid to late summer, seed may be picked up by vehicles and transported to new sites where the new sites establish. Many noxious weeds are readily spread by this manner.

Known weed sites have been identified within the planning area, and the locations of their existence in relation to specific sale units.

The sites within the general area of units will either first be treated to reduce the potential for weed dispersal or will be avoided by treatment activities.

Fuels treatment will move the project area towards a healthier, resilient, diverse and sustainable ecosystem. The abundance of noxious weeds remaining in the project area and the impact they have on other resources will depend upon several variables; implementation of prevention and design measures, the effectiveness of these measures, along the treatment options available and their implementation.

Although the action alternative adds a disturbance factor that provides a potential risk of noxious weed establishment and spread, Alternative 1, will also provide a potential for an increased level of recognition and reporting of new noxious weed infestations or expansions. Fuels treatment will move the project area towards a healthier, resilient, diverse and sustainable ecosystem. One that is capable of maintaining healthy native vegetation.

Cumulative Effects

Certain noxious weed populations will almost certainly continue to expand, regardless of the alternative chosen, due to natural increase of existing populations from all the complex ways these species are spread. However, other species that occupy limited area (plus other species that are not yet here) will be managed to the extent possible to stop the spread

Existing noxious weed populations may continue to spread onto adjacent or intermingled private and other agency lands; similarly, populations from other-ownership lands will continue to spread onto the Forest. Both conditions require coordination with country weed and pest offices to manage populations and their effects regardless of land ownership and property boundaries.

Cumulatively there are a number of activities that occur within the Area which can and do provide a moderate to high probability of the introduction and spread of noxious weeds. These reasonably foreseeable future activities include (but are not limited to): domestic livestock grazing, mining, motorized and non-motorized recreation, road construction and maintenance, and resource enhancement projects. As identified in the Range Resources Report for the Canyon Creek WUI Project, the proposed action alternative could increase the level of accessibility and use by domestic livestock (as well as wildlife and recreationists), increasing the transport of weed seeds by these vectors. This increased accessibility could result in cumulative spread of noxious weeds.

Application of the design measures in the planning of all future projects within the area under analysis are expected to substantially reduce noxious weed spread and establishment through vectors controlled and administered by the Forest Service.

Rangeland

Introduction

Livestock grazing is currently authorized through three Term Grazing Permits on five allotments within the Canyon Creek WUI project area. These allotments include: Joaquin, Williams, Fawn Springs, Sugarloaf, and Seneca.

Livestock grazing has been a part of the landscape of the Malheur National Forest since the 1860's, when the first miners and homesteaders entered this area. Although livestock grazing on National Forest System lands has decreased since the early 1900s, the ranching industry remains an important part of the Grant County economy.

Livestock are primarily characterized as grazing animals that preferentially select herbaceous vegetation such as grasses and forbs. With the suppression of fire throughout the project area, woody vegetation has dramatically increased. Densely stocked conifer stands limit water and sunlight availability to the herbaceous understory. As a result, many of the allotments within the project area are not as productive for livestock grazing as they once were. In addition, many areas are now so thick with trees of varying age class that livestock have a difficult time traveling through them, resulting in livestock concentration around remaining open meadows or stream corridors.

Regulatory Framework

Laws, regulations, and policies direct Forest Service rangeland management. The specialist report details the regulatory framework in which rangeland management operates.

Analysis Methods

The analysis area for evaluating rangeland resources is consistent with the project area and has been subdivided following the grazing allotment boundaries to aid in the evaluation process

Rangeland conditions and possible effects of the project were analyzed using information from: forage production estimates, permanent camera points, multiple indicator monitoring, Area 3 Ecologists notes, 2210/2230/2240/2270, 2600 file review, along with the history of the allotments and pastures, past permittee performance & compliance, on the ground knowledge of area, conversations with permittees, professional judgment, team input and literature review. Both positive and negative effects from this proposed project have been examined and are divided into three categories: First, forested understory vegetative conditions. Second, riparian vegetative conditions. Third, rangeland and allotment management including short and long term costs and benefits, additional management demands, displacement of livestock, forage increases/decreases and improved conditions for herd management along with rangeland improvements and infrastructure.

Existing Condition

This section provides an overview of current existing forested and non-forested rangelands, riparian vegetation resources, and upland forested and as they relate to forage availability for domestic livestock grazing, as well as an overview of allotment management within the Canyon Creek WUI Project.

In Area Ecologist Charlie Johnson's notes from the mid 1990s, he characterizes the land within the project area as outside the normal range of variation. He asserts key factors influencing this are based on disturbances that have been either too severe or due to the lack of maintenance disturbance processes. Fire is the element of the ecosystem, which has had the most profound influence on the quality of the plant communities following the intensive grazing period. Where overgrazing was rampant in many parts of the southern Blue Mountains in the first half of the century, the effects of curtailment of fire over time from having its normal cycle of activity in the communities has been pronounced during the past 50 years. He adds the health of the land relates to the incursions by administrative projects to harvest trees. This has been intensive on most areas. The removal of larger trees coupled with removal of fire from the ecosystem has led to promotion of later seral tree species when fire seral tree species were favored in the removal. These plant communities are now far outside the natural range of variation, which effects the overall forest and rangeland health and production. (Charles G. Johnson, Jr; Summary Report for Rangeland Health on Selected Allotments, 6/6/95).

Forested Understory Vegetation Conditions

The presence of livestock grazing in the watershed can be readily observed in both uplands and the riparian zones. Cover types available to livestock use are primarily Forested Uplands (about 84% of area). Forested upland vegetation, especially mixed conifer types, is considered transitional range, where forage production/quality is closely related to canopy cover and varies greatly over time with seral stage and forest management activities. These communities consist mainly of Warm Dry Upland Forest (PAG) with mixed conifer overstories (Douglas fir, grand fir, larch, ponderosa pine) supporting shrub, grass and/or sedge-forb understories. Also present, but less abundant, is Dry Upland Forest (PAG) with ponderosa pine overstory and mainly shrub-bunchgrass understories. Low preference for use of this area by livestock is evidenced at times where forage yields are under-utilized, shading is high from dense canopies (stock prefer open grown forage), slopes are steep or there is more desirable forage elsewhere. Forage available in these forested uplands, depending on site potential, is primarily pinegrass, elk sedge, Ross sedge, western needlegrass, western fescue, Idaho fescue, Junegrass, Wheeler bluegrass, with some shrub use (i.e. bitterbrush, mtn. mahogany, serviceberry) later in the season.

Prior to European-American settlement of this area, fire played a dominant role in shaping the landscape. Current policies of fire suppression have significantly altered the ecosystem. Areas of open park-like stands of ponderosa pine have been converted to dense, overstocked, dead and dying stands of diseased forest which provide little in the way of forage for grazing animals. Conifers have now encroached upon areas that were once open meadows and dry rangeland. Much of the densely stocked forest stands have succumbed to insects, disease and reduced vigor because of over crowding. Where significant tree mortality has occurred, fallen trees often restrict the movement of livestock, thereby further limiting the amount of forage produced and available for domestic livestock.

Understory vegetation in cold forests has probably changed the least of any forest type, since management was initiated. Because of dense canopy cover, understory species tend to be sparsely represented and tolerant of shade. Riparian shrubs are few, except where disturbance has created gaps.

Moist forest supports a more varied and abundant understory that increases wherever light becomes more available. Elk sedge (Carex geyeri) and pinegrass (Calamagrostis rubescens) are widespread, along with a number of forbs. Upland shrubs are noticeably sparse and heavily browsed, with little seed set or vegetative reproduction.

Dry forest has generally sustained more alteration of its understory due to the combination of loss of regular fires, past management practices, and current populations of wild ungulates, therefore is the most changed from its historic condition. Native understory grasses and forbs in dry forest environments are adapted to short fire return intervals, and common species such as pinegrass (Calamagrostis rubescens), Elk sedge (Carex geyeri), blue wildrye (Elymus glaucus), tailcup lupine (Lupinus caudatus), and heartleaf arnica (Arnica cordifolia) are stimulated by low intensity burns, especially where adequate light is available. Canopy gaps and a mosaic pattern of forest openings enhance opportunities for the growth of such species of the forest floor. The alteration of natural fire regimes has resulted in uncharacteristically dense shade from the overstory in areas heavily stocked with climax tree species, with a resulting decrease in grass cover and resultant forage availability.

Since most understory shrubs, both riparian and upland, are early seral, they are also dependent on a mosaic forest pattern and overstory gaps to provide the light-rich environment that they need in order to establish. Most are either dependent on top-kill by fire to remove diseased older stems and stimulate regrowth, or require the scarified substrate created by fire to germinate seed. The alteration of natural disturbance regimes in the last 100 years, combined with use by ungulates, has resulted in degraded shrub communities throughout the analysis area.

Native grass and forb species are still predominant in the dry forest, but in areas have been mixed with exotic species introduced to stabilize soils along roads, skid trails, and landing sites, while enhancing domestic livestock forage. Some of these same disturbed locations now host populations of noxious weeds (see Noxious Weeds Report).

Riparian Vegetation Conditions

The riparian vegetation in the project area ranges from cool moist conifer-dominated and moist meadow communities in the upper stream reaches, to mixed conifer/hardwood types in the middle elevation reaches, to grass/sedge dominated communities in the lower elevation wider valley bottoms. Hardwoods (primarily alder) in these upper reaches are generally limited to areas where there are natural or created openings in the canopy. Mid-elevation reaches currently show the most predominant effects of past management activities; lack of fire, historic harvest, livestock grazing, big game browsing and poor road location. These hardwoods often show reduced vigor due to the effects of excessive browsing pressures and lack of natural disturbances such as fire or beaver.

The riparian zone covers only about 4% of the project area. These highly productive bottoms attract livestock because of the high quality forage production that is available season long, the relatively flat terrain, availability of drinking water, and lower temperatures which can occur in drainages protected from the hot summer sun. Livestock prefer the abundance of feed produced in the riparian areas especially after upland feed sources are mature and cured. Several plant association groups are represented in the riparian zone but occur in small acreages such as willow, alder, cottonwood and a variety of forbs/grasses such as bluegrass, reed canary grass, sedges, and rushes.

Wider valley bottoms lower in the watershed sustain wet meadow grass communities consisting of various sedges and rushes. In some areas, native grass species are largely displaced due to a combination of factors including changes in water table levels roads limit the vegetative production and potential along creeks where roadbeds occupy significant portions of the historic floodplains. Aspen clones occur in isolated small areas of localized high soil moisture, such as riparian zones, ephemerally wet draws, wet meadows, and areas of groundwater seeps. Aspen communities are most commonly found in the mid-elevations around4500-5500 feet above sea level. The current aspen populations are predominantly mature to over mature with little structural or age diversity. The present successional processes have led to diminished patch size and loss of vertical structural diversity. Heavy browsing has exacerbated the stagnant condition of most aspen clones within the Canyon Creek WUI Project area.

Rangeland & Allotment Management

The Canyon Creek Wildland Urban Interface Planning Area is located within the boundaries of 5 active grazing allotments on the Malheur National Forest. Two of these allotments (Joaquin and Williams) have on/off provisions which allow landowners to utilize National Forest System lands in conjunction with their private land. Currently three grazing permittees hold these five ten year Term Grazing Permits. All of these allotments combined are subdivided into 34 pastures and other small holding units. Because the project boundary was not established to correlate with allotment boundaries, they do not exactly coincide and only 24 of the total pastures are located to some extent within the project area. For purposes of management all allotment pastures were included in the following analysis. Pastures within the project area are as follows: the Fawn Springs and Williams On/Off Allotments contain eleven pastures, the Joaquin On/Off Allotment contains three pastures, the Seneca and Sugarloaf Allotments have nine total pastures. All the above mentioned pastures and allotments fall under (USFS) ownership.

Livestock grazing on these allotments is conducted through commercial cow-calf operations and in previous years has included five spring-calving herds. Permitted cattle are cows with calves and bulls. Calving is completed prior to turnout. Season of use is normally summer until early fall, however, the actual turnout dates are set annually depending on weather and current growing conditions. Closing dates are then determined by either the culminations of the permitted season of use or the realization of utilization standards.

The Fawn Springs Allotment has five pastures that are used in a rotation by one herd so that all pastures are used briefly once each season. The Seneca Allotment hasfour pastures and Sugarloaf Allotment has five pastures that are grazed by three different herds.

The Allotments within the project area have been grazed by cattle and horses since the creation of the national Forest, however, the present allotment boundaries were established in 1943. Despite the lack of early records on stocking levels in these allotments, it is thought that grazing levels were well above those recommended for maintaining high ecological conditions of the arid or semi-arid rangelands which exist in this allotment. Moreover, livestock handling techniques of the day would have produced relatively poor livestock distribution and continuous use of selected feed areas, hampering recovery of the overstocked range. This degree of livestock use led to structural improvements including fences, gates, cattleguards, handling facilities, livestock travel routs and exclosures which occurred in the1950's. This served to formally separate the Seneca and Sugarloaf Allotments and to stop unknown amount of drift in to the Coal Pit, Dark Canyon and Sugarloaf Allotments. Further projects such as the development of springs for livestock watering helped to improve distribution of livestock in these allotments. Later specific grazing strategies were developed to assist in the development and restoration of grazed landscapes.

These Allotments are primarily defined by three distinct ecosystem types: the northwest slopes are characterized by steep terrain and densely timbered mixed conifer stands with elk sedge understory. The southeast slopes are characterized by a grassland type ecosystem that contains moderate amounts of Sandberg's bluegrass and Bluebunch wheatgrass with scattered Ponderosa Pine overstory and the drainage bottoms are characterized by Meadow types dominated by Kentucky bluegrass. An analysis of the allotment conducted in the 1980's indicated with a few exceptions that the majority of herbaceous species were in fair to better condition. The major exceptions occurred on the south facing slopes of the East Gulch unit where invasions by cheatgrass, sagebrush, and conifers combined with harsh conditions were resulting in unsatisfactory range recovery. Alterations were also apparent in the conversion of meadow types to Kentucky bluegrass and in the increasing density of conifer species with a corresponding decrease in herbaceous understory. This same analysis indicated that the browse shrubs on the allotment were mosltly in fair to poor condition with the exception of the mixed riparian hardwoods (hawthorne, alder and dogwood) which are considered to have a low relative palatability to livestock. Most shrubs (upland and riparian) were found to be old and decadent with limited reproduction occurring.

The Camp Creek, Swick Creek, and Camp Creek Management units all have similar terrain characterized by riparian areas along with wide stringer meadows and relatively low gradient uplands which are dominated primarily of Idaho fescue and bluebunch wheatgrass in areas of lower density overstories and Pinegrass in areas of higher density overstories. Vance Creek and East Gulch units have steep 60% slopes or greater with very narrow riparian areas, sometimes only about 30 to 90 feet wide, most streams are ephemeral or intermittent and riparian areas are dominated by Kentucky Bluegrass, Mountain Alder, Dogwood, Mixed Coniferous overstories, and herbaceous noxious invaders.

Some photo records lend support to the earlier claim that meadow systems containing bluegrass have become more dominant. Moreover, these systems have an appearance that would indicate Aspen groves are diminishing and failing to regenerate.

Environmental Consequences

Alternative 1 – No Action

Direct and Indirect Effects

No action within the project area would continue to decrease the amount of available forage over time due to the continued encroachment of timber into the rangelands. This will force livestock to concentrate on a continuously shrinking area of suitable rangeland. If more suitable rangeland is not created by future management projects or natural disturbance, the number of permitted livestock (stocking rates) will need to be adjusted to avoid unacceptable environmental effects. This would have a direct negative economic impact on the permittees.

With no action, many of the forested hot-dry and warm-dry biophysical environments will remain outside of the "Historical Range of Variability (HRV), due to overstocked stands that cannot be sustained in the long-term. In absence of fire, forest stand density has increased and vigor has diminished. This diminished health has contributed to more frequent outbreaks of insects and disease epidemics that have further increased the probability of large stand replacing fires (Hall 1980).

Fire exclusion in dry forest ecosystems has led to large catastrophic wildfires, increasing the potential for invasion by weeds and further altering ecosystems. (Harrod, et. al. 2000) These fires result in increased exposure of mineral soil, reduced plant competition, and increased light and nutrient levels-conditions that are favorable to exotic weed species (see Noxious Weed section).

With Alternative 1, structural rangeland improvements and infrastructures along with ecological plots will not be at risk of damage or destruction by management activities and there would be no closures or decommissioning of roads. The current road access to spring developments, salt grounds and fence lines would remain. In the long term, as forest health declines, the abundance of downed logs is likely to present more physical difficulties to livestock grazing operations and decrease access to available forage.

Cumulative Effects

The reasonable and foreseeable future activities in the project area include (but are not limited to) motorized and non-motorized recreation, road construction and maintenance, and resource enhancement projects. Alternative 1, No Action, will not move the project area towards a healthier, resilient, diverse and sustainable ecosystem.

If no action is taken forage quality and production will continue to decline, reducing the quantity of primary, secondary and suitable rangeland over time. There would be a decreased likelihood that the area could be managed in the long term toward open forest conditions, consistent with the historic range of variability. Less forage availability in the upland area would increase use by ungulates (both domestic and wildlife) in more open riparian areas and have potential detrimental impacts to fisheries as well as aquatic resources.

Alternative 2 – Proposed Action

Direct and Indirect Effects

This alternative designed to reduce fire danger, improve tree health and develop vegetation more representative of historic conditions, will provide long-term benefits to the rangeland management program, rangeland resources and the management of livestock. Adjustments to the proposed action have been made to protect government investments, help resolve resource conflicts, lessen disruption to the ongoing rangeland program, and lessen grazing permittee economic concerns.

Factors including: type of treatment and prescription, size of treatment unit, type of landscape/ecosystem to be treated, and seasonal timing of individual components have been evaluate to lessen the potential for negative effects to the grazing allotments and the permittees.

Cutting Treatments (all methods)

Densely shaded stands opened up by thinning or harvest cuts will allow herbaceous forage production of pinegrass, elk sedge and dry site bunchgrasses (Idaho fescue, bluebunch wheatgrass) to increase. Over time palatable shrubs including itterbrush will also increase. An increase in palatable vegetation on National Forest lands may also reduce the amount of pressure wild ungulates place on private agricultural land during parts of the year. Reducing tree density will also improve livestock distribution over the pastures. It may also reduce pressure on riparian zones early in the season, especially if management is used to encourage this action. Livestock management/herding will be improved with more open vegetation since livestock movement is less restricted and stock are much more visible to ranchers. The anticipated flush in livestock forage production could be a positive impact on the rancher (permittee) economic situation, especially if open stands can be maintained over time, as in historic periods, by future forest management.

Potential negative impacts of the various cutting treatments on local ecosystems and the rangeland resources include the following. Meadows, natural grassland openings and previously undisturbed sites, may be impacted if used for piling, landings, temporary access roads and equipment storage. The impacts of these activities have been avoided by requiring avoidance of theses sites. In addition to the death loss of plants impacted by heavy ground disturbance, some sort-term loss of growing space and feed availability to animals will occur where ever heavy slash, thinning debris is pilled. Excessive soil disturbance and soil compaction in treatment units from equipment and logging may delay understory recovery.

Mechanical treatment contracts not coordinated with the livestock grazing schedule can adversely affect the livestock program by adding to the traffic/accident potential, altering stock use areas, and possibly affecting the use of gates/fences. Also, there is a risk of loss or damage to range improvements from project activities that may impact these features. There are a number of harvest and thinning units, which are adjacent to or include fences and create a potential conflict if directionally felled trees break the fence or the fence is cut to skid trees. The more a fence is spliced, the less effective it becomes. This is especially a concern if harvest operations are conducted during the grazing season (these fences need to remain intact from May 1 through November 15, or more specifically when livestock are on either side of the fence, in order to maintain the livestock grazing system). Design elements are in place to avoid or reduce the likelihood of these concerns to become reality.

Prescribed Burning

Landscape-scale fire spread modeling indicates that strategic placement of fuel treatment areas, specifically designed to interrupt primary fire spread pathways, will reduce the size of large fires as opposed to randomly placed fuel treatments or no fuel treatment. Treating as little as 20% of a landscape in this way can have significant results. Also, when fires burn around or through treated areas, the reduction in burn severity can extend beyond the area treated. Treating in a spatially strategic pattern will increase effectiveness in minimizing large fire spread and buy time to complete treatments on additional areas before they burn (Beighley, 2004).

The vegetation of the Blue Mountains is highly adapted to periodic fire in forest, shrubland and grassland ecosystems and fire was once an integral function of the majority of ecosystems in northeast Oregon (Johnson, 1998). A rest period from grazing after prescribed fire is not anticipated as the majority of the area within the burn boundary supports an understory dominated by rhizomotous grass & sedge, such as pinegrass and elk sedge (Psme/Caru, Psme/Cage, Pipo/Caru, Pipo/Cage, Abgr/Caru, Abgr/Cage), which are fire resistant and recovery very quickly after fire. Generally speaking, in these communities, pinegrass and elk sedge increase with disturbance. Also, within the project area are other plant communities with understory vegetation dominated by snowberry or grouse huckleberry. Prescribed fire in these plant communities promotes pinegrass (Caru), ponderosa pine regeneration and bunchgrasses (Agsp, Feid).

Within the grassland and/or bunchgrass dominated understory plant communities (Pipo/Feid, Pipo/Agsp, Juoc/Feid-Agsp) prescribed fire helps provide vitality, stimulates grass vigor, promotes bunchgrasses and controls stocking.

Burning impacts on plant species in this project will vary in response to a variety of conditions such as the weather, season of burning, plant morphology, current plant condition and vigor, accumulated dead leaves, soil moisture and ultimately the fire intensity. Fire intensity is probably the most influencing factor that may effect individual plants and create future voids in ground cover throughout the treatment units. The wide variation in burning intensity across treatment units (unburned to light to moderate) will create wide variability in results and recovery. Very low intensity will have light impact, low death loss (good survival), and stimulating effect on vigor after recovery. More fuel, dryer fuel, and longer burning fuel all produce more heat. More death loss is expected with heavier fuel loading, but less local impact where this fuel is spread (as it occurs or scattered). All understory will succumb under scattered heavy slash and at piles, since fire intensity will be severe, and the result may be a short term loss of all understory cover.

Low intensity burn is expected where fuel loads are mostly herbaceous, and there is very little woody material, less than 1 ton per acre as in open grassland with only light shrub cover. When prescriptions call for broadcast burning of scattered fuels, the burning impacts will be wide spread over the unit, with severe burning intensity creating cover voids but with surviving plants interspersed throughout the unit. Bunched slash and piles burned at landings mean certain death of all understory species, but the impact will be more confined, less wide spread over the unit.

Long term impacts of prescribed burning are anticipated to be positive in terms of moving treatment units towards the historic condition objective and improving both watershed values and production of rangeland resources. Burning “effects” include the release of nutrients which have been tied up in the system so that there is a stimulant (fertilizer affect) on the understory. Recovery of vigor and production in the herbaceous species is quickest for pinegrass and elk sedge, and with low intensity fires, dry site bluebunch wheatgrass and Idaho fescue should be stimulated by the defoliation. However, maintenance of historic-like conditions, long term, will require more follow-up treatment so that shrub recovery may not reach pretreatment levels or dominate understories. Historic conditions on these sites probably did not have heavy shrub cover in many places since fire return intervals probably thinned the shrub cover repeatedly.

Long term effects on rangeland management are positive. Higher forage yields and availability on upland sites may result in more animal unit months (AUMS) to be harvested, held in reserve, or take some pressure off riparian zones by better distributing livestock. Forest stand treatments that open up stands previously not accessible to livestock will redistribute grazing effects in a more uniform scope across the pasture.

Access for livestock and personnel will be much better, livestock visibility and herding will be greatly improved. Long-term maintenance costs may be reduced due to improved access along fences and water sources..

There is a risk of damage to some range improvements if they are not identified in advance and avoided. Fences within or bordering burning units may have fire run through the fence line. Workers may cut and remove fencing for vehicle and worker access. Valuable monitoring study plots (permanent ecological plots, enclosures) may be affected, and special habitats at upland water sources (springs) may be at risk. Design measures provide for protection and/or reconstruction of these structures and monuments. The area ecologist will be notified of any impacts to existing ecological plots or their monuments.

Some areas where the fire is especially hot may need to be rested from livestock grazing. Arrangements will need to be made to provide alternative grazing locations in order to reduce the potential for negative economic impacts to the permittees.

Cumulative Effects

The earliest management activities had the most profound effect on current conditions; many streams with in the planning area were affected by grazing. Logging and road building provided livestock increased access to riparian areas and changed the forested area composition to favor less fire resistant species. Fires suppression has maintained this composition.

Actions taking place within the watershed today include: recreation (hiking, camping, horseback riding, off-road vehicle use, fishing, and hunting), prescribed burning, commercial thinning, grazing and associated range improvements and road maintenance and construction. Past actions in or near the project area include timber management, fuel management, fire suppression, grazing, recreation, firewood cutting, big-game management, and road and facilities construction and maintenance. All activities have influenced the current forest composition and structure, and the management infrastructure of the area. Thus, these activities are still reflected, with individual variance, in the current condition of the area's natural resources and human environmental values

Cumulative effects of past, present and foreseeable projects in association with the proposed action would have a positive effect on transitory range availability and livestock distribution in the affected allotments. Previous harvest and thinning activities have generally had a positive impact on all range resources by reducing the overstory and allowing forage species to thrive. This project would treat forested stands by thinning and burning, which would also increase forage availability, improve livestock distribution, and long-term protection of range improvements. There are no expected negative cumulative effects.

Occasional travel permits on closed roads may be granted to permittees for range improvement maintenance.

Consistency With Direction and Regulations

All alternatives are consistent with Forest wide standards for rangeland resources.

Irreversible/Irretrievable Effects

There are no irreversible and irretrievable commitments of resources that may result from the alternatives with respect to rangeland management.

Recreation

Introduction

This specialist report contains an analysis of existing recreation conditions in the Canyon Wildland Urban Interface (WUI) Project area and an analysis of effects from proposed activities on recreation facilities.

Regulatory Framework

Guidelines from the Malheur National Forest Land and Resource Management Plan 1990 are used to determine the condition of facilities and dispersed campsites. The Strawberry Mountain Wilderness (MA 6A) is to be managed in accordance with values specified in the Wilderness Act of 1964 and the Oregon Wilderness Act of 1984. The wilderness character of the resources will be preserved and protected while providing for recreational, scenic, educational, scientific, and historical uses. More details regarding the regulatory framework for recreation are located within the Specialist Report.

Recreation Opportunity Spectrum

The project area falls within the Roaded Natural class of the Recreation Opportunity Spectrum (ROS). Roaded natural is characterized by predominately natural appearing environment with moderate evidence of sights and sounds of man. Resource modifications and utilization practices are evident by harmonize with the natural environment. Interaction between users may be moderate to high, with evidence of other users prevalent. Motorized use is allowed.

Existing Condition

Strawberry Mountain Wilderness

The Strawberry Mountain Wilderness is located just outside of the project area. There are three trails that access the wilderness that begin in the project area. Concentrations of users are low, with use rising during hunting seasons. There is a high opportunity for exploring and experiencing isolation and solitude within the wilderness. There are no current outfitter/guide permits issued for the Strawberry Mountain Wilderness.

Developed Sites

There is one developed campground within the project area, Wickiup Campground. It has 3 tent/trailer sites, and one group picnic area. The facility has a vault toilet and no potable water. It is used by a variety of recreation users, including hunters and bikers.

The Starr Bowl Winter Sports Area is located on Highway 395, just outside the project area. It offers during the winter months a play area for sledding and tobogganing and provides a hub for snowmobile and cross-country skiing opportunities in the area.

Trailheads

There are 3 trailheads in the project area with connected trails that lead into the Wilderness. They are the Table Mountain, East Fork Canyon Creek, and Joaquin Miller trailheads. There are horse stalls, signs, and other structures at these trailheads. Table Mountain Trailhead is classified as Roaded Natural and Joaquin Miller and East Fork Canyon is classified as Roaded Modified.

Trails

There are opportunities for mountain bike riding within the project area. Starr Ridge #18 bike trail 15 miles long with 12 miles within the project area, and Table Mountain #16 bike loop 4.6 miles long with 2 miles within the project area. The trails are on both open and closed roads that range from paved and graveled to native surface.

Hiker trails within the project area are the Table Mountain trail (1/2 miles), Joaquin Miller trail (1/4 miles), and East Fork Canyon Creek trail (.1 miles). Trail facilities found on or adjacent to trails include wooden bridges, culverts, and retaining structures. The major maintenance problems for the majority of the trails are due to the large amount of dead and dying trees adjacent to the trail system. General maintenance concerns include drainage structures to protect the trail.

Snowmobile Trails

The Geary Snowmobile trail is 2 miles long within the project area; a groomed snowmobile route co-located on the following roads: 3925-196, 3925-987 and 1519. Grooming consists of compacting snow in a 10 to 12 foot wide trail. Grooming is done when the snow is a minimum of one to two feet deep, and it does not remove or side-cast material. Use of these roads during the winter recreational season, is generally December 15th through April 15th (though timing varies with snow conditions).

Dispersed Sites

The analysis area receives low to moderate recreation use, which is spread throughout a six month period starting in late May and running through mid-November. There are approximately 3 established dispersed campsites within the project area. Dispersed campsites offer the recreationist a more primitive camping experience. Fall hunting season use is moderate to high with use distributed throughout archery, deer and elk seasons. Hunter use of the dispersed sited varies depending on number of hunting tags for a unit and the number of “new” hunters in the area.

Off Highway Vehicle Use (OHV)

A portion of the project area is designated as Big Game Winter Range. To protect big game, OHV use is prohibited on all roads between December 1 and April 1, except for designated routes that are compatible with management area emphasis.

Environmental Consequences

Alternative 1 – No Action

Direct and Indirect Effects

Under the no action Alternative there would be no impacts on recreationists and forest recreation settings from restoration activities, and there would be no timber hauling from National Forest lands to conflict with recreational traffic. There would be no change in road miles available for public travel.

Impacts associated with no action are a continued high number of acres at risk from severe disturbances from fire, insect or disease, which may reduce the amount of area suitable for recreation activities, and recreation facilities could be negatively impacted. Hazard trees would still be removed on an annual basis along public roads. No road segments would be closed and there would be no additional non-motorized trail opportunities. There would be no impacts to these areas from timber harvest and post-harvest activities. Scenic quality would continue to decline due to the high stand densities (see Visual Quality section in this Chapter).

Alternative 2 – Proposed Action

Direct and Indirect Effects

Effects to recreation are measured in terms of change in the recreation opportunity spectrum (ROS). There would be no effect on the ROS class for this area. There will be little change from the existing condition.

It is useful to keep in mind that activities vary in importance over time. Therefore, dispersed campsites that are there today may not be in the future. So this data is valid only over an intermediate length of timeframe.

Tree harvest and fuel reduction activities may displace recreationists in the short-term, particularly those who cannot tolerate changes to their traditional recreation setting, therefore would result in some level of changes to the recreation setting. Displacement may be due to physically closing access to areas during vegetation management activities and, indirectly by altering the setting. Harvest and post-harvest activities would have the longest duration effect on use by recreationists, while prescribed burning would only physically prevent recreationists from visiting areas during implementation of the activity. In addition, hauling timber along forest roads may also affect visitors by increasing the perceived hazard of traveling along narrow forest roads with log trucks. Tree harvest and fuel reduction activities that occur during seasons other than summer and fall would impact fewer recreationists.

Removal of hazard trees along haul routes and recreation sites would have a positive effect on both the actual and perceived safety of recreation sites and travel routes.

Changes in road access can change the ability of visitors to access recreation sites. Reopening roads for harvesting, thinning, and fuel treatments open up new areas to vehicle traffic and can temporarily establish areas of new recreation use. These roads are planned for closing after activities are completed so use will again be restricted in the long term. Closing roads (either temporary or long-term) to vehicle use restricts vehicle access, but can result in additional non-motorized trail opportunities (walking, biking and horseback riding).

There may be increased traffic during implementation periods on FS roads 6510, 6510-812, and 1500-651. These roads are the sole access to East Fork Canyon Creek Trailhead, Joaquin Miller Trailhead, and Table Mountain Trailhead, which could increase dust in the trailheads. Road use may create dust clouds that can impair sight distances and impact safety of the traveling public. Other high Recreation use area roads are 1516, 3925, and 3925-196.

The temporary road that is planned for use for log haul at the East Fork Canyon Trailhead will displace some parking and will necessitate more awareness of safety concerns for the recreationist at the existing trailhead for a short term while harvest activities are occurring. This temporary road that leads to a landing north of the existing East Fork Canyon Trailhead is slated for closure after harvest is complete.

An indirect effect from opening dense stands in this project area is the increased ability for people to drive vehicles through the open forest, so there may be an increased risk of off road vehicle use if the forest is easier to drive through.

Noise and visibility of timber harvest and post-sale activities adjacent to the wilderness areas could impact opportunities for solitude and isolation from sights and sounds of humans close to recreation sites. The recreational experiences available may be changed in the short term by logging activities. The possible effects include increased sights and sounds of equipment and people within the planning area during harvest activities for a short period of time.

The recreational experiences may also be changed in the short term by the smoke caused by pile burning at the landings. The possible effects include smoke affecting someone who has trouble breathing and their visibility may be obscured for a short period of time.

Large-scale disturbances from wildfire, insect or disease, can result in broad changes in recreation settings, particularly by altering the aesthetic quality of settings, the quality of riparian habitat that supports fishing, and by reducing the thermal cover from high summer temperatures and exposure (Evers 2000, Omi 1997). Recreationists would also not be able to visit forest areas during wildfire suppression activities. The reduced fire risk would allow more use of the forest in the future.

Since the impacts on scenic quality are expected to be short-term (see the Scenic Resources discussion in this Chapter) and are expected to enhance the scenic quality over the long term (longer than 5 years), it is not expected that recreationists would be displace due to a change in the forest setting. In fact, since driving for pleasure and sightseeing is an important activity in the project area, it is expected that the proposed action would improve the quality of this activity (Scenic Resources effects, this Chapter).

This action would maintain the existing road miles and resulting in no change in the opportunity for the public to drive on forest roads within the project area.

Proposed activity may affect the quality of hunting and fishing in the project area. Changes to the riparian areas are not expected to be very noticeable to recreationists, so setting for fishing may not change in the short-term. Big game hunting is another popular recreation activity in the area, with displacement of deer and elk in the short term a possibility.

Snowmobile activity in this area is a mix of travel on groomed and un-groomed designated trails with the majority of use on groomed trails and minimal recreational activity on other area roads. Proposed road closures or decommissioning will not affect existing designated snowmobile trails in the Canyon Creek WUI Project Area.

Other snowmobile activity is concentrated into open, nearly flat areas and un-timbered hillsides in close proximity to designated snowmobile routes.

Actions under this project are expected to contribute to the increased perceived and actual safety of recreationists from wildfire on the Malheur National Forest.

Strawberry Mountain Wilderness:

There would be no activities within or over the Strawberry Mountain Wilderness. The recreation opportunity spectrum (WROS) class for this area would not be affected.

Helicopter harvest of stands adjacent to the wilderness area may result in indirect, short-term effects on remoteness with the area. Potential effects include increased sights and sounds of helicopter, people, and equipment adjacent to portions of the wilderness boundary during harvest activity, along with other management activities.

With the exception of temporary and short-term displacement of recreationists during the time management activities actually take place, there are no long-term direct, indirect, or cumulative effects to recreation settings or overall opportunities expected from harvest activities adjacent to the Strawberry Mountain Wilderness.

Cumulative Effects

Reasonably foreseeable future activities in the analysis area with a potential to affect recreationists include road closures. Proposed road closures will reduce areas that the visiting public will be able to drive, disperse camp and view scenery. Other foreseeable future activities include commercial and precommercial thinning and fuel treatment for 3 miles along Highway 395 south of Starr Ridge and cutting of trees that have grown up and are obscuring the view from the Dry Soda Lookout. Once stands are treated to reduce the current fuel loads they will be in suitable condition to begin reintroducing fire into blocks of land within the project area.

In areas where vegetation is treated within or immediately adjacent to a dispersed site, trailheads, or facilities recreationists may not use that site again for many years. If recreationists feel that treatment may disperse animals out of traditional hunting areas, they may decide to hunt elsewhere. Other recreationists could feel that hunting success may increase after treatment of the area. Hunting experience may be changed. As ground cover grows, it will provide more forage for big game animals. Hunting may be less desirable until new under-story vegetation is established. Although future recreation use within the project area is difficult to determine, visitation has increased rapidly in the past few years. As the project area changes over time, so may the make-up of visitors and the activities they pursue. Recreationists will have to either adapt to the new situations or seek another area in which to recreate.

Consistency With Direction and Regulations

This proposed project is consistent with Forest Plan direction and regulations. The proposed project will meet Forest Plan Standards for the Recreation (ROS) of roaded natural and roaded modified. Proposed activities are consistent with Forest Plan direction to manage General Forest and Rangeland (MA 1 & 2) to maintain dispersed camping opportunities in a roaded setting and manage these areas for partial retention as roaded natural, and to provide roaded recreation opportunities.

Recreation in MA 3A (Non-Anadromous Riparian) is managed as roaded natural but standards include limiting and distributing recreation use as necessary to protect and/or rehabilitate riparian areas.

Irreversible and Irretrievable Commitments

There are no irreversible and irretrievable commitments associated with the consequences of any of the alternatives analyzed to the recreation resource.

Visual Quality

Introduction

This landscape aesthetics analysis requires an integrated look at the project area and its resources. This integrated analysis defines the desired landscape character. The analysis assessed existing conditions to determine where it is appropriate to maintain the existing condition; or, where change is appropriate, move the conditions of the area toward the desired landscape character. It is not a definitive answer, there are, no doubt, several approaches that would address the fuels and forest health situation and also meet the visual objectives set forth at this time.

Many factors affect the character of the landscape. Landscape attributes such as landform, vegetative pattern and species makeup, water characteristics, and architectural elements, all contribute to the aesthetic character in this area. Desired landscape character, as used in this report, is the combination of attributes that contribute to a positive sustainable experience. This report addresses social, physical and biological elements of the ecosystem in which the project is set. The desires of the people who value this area determine what is desired and the conditions defined by the historical range of variability indicate what is sustainable, or desirable.

The terms scenic stability and scenic integrity are used as general ratings of the existing landscape character. Scenic stability refers to the ability of a landscape to sustain desirable characteristics over time, or how healthy the system is. Scenic integrity is a measure of the degree to which a landscape or proposal deviates from the desired landscape character. It can be used to reference a proposed action, an existing situation, or a desired condition.

Regulatory Framework

The goals, for the sensitivity level 1 corridors identified along the Wilderness Loop and Co. Hwy. 395., as stated in the Malheur National Forest Land and Resource Management Plan, 1990, are to “Manage corridor View sheds with primary consideration given to their scenic quality and the growth of large diameter trees. Visual quality objectives of retention, partial retention, and modification will be applied while providing for other uses and resources.” Forest standards for foreground retention limit the size of created openings to 2 acres, stress the use of uneven aged management, and limit the percentage of foreground area that can be in a created opening at any one time to 10%. The intent is to create stands composed of large overstory ponderosa pine in an open park like setting which features the large trees as well as healthy under story trees.

The Landscape Aesthetics Handbook requires an analysis that considers more than effects that impact natural appearing landscapes. We are directed “to prescribe management which promotes sustainability"(USDA, 1995). We are directed to use an interdisciplinary process that integrates the physical, biological and cultural/social information available to us relative to the ground we manage. It is not the existing landscape against which we base comparisons, but what is ecologically sustainable and desirable.

Constituent Information and Social Ecology

Historical Uses

The current landscape in this area reflects historical patterns of use. The lower elevations have been frequently underburned by naturally ignited fires as well as by Native Americans. This cleared the forest floor of accumulated duff and debris, seedlings and saplings, creating open stands of single stratum large diameter trees of fire resistant species. For the past 80 years or so, fires have been extinguished and kept small over much of the area, resulting in over stocked stands of later seral species, increased levels of susceptibility to insects and disease and higher loadings of potential fuel for wildfire that increases ignition rates and intensifies fire damage.

Timber harvesting increased in the latter half of 1900's as roads and tractor logging made it feasible. Many of the larger ponderosa pine were removed in the early part of the period, leaving behind a scattering of the large trees and allowing ingrowth of smaller fir trees. Later harvest focused on regeneration cutting with clearcuts and commercial thinning. The clear cuts are reforested with trees 5 to 15' tall, but are still quite noticeable on the landscape.

Recreational Uses

The area is used by many people who enjoy a variety of activities. Roads through the planning area provide access to trailheads of three trails into the Strawberry Wilderness. These trails are used for horseback riding and stock packing, hiking, and for access to the wilderness during big game seasons. The project area is also used for mountain biking, snowmobiling, and ATV use. Campers use both developed campsites and participate in dispersed camping throughout the area. Hunting big game animals is the most frequent activity in the area; fishing is also enjoyed. Firewood and Christmas tree cutting; gathering berries, mushrooms, and shed big game horns are additional popular activities. Viewing scenery of many varieties and enjoying the landscape is a part of all of these activities.

Commercial Uses

The area provides range for grazing cattle and horses, timber for lumber and other wood and vegetative products, and minerals. It is used by guides and outfitters during the fall hunting seasons and on a limited basis for horse pack trips.

Analysis Methods

This report addresses the effects to Visual Quality and Landscape Aesthetics of the Canyon Creek Wildland Urban interface proposals. Effects to Visual Quality are measured in terms of whether the alternatives meet the Visual Quality Objectives outlined in the Forest Plan. Effects to Landscape Aesthetics are measured in terms of positive or negative impacts to scenic integrity and scenic stability. Scenic integrity is a measure of the intactness of the landscape. Impacts that introduce negative elements to the landscape reduce the scenic integrity. Impacts that introduce retain or support positive elements of the landscape increase the scenic integrity. These can be direct and indirect effects. In general, activities that reduce the sustainability of natural forest systems decrease scenic stability. Impacts that improve or support sustainability of the forest ecology increase scenic stability.

Existing Condition

Existing Scenic Integrity

Ponderosa pine and western larch stands have a distinctive character that is an open park-like appearance, with a medium to high canopy that allows sunlight to reach the grass/sedge forest floor. This character is a sustainable condition that is perpetuated by frequent low intensity fires. Pockets of cold temperatures and moist conditions were not underburned, which left dense stands of multi stratum Douglas-fir and other fir species. Riparian areas support deciduous species that add diversity in color and form.

Currently this area shows a moderate, obvious level of evidence of past logging practices. Clear cut units located on north facing slopes are obvious but most meet visual quality objectives of maximum modification. All are currently re-stocked, meeting current stocking level guidelines. Older overstory removals, where scattered large trees have been maintained, have left a number of options as future management is considered. The scenic integrity as well as scenic stability have suffered as a result of past fire suppression efforts with resultant fuel loadings and high stocking levels in undesirable species. There are high quality options in meeting visual quality objectives. Foreground and middle ground views from Highway 395 carrying visual quality objectives of retention and partial retention offer good opportunities to meet visual quality objectives and address forest health concerns.

Existing Scenic Stability

Existing scenic stability is an indication of the sustainability of a landscape. A landscape with a low rating would likely be difficult to manage, or maintain over time. The existing scenic stability is determined by considering the current condition of key resources and the current trends that exist.

Currently, there are numerous trends in this planning area that indicate that the scenic stability is in poor condition, or would be rated low. The coniferous forest is generally overstocked, in both ponderosa pine types as well as mixed fir types, with excess ground fuels and ladder fuels. This condition will make it difficult to keep wildfire starts from expanding rapidly and burning intensely. The suppression of fires has resulted in a change in species and structural stage composition. These developmental trends are critical to the scenic stability of this landscape. Scenic stability trends are critical as both they, and the condition of the forest, affect so many other resources. These trends are difficult to maintain.

The scenic stability of this area will be impacted in different ways, depending on what level of treatment is pursued in stands that are outside the historical range of variation. It is generally expected that as an alternative is developed that treats additional acreage in stands outside established historical ranges of variation, it will have some identifiable benefits.

The following chart indicates the need for silvicultural treatment as identified on a stand by stand basis, as well as the amount of each category that is proposed for treatment with the proposed action. For a more in-depth discussion of the current area condition relative to the historical range of variation, review the silvicultural prescription and analysis.

Table VQ-1: Sivicultural Treatment Acres

Silvicultural Treatment	Potential Acres	Proposed Action Acres
Shelterwood	2560	1010
Understory Removal	1800	1000
Commercial Thin BA 50 ft.	3570	3140
Commercial Thin BA 40 ft.	330	10
Pre-commercial Thin to 7”	70	50
Pre-commercial Thin to 9”	2310	1830
Total	**10640**	**7040**

It is not realistic to expect to move the planning area balance of stand types to what would have been historically present within a short period of time. It may never be accomplished. However, it is desirable to move in that direction. From a visual management standpoint, it is desirable to work within ecological frameworks and meet established visual quality objectives. It is desirable to work in conjunction with other resource areas and identify sustainable situations, as well as conditions that lead to a mutually beneficial treatment or even a maintenance of the existing situation.

Desired Condition

Desired Landscape Character

In this planning area the landscape character is largely comprised of natural elements, however there are a few historic elements and facilities associated with developed sites and transportation systems. By considering the comments and concerns of the public, and the biophysical conditions required for sustainability through time, the desired landscape character is determined.

The desired landscape character of this area is a forested environment that is healthy, sustainable, and supports the uses of today's constituents. Recreationists enjoy the open park like character of the large ponderosa pine and larch stands that can be sustained by low intensity prescribed fire. Many enjoy the diversity and escapement cover for wildlife offered by dense, over stocked patches. The historic features of this area are interesting to constituents. Dispersed camping along Canyon Creek and its tributaries is a highly valued experience. Access to the Wilderness areas, hunting and fire woodcutting are also highly valued activities. Hunting is the dominant activity at this time. An environment that can support these activities and meet these expectations is the desired landscape character.

A sustainable environment that provides a mosaic of open, park like stands with pockets of more densely spaced trees to provide cover for game animals, healthy riparian areas, and infrastructure for dispersed camping and vehicular access is the desired landscape character.

Recommendations

Efforts should be made to move the existing condition toward the desired landscape character, one that is sustainable. An improvement in the sustainability of this area will not be accomplished by not treating the stands in this area, or by adopting the No Action Alternative. Efforts need to be made to move conditions towards a balance that can be sustained. Forest stand health needs improvement. Efforts to restore a more fire resilient forest should be considered a high priority for the future of the area's scenic and ecological stability.

The scenic integrity is dependent on the care taken in designing projects to minimize impacts that detract from natural appearing landscapes. If project implementation creates long lasting (10+ years) impacts of large magnitude that detract from a naturally appearing landscape, scenic integrity will be severely degraded. However, to preserve scenic integrity entirely (no action) would be to maintain the unacceptable low scenic stability and to encourage the persistence of the existing high risk of large stand replacement fire and/or epidemics of insect and disease. In the event that the ecological stability is deemed to be low, and treatment is pursued in excess of forest standards in visual corridors, silvicultural prescriptions should reflect a desire to lessen impacts to scenic integrity by maintaining as much diversity on harvested sites as possible. This can be accomplished by retaining healthy ponderosa pine and Douglas-fir.

Environmental Consequences

Alternative 1 - No Action

Direct and Indirect Effects

Visual Quality

The effects of no action to the Visual Quality of the area are minimal. The visual quality objectives would be maintained, continuing a gradual downward trend. The existing landscape character would not be directly altered.

Scenic Stability

The effects to Scenic stability are considerable. The perpetuation of existing trends would negatively impact scenic stability. Many of the stands are currently overstocked and fuel loadings are high. As long as these conditions exist, the potential for epidemics of insects or disease, or large stand replacement fire is high. Without treatment this continues in an increasing trend because the forest landscape has lost its characteristics of sustainability. In the event of widespread fire or insect and disease, many of the desirable elements of landscape character would be lost for an extended period of time. If nothing is done to deal with the forest characteristics associated with over stocking and high fuel loading an unacceptable level of stability will be maintained.

The Malheur National Forest has experienced large replacement type fires in the last decade. On the Blue Mountain RD alone, the Summit Fire burned about 38,000 acres and Flagtail Fire burned about 7,000 acres. Conditions in these areas burned acres that were in similar condition to those found in this area.

Scenic Integrity

The condition of overstocked stands reduces the visual interest by reducing sight distances, restricting light from reaching the forest floor and reducing the variety of color, line and form. These are direct effects to scenic integrity. The desired landscape character of open park-like stands of pine and larch inter woven with pockets of young material is being diminished, therefore reducing the scenic integrity of the area. Implementation of the No Action Alternative would perpetuate this trend. Many of the natural elements of the landscape system are currently being reduced, and show little promise of retuning naturally. The indirect effect to scenic integrity would be greater due to the existing trends that would not be addressed. The scenic integrity would be low to very low in 25+ years. An opportunity to introduce visual variety to a somewhat mundane landscape would be foregone by not pursuing treatment of stands at this time.

Cumulative Effects

The most impressive need in this area is to reintroduce visual and landscape variety to a somewhat mundane landscape before natural forces such as insects, disease or fire change the landscape. Every growing season that passes without change being introduced results in more dead trees, more shade tolerant species becoming established, and more fuel accumulating. By initiating treatment sequences at this time, and not delaying them, we can reduce the impacts of future insect epidemics, and/or fire.

There are about 10,600 acres of ground that have been identified in the area that are in need of silvicultural treatment to return to a balance of types representative of what would historically have developed. Treatment of these stands would improve the scenic stability of the area, especially those in the visual corridors. The no action alternative would continue trends that will make it difficult to meet multiple use objectives. Stocking levels would continue to increase. Disease and insect levels would continue upwards. Fuel levels would increase. The existing visual quality levels would also deteriorate, even though no deviation to the natural landscape are being introduced. A progression towards open park like stands with pockets of younger trees would not be made.

Alternative 2 - Proposed Action

The Proposed Action will require a Forest Plan Amendment to allow shelterwood harvest without the limitations on unit size and to eliminate the requirement to meet partial retention in the foreground and modification in the middle ground along the Wilderness Loop (County Road 65 and Forest Road 15) and Highway 395 visual corridors for this project. There are stands along the two corridors that are in poor shape due to over-stocking, disease and high fuel loadings that are a high fire hazard. These stands would contribute to extreme fire behavior and put other resources as well as lives and personal dwellings at risk in the event of a fire.

Direct and Indirect Effects

Commercial Thinning and Understory Removal

Scenic Integrity

Commercial thinning can be applied in a fashion that creates minimal negative impacts to scenic integrity. This practice could improve the landscape character by opening up the foreground views and allowing more light to the forest floor, which would create a more pleasing visual appearance. The indirect effects would include improved health by reducing competition for those fire resilient tree species that are left, a shifting in size classes as openings are invaded by pioneer species, and improved growth rates in trees left on the site.

Commercial thinning at variable densities and successful introduce of variation introduces desirable change into foreground views. Changes in form, structure and color can result from commercial thinning.

Scenic Sustainability
Commercial thinning would reduce stand densities, and produce more favorable conditions for the ponderosa pine and western larch species. The indirect effects would include lowered risk of stand replacement fire and/or epidemics of insects and disease.

Shelterwood Treatments

Scenic Integrity
Direct effects to scenic integrity could be favorable as the openings created would provide a spatial mosaic of natural appearing patches of varying sizes giving variety to the forested landscape. These openings would not appear as clearcut units on the landscape, and irregular spacing of leave trees could help to soften impacts and blend into adjacent unharvested stands. Negative effects would occur during the implementation of the harvest, and would lessen over time as regeneration occurs.

Scenic Stability
The risk of large stand replacement fire and/or insect and disease epidemics, would be reduced by creating breaks in the forest vegetation, reducing stocking, improving the health of residual trees, as well as creating changes is stand structure. Openings would be favorable to fire resilient early seral species such as ponderosa pine and larch, which provide the large tree open park like character and are fire resistant.

The reduction of tree competition and conversion to fire resilient species would make the forest landscape more sustainable. The openings created would allow ponderosa pine and larch to become established, where fir species were harvested. This would help reduce the risk of stand replacement fire and/or insect or disease epidemics.

Road Construction

Scenic Integrity
People view the issue of roads in very different ways. Many people enjoy and appreciate the access to the area provided by roads. Others desire a roadless experience. From a visual perspective, roads are created lines that are not natural appearing, often with cut and fill slopes that detract from the natural view. These effects will be evident.

Road construction can have a major impact on visual quality. The proposed action calls for approximately 2 miles of new temporary roads. All are outside of areas which would detract from expected visual experiences.

Logging Practices

Scenic Integrity
Associated with silvicultural treatments are the elements of logging practices that can negatively impact the scenic integrity of the area. The evidence of past logging is

evident in this area, there are several regeneration harvest units that have been implemented in the last ten years, and precommercial and commercial thinning have been used throughout. Harvesting in the foreground and middle ground views has been done with mixed success. Some did not meet visual quality objectives. Much, however, has healed over time, and increased growth rates and natural regeneration in shade tolerant species has improved scenery conditions. Visual quality objectives are met with proposals in the proposed action.

Tractor and Skyline Skidding

Scenic Integrity

Tractor skidding will directly impact foreground views. These effects consist of soil, duff and vegetation ground cover disturbance. The impact is not wide spread but will be evident for 1 to 5 years after harvest. Skyline skidding will impact middleground and background views. These effects consist of radial striations from a high point in the landscape where corridors are used to pull trees up slope. Tractor skidding will be evident in some foreground views for 1 to 5 years. Skyline skidding will be evident in middle and background views from 5 to 10 years.

Prescribed fire and associated activities

Prescribed fire often creates a natural mosaic pattern of tree scorch and crown fires. However, there are events that create pockets of torched trees that can impact foreground views if they occur along roads or trails. Hand line and machine line placed to control prescribed fire are very necessary but create a line of disturbed soil and vegetation that detracts from the natural setting. Hand lines will be evident for 1 to 5 years.

Fuel treatments along Highway 395 are expected to consist of hand piling and burning, which will be of short duration impact.

Visual Quality Objectives

The visual quality objectives would not be met by regeneration harvesting in the proposed action in foreground and middle ground units along the Wilderness Loop and Highway 395. The interdisciplinary team considered it to be more important to treat stands that contained high levels of disease and down fuel loading in the Wildland Urban Interface. This will result in a landscape with more diversity of age classes and habitat types, and a higher level of scenic (landscape) stability. The Forest Plan is being amended as part of this process to reflect this decision. In many cases, visual quality objectives and other resource objectives combined to form the design criteria for unit boundaries as well as silvicultural prescriptions.

Cumulative Effects

The most impressive need in this area is to reintroduce visual variety or landscape variety to a somewhat mundane landscape before natural forces such as insects, disease or fire change the landscape. Every growing season that passes without change being introduced results in more dead trees, more shade tolerant species becoming established, and more fuel accumulating. By initiating treatment sequences at this time, and not delaying, we can reduce the impacts of future insect epidemics, and/or fire. By working within the framework of the capabilities of the land in this area, we can maintain a pleasurable viewing experience through time. The scenic integrity would be low in the short term as a result of regeneration harvesting in the foreground and middle ground. However, in the long term, both the ability of the landscape to provide a high quality experience and be managed through time would be enhanced.

Units 140, 246, 180 and 182 in the foreground would exceed acreage limitations in the Forest Plan. Instead of meeting retention, partial retention and modification objectives, units would more closely meet modification and maximum modification objectives.

Units 48, 52 ,62, 90, 152, 166, 176, 178, 200, 202, 218, 228, 504, 582, and 583 in the middle ground would not meet visual quality objectives.

Consistency with Direction and Regulations

The Proposed Action is consistent with the Malheur National Forest Plan, as amended with this project. This project is also consistent with guidelines for scenery management as set forth in the Forest Plan, and the Landscape Aesthetics handbook.

The Forest Plan would be amended to allow treatment of stands that are in poor condition in the Wilderness Loop and Highway 395 visual corridors. Visual quality objectives are being met and the capabilities of the land are being worked with to formulate management alternatives.

Irreversible and Irretrievable Commitments

The project as described will not result in any irreversible or irretrievable effects to the visual resource.

Roads

Introduction

The project area can be accessed from the north and south from US 395. County Road 65 provides access up Canyon Creek from Highway 395 through the private ownerships in the valley bottom, which transitions to Forest Service Road (FSR) 15 near the east end of the project boundary. County Road 65 and FSR 15 are double lane asphalt surfaced roads. The other main access roads in the project area are the 1516, 3920, 3925, 4920 and the 6510 roads, which are Maintenance Level 3 roads, with aggregate surfaces. The road surfaces for Maintenance Level 1 or 2 roads in the project area are typically either improved or native materials.

The road system has also evolved over time. The Forest Service was building roads for fire access starting in about 1925, and much of the area had some access by 1950. The majority of the forest roads in the area were constructed between 1960 and 1995 to support timber-related land management objectives. The main Forest Service roads that access the Canyon Creek WUI project area include all or portions of roads 1500, 1516, 3920, 3925, 4920 and 6510. The majority of the total road miles within the Canyon Creek Watershed are Forest Service roads.

Regulatory Framework

Roads Analysis
A Forest Level Roads Analysis (FLRA) for the Malheur National Forest was completed in December 2004, which addressed the "potential minimum primary transportation system" throughout the Forest, including many of the primary access roads in the project area. The Canyon Creek WUI Roads Analysis was tiered to the FLRA, addressing the local roads in the project area, and intended to inform road related decisions at the local Watershed and Project scale.

An interdisciplinary process involving members of the Blue Mountain Ranger District staff representing various resource areas was used to complete the roads analysis for the Canyon Creek WUI project. The team was charged with analyzing all of the roads in the area and recommending whether to maintain or change their current status (open or closed), and which roads are no longer needed and should be decommissioned.

Forest Plan
The Forest Plan (Chapter IV, Desired Future Conditions) established open road density goals of not exceed 2.2 miles per square mile for winter range, and not exceed 3.2 miles per square mile for summer range by the end of the first decade (1999). The Forest Plan also provided long term goals, stating that access management planning will strive for open road densities not exceeding 1.5 mi/mi^2 on summer range and 1.0 mi/mi^2 on winter range unless those densities do not allow for a healthy and productive

forest as envisioned in the desired future condition, or interferes with access to private land.

Analysis Methods

Road Condition Surveys (RCS) were completed for all roads in the project area during the fall of 2002. The surveys included completing a road log during the field inspection of each road. The RCS road log forms included data on whether the road is currently open or closed, the surface type, erosion concerns, maintenance needs and whether the road should be recommended for decommissioning. Each road in the project was field checked and road logs updated to reflect existing conditions. This information was used to upgrade the GIS data base (INFRA Travel Routes).

In June 2003 Canyon Creek Watershed Analysis was completed for the Canyon Creek Watershed area. This effort included various analyses of existing conditions of roads in the area, including:

- Road related erosion concerns both from the RCS data and from the USFS GIS data coverage.
- Road density in terms of sedimentation concerns and LRMP goals related to big-game management.
- Road maintenance concerns summarized from the RCS road log data.

Assumptions

The Canyon Creek WUI Roads Analysis was done using the following assumptions:

- The need for a basic transportation system will continue to exist.
- Available maintenance dollars are likely to remain static or increase only marginally in the foreseeable future.
- Roads can adversely affect water quality and riparian habitat.
- Poor road conditions can present a hazard to users, and are a liability to the Forest.
- Roads will continue to be used for recreation, administration, fire protection, permit and contract access, special uses, mining, and other traditional uses.

Road Analysis Recommendations

The roads analysis recommended closing 5.7 miles of road that are currently open, and decommissioning 9.1 miles of existing system roads. The Canyon Creek WUI project was prepared and designed using HFRA authorities, which do not authorize decisions or implementation of new road closures or road decommissioning. So the road closure and decommissioning recommendations of the roads analysis will not be implemented with the Canyon Creek WUI project, but could be implemented with future projects and NEPA efforts in the area.

Existing Condition

Within the project area boundaries there are a total of 135.5 miles of National Forest System roads, including 71.2 open road miles and 64.3 closed road miles. Of this total approximately 21.3 miles (16%) are Maintenance Level 3 or 4, 49.9 miles (37%) are Maintenance Level 2, and 64.3 miles (47%) are Maintenance Level 1 (closed to motorized traffic). Maintenance Level 3 and 4 roads receive relatively frequent maintenance with the annual Road Maintenance Plan, while Maintenance Level 2 and 1 roads receive only very minimal maintenance except when maintenance is performed in association with specific projects such as timber sales.

In recent years most of the available funding has been directed towards maintaining the Forest Arterial and Collector roads (Level 3 to 5), which will receive the highest traffic use. The maintenance needs of local roads (Level 1 and 2 roads) are typically deferred, because the funds to maintain the roads to standard are simply unavailable.

Most of the roads in the Canyon Creek project area will need some maintenance done to meet current road maintenance objectives and classification standards.

The road condition surveys revealed a significant number of discrepancies between actual on-the-ground conditions, and the conditions that were recorded and stored the Forest INFRA database. The following changes were made in the INFRA database to reflect the actual current conditions on the ground:

- The following roads were found to be closed on the ground by management devices such as earth berms, pole barricades, or other devices. Their status was changed in INFRA from Maintenance Level 2 (open) to Maintenance Level 1 (closed).

  Roads: 1516355, 1516356, 1516364, 3900706, 3900708, 3900875, 3920796, 4920105, 4920106, 4920310, 6500226, 6500231, 6500238, 6500292, 6510770, 6510810 - Closed at Mile Post 1.11, 6510813, 6510816

- Two roads were changed in INFRA from decommissioned to Maintenance Level 1 roads (closed): 6500247 and 6500355. The existing closures are not effective and the roads still have culverts in them.

- The following roads were found to be naturally closed on the ground by vegetation and trees, and were changed in INFRA from Maintenance Level 2 (open) road to Maintenance Level 1 (closed) road to reflect their current condition:

  Roads: 1516998, 3900898, 3920677, 3925218, 4920096, 4920097, 4920314

- Three roads have been changed in the INFRA database from Maintenance level 1 (closed) to Maintenance Level 2 (open), roads 6500212, 6500331, 6500345.

  Road 6500331 was listed as having a CFR closure on the entire road. The Dry timber sale EA (dated 4-92) shows only part of the road was to be closed. Only one barricade was installed at that time, which has since been destroyed and removed. The CFR closure was recorded incorrectly, and will be dropped from the CFR road listing.

- The following changes to existing road closures were also made:

  Road 3920830: This road closure was implemented with the Fawn timber sale in 1995. A steel gate was installed on the 3920830 road at the junction of the 3920. The steel gate should have been installed on the 3920868 road. The team recommends leaving the steel gate where it is currently located. Roads behind this closure will be shown in the INFRA database as closed.

  Road 6510825: This road closure was implemented with the Fawn timber sale in 1995 as a seasonal closure. The CFR order is shown as a year round closure. The IDT specialist recommend leaving the road as a seasonal closure and to change the CFR order to reflect seasonal closure dates of 12-1 to 4-30. This change will not affect any of the closed roads behind this closure. Wildlife will have responsibility for opening and closing the wood pole barricade for dates specified.

  Road 6510842: This road closure was implemented with the Fawn Timber sale in 1995 as a seasonal closure. The CFR order is shown as a year round closure. The IDT specialists recommended changing the closure from a seasonal to a year round closure. The CFR order number will stay the same, but the seasonal dates will change to year round. This change will not affect any of the closed roads behind this closure.

The following table was prepared after all the changes described previously were completed in the INFRA database.

Table R-1. Current Road Densities and Total Road Miles by Subwatershed:

SUBWATERSHED	Total Miles	Total Area ($Miles^2$)	Total Road Density (Mi/Mi^2)	Open Miles	Closed Miles	Open Road Density (mi/mi2)
East Fork Canyon Ck.	1.33	24.73	0.05	1.33	0.00	0.05
Winter Range	1.3	5.06	0.26	1.33	0.00	0.26
Summer Range	0.00	19.67	0.00	0.00	0.00	0.00
Upper Canyon Creek	125.23	36.38	3.44	86.73	38.50	2.38
Winter Range	30.44	8.83	3.45	16.63	13.81	1.89
Summer Range	94.79	27.55	3.44	70.10	24.69	2.55
Vance Creek	112.98	29.10	3.88	69.92	43.06	2.40
Winter Range	65.36	19.50	3.35	35.55	29.81	1.82
Summer Range	47.62	9.60	4.96	34.37	13.25	3.58
Total	239.54	90.25		170.9	81.56	1.83

Note: Rounding road miles during calculations may result in minor (0.1) mile discrepancies.

The numbers and mileages listed in Table R-1 are compiled using all Forest Service System Roads, Private, and County Roads, in the USFS GIS data. The mileages are based upon USFS GIS lengths for each road segment. All values are calculated based upon total acreages in each sub-watershed, including wilderness areas.

Environmental Consequences

Indirect/Direct Effects common to both alternatives

Neither Alternative would result in any long term change in total road miles, or miles of open or closed roads. Alternative 1 and 2 will not have any positive or negative effect on meeting the Forest Plan goals for open road densities.

Table R1 indicates that minimum standards for open road densities are being met on a sub-watershed basis with the exception of summer range in Vance Creek (3.58 miles per square mile) and winter range in Upper Canyon Creek (2.27 miles per square mile).

Alternative 1 – No Action

Direct and Indirect Effects

Under the No Action alternative, all existing open roads would be left in the same condition they are in now. Motorized access would continue to be provided at existing levels, with no foreseeable funding opportunities to improve overall road conditions, including road surface and drainage maintenance and improvements. The roads would continue to deteriorate over time until and unless other funding opportunities become available.

Alternative 2 – Proposed Action

This alternative would not build any new permanent roads, except for the short road to the John Morris property, nor will it close any presently open roads. Two miles of temporary roads are to be built to access skyline landings and are to be rehabilitated after use. Forty-six miles of currently closed roads will be opened for timber harvest and then would be reclosed. Water for dust abatement may be drawn from Canyon Creek near Wickiup Campground (only on weekdays) or from Vance Creek near the powder house on road 3920 (weeklong).

With this alternative, there would be an opportunity to perform road maintenance on up to 86 miles of forest roads commensurate with any commercial uses associated with project activities. The type of road maintenance activities which may occur on roads used for commercial haul could include:

- Blading and shaping of road surface and ditches
- Construction or reshaping of drain dips or grade sags
- Construction of waterbars/cross ditches
- Spot rocking of road surface
- Brush removal from roadway
- Felling and or removal of hazard trees
- Minor realigning of road junctions
- Cleaning culverts
- Seeding

- Removing excess materials from roadway

Because the maintenance work accomplishments will be commensurate with use, the amount actually accomplished will vary depending on existing road conditions, season of use and other factors. What work is accomplished will provide greater user safety and a reduction in road related sediment delivery to local streams.

Direct/Indirect Effects

This alternative would construct a new permanent road approximately 200 feet in length (0.04 miles) off of Forest Service Road 6500331. The road will access private land and will be posted as a private drive. This road would be administrated by the Forest Service and would be signed with a Forest Service road number. The land owner would be responsible for the construction and the maintenance of the road. This construction does not include cutting of any merchantable timber, but some mahogany trees may need to be cut. This work would allow the landowner to harvest timber and complete other activities on his property to reduce fire hazard.

With this alternative most roads in the planning area would temporarily experience increased levels of traffic and use associated with Canyon Creek WUI project activities. The new constructed road will also experience temporary, short term increased levels of traffic when the landowner treats his property to reduce hazardous fuels. Some currently closed roads will be temporarily opened for use and closed again as activities are completed. Approximately two miles of temporary roads will be constructed and effectively decommissioned after activities are completed. The temporary roads would result in a short term loss of productivity, but those areas would be returned to productivity when the roads are rehabilitated.

Because of the maintenance work that is planned, overall road conditions should have at least a slight upward trend during the project activities and for at least five years afterwards.

Motorized access will continue to be provided at the same level that currently exists once the project activities are complete. This alternative would not close any additional roads, and any closed road that will be used for the project will be closed after the project activities are completed.

Cumulative Effects

Considering the past, ongoing, and planned future activities in the area, and the fact that the action alternative would not result in any changes to motorized access once the project activities are complete, any cumulative effects changes related to the road system are expected to be negligible.

Consistency with Direction and Regulations

Alternative 1 – No Action would not meet the Standards and Guidelines contained in the Forest plan. Alternative 2 - Proposed Action is consistent with Forest Plan direction and regulations, except that there will be no improvement to the open road density.

Irreversible and Irretrievable Commitments

Some roads may require rock on roads for spot rocking in wet areas. This would be an irreversible commitment of the rock resource for road improvements. This material would come from the Starr Ridge Pit on the 4920464 road.

There would be a short-term loss of productivity on the ground where 2 miles of temporary roads would be built, but those areas would be returned to productivity when the roads are rehabilitated.

Economics

Introduction

Although individuals and communities over a wide geographic area use national forest resources, the residents and businesses of counties near the forest depend most heavily on the availability of the resources. Consequently, the effects of forest management on social and economic factors are strongest within these areas. For this reason, the Malheur National Forest primary zone of influence is defined as Grant and Harney counties in Oregon.

Regulatory Framework

The Malheur Forest Plan includes forest-wide management goals to provide a sustained flow of timber, contribute to the social/economic health of communities, and provide an economic return to the public. In addition there are a number of laws and regulations addressing the impact of Federal programs on environmental justice. Additional details on the regulatory framework for economics and environmental justice can be found in the specialists report.

Analysis Methods

The social and economic effects of the proposed management alternative were assessed in terms of viability of harvestable timber, employment supported and income provided. The following sections describe each of these criteria in detail. The effects are summarized in the Environmental Consequences section that follows.

Viability of Harvest

Although the Canyon Creek Wildland Urban Interface project has both a commercial and non-commercial component, harvest viability is only relevant to the commercial component. Therefore, viability of harvest was only analyzed for those units that had a commercial component.

The computer program, TEA_ECON, was used to estimate the sale revenues based upon the estimated tentative advertised bid rates per hundred cubic feet ($/ccf) for the commercial acres of the action alternative. (TEA_ECON: An economic analysis tool that allows the user to perform timber sale accounting at the planning or sale layout level.) The program uses price and cost data and the quarterly updated regional record of timber sale transactions to generate gross timber values, estimated advertised rates, and cash flow estimates.

These bid rates indicated the economic viability of harvesting timber. The estimates of these bid rates were based on the most current estimates of the following:

- Estimated volume per acre - estimated from stand exams and local knowledge of stands. All volume is in hundreds of cubic feet (ccf). An average commercial unit volume was estimated at 5.5 ccf per acre. (see Table E-1)

- Species Composition - estimated at 72 percent ponderosa pine, and 28 percent Douglas-fir for the sale as a whole. (see Table E-1)

- Base Period Price - volume-weighted average bid price of competitively sold timber sales in the previous 4 quarters. This value is updated quarterly.

- Preliminary Value of Timber Removed - based on a weighted average for all sales actually sold within Appraisal Zone 3 (primarily Blue Mountain forests) within the last 12 months.

- Costs - logging systems, log haul, road maintenance, contractual, brush disposal, erosion control, and other development. These costs are shown in Table E-2 and were discounted to present net values at a rate of 4 percent.

Table E-1. Commercial Acreage and Volume Estimates.

Activity	Alternative	
	No Action	Proposed Action
Commercial Unit Area (Acres)	0	5141
Douglas-fir Sawtimber (ccf)	0	8072
Ponderosa Pine Sawtimber (ccf)	0	20562
Other Sawtimber (ccf)	0	0
Total Sawtimber (ccf)	0	28634

Table E-2. Assumed Costs of Commercial Sale

Cost Center	Cost ($/ccf)	Year
Sale Preparation	16	0
Sale Administration	10	1-2
Stump to Truck	222	2
Log Haul	14	2
Road Maintenance	4	2
Brush Disposal and Erosion Control	32	2

An initial tentative advertised sawtimber bid rate ($/ccf) was determined by subtracting the costs associated with logging from the base period prices and adjusted for the quality of the material and current market conditions. This rate was reduced by 10 percent per current appraisal methods (Transaction Evidence Appraisal) to account for competition between bidders. It is important to note that advertised bid rates have fluctuated over the last few years reflecting the volatility of the timber market. Prices would likely change in the future (e.g. when the actual sale appraisal occurs), depending on market conditions at that time. Therefore, these estimates should only be considered rough approximations of future conditions. As a result, calculated bid rates were rounded to the nearest dollar. Timber sale revenues were also discounted to present values at a rate of 4 percent.

Employment and Income

Employment and income effects from the commercial units were derived from multipliers obtained from the IMPLAN (Impact Analysis for Planning) model, and from the forest-level Timber Sale Program Information Reporting System (TSPIRS) analysis in fiscal years 1996 to 1998 (USDA 1998, USDA 2000). Analysis of employment (jobs) and income assumed that all harvesting would occur over the next two years. Employment coefficients were 0.0029 direct jobs per ccf and 0.0018 indirect jobs per ccf. The direct income coefficient was $83.84 per ccf and the indirect and induced income coefficient was $54.12 per ccf.

Job estimates were based on the assumption of a direct relationship between changes in harvest volumes and manufactured output. The model assumed that the price of timber is constant in response to changes in the supply of timber; the mills would not adjust their use of the factors of production (labor and equipment) to increase efficiency as a response to changes in the price or supply of timber; and the mills would not change their output per timber input in response to changes in timber supplies or changes to their mix of labor and equipment. Job estimates included temporary, permanent full-time, and part-time employment. Employment effects from recreation and domestic-livestock grazing activities were not analyzed because only minor or no changes were expected in the level of use for these activities. The estimates provided by this analysis also did not include unpaid family workers or sole proprietors.

Levels of harvest volume by alternative would affect employment and income in several ways:

- directly - (employment associated with harvesting, logging, mills and processing plants for sawtimber, pulp, chips, veneer and plywood)
- indirectly - (industries that supply materials, equipment, and services to these businesses)
- induced - (personal spending by the business owners, employees, and related industries)

Several factors would influence the ability of any one county or community to experience the largest extent of the harvest-related employment and income effects.

The financial viability of the timber sale proposals would influence whether potential purchasers closest to the project area could compete with other purchasers to acquire the majority of the supply. Changes to bid rates would likely occur during appraisal, depending on actual market conditions at that time. Employment projections would depend on other factors such as market conditions, quality and quantity of the volume offered for sale, timing of the offerings, and financial conditions of local firms.

There are no IMPLAN employment multipliers for non-commercial thinning projects, so direct and indirect employment from the thinning of the non-commercial units could not be estimated. However, the cost paid for this work was assumed to go directly into the local economy as direct income. Indirect income was estimated as being in the same proportion to direct income as in a commercial timber sale.

Environmental Justice

Information on local populations was obtained from several reports (Kohrman 2003; United States Census Bureau 2003). The Data regarding minorities or people with disabilities employed in the region in the timber, mining, ranching, road construction, forestry services, and recreation sectors is unavailable.

Economic Efficiency

Economic efficiency is a term used to describe how well inputs are used to achieve outputs when all inputs (activities) and all outputs (including market and non-market) are identified and valued. All costs and all benefits to society are included; amounts of each output are not pre-established but are produced in amounts that maximize net public benefits" (FSH 1909.17, §11.1).

Due to unavailable information, the non-wood outputs from this project could not be valued. Therefore, the economic efficiency of this project was measured by cost effectiveness, as recommended by FSH 1909.17. Cost effectiveness analyses attempt to determine the least costly alternative to produce the desired result. The objective of the cost effectiveness analysis was to show a relative measure of difference between alternatives. Where harvest viability was analyzed for only the commercial units, cost effectiveness was analyzed for all units, together. The analysis focused on identifiable and quantifiable ecosystem benefits and costs for each alternative in terms of the present net value to assess which alternative came nearest to achieving the purpose and need over the largest land area at the least cost. All dollar values were discounted in terms of the present net value (2004 dollars). The real (exclusive of inflation) discount rate used was 4 percent.

The measurement of economic efficiency differs from the measurement of harvest viability in that economic efficiency attempts to put values on the full range of inputs and outputs (both market and non-market) associated with the project, while harvest viability is more an accounting procedure that only considers the costs and revenues of the project as expressed in timber markets.

Present net value is defined as the discounted present benefit value (PVB) of the stream of benefits less the discounted present cost value (PVC) of the schedule of costs.

Discounting is a process whereby the dollar values of costs and benefits that occur at different time periods are adjusted to a common time period to facilitate comparison.

In this project, cost effectiveness was measured in terms of present net value (PNV) per acre or:

PNV/acre = Present Net Costs/acre – Present Net Revenues/acre

Measurable costs and benefits on commercial units were based on costs and revenue from timber volume proposed for harvest and described under the assumptions for harvest viability.

Viability of Harvest – Existing Condition

The viability of harvest is dependent upon the market prices for raw wood fiber and the costs of harvest that are identified in the above Methodology and Assumptions section. Market prices are determined by the supply and demand relationships that exist for wood fiber on a global scale.

Local sawmills that could bid on the sawtimber from this project are located in La Grande, Pilot Rock, Prairie City, and John Day. In addition to local sawmills, three to four large logging contractors usually bid on local timber sales, and if successful, could sell the sawtimber to the same local sawmills.

Viability of Harvest - Environmental Consequences

Alternative 1 – No Action

Direct and Indirect Effects

The No Action alternative would not harvest timber, so would not affect harvest viability.

Alternative 2 – Proposed Action

Direct and Indirect Effects

Commercial harvests show positive value. This indicates the proposed action would produce a viable harvest.

As shown in Table E-3 this alternative would produce revenue, estimated at $2,140,000. Its costs would also be $1,950,000. This would produce an estimated present net value of $190,000 for the commercial component.

Table E-3. Estimated Average Bid Prices and Net Present Value for Commercial Units

	Alternative	
	No Action	**Proposed Action**
Average Bid Price ($/ccf)*	0	$82.41
Discounted Sale Revenues**	0	$2,140,000
Discounted Sale Costs	0	$1,950,000
Present Net Sale Value	0	$190,000

* The average bid price is rounded to the nearest dollar.
* Sale revenues and costs are rounded to the nearest $1,000.

Cumulative Effects

Estimates for tentative advertised sawtimber bid rates for the proposed action are within the range of rates experienced by the three Blue Mountain forests (Malheur, Umatilla, and Wallowa-Whitman) within the last two years (Musgrove, 2004). Because of the competitiveness of the market, and its global nature, the no action alternative or the proposed action alternative would not affect prices, costs, or harvest viability of other present or future timber sales in the economic impact zone. These actions are described in Appendix C.

Existing Condition - Employment and Income

Agriculture, manufacturing (particularly wood products), and food processing are important sources of employment and income in this region. Reliance on timber and forage from federal lands is moderate to high in several counties in the impact zone (Haynes et al. 1997). Many communities in the impact zone are closely tied to the forest in both work activities and recreation. Cattle production and forest products provide the core employment for Grant and Harney counties. Forest Products industries include 3 major lumber mills and numerous logging companies. Wood products employment totaled 530 direct jobs (i.e. mill workers and loggers) and 131 indirect jobs, approximately 8% of the total non-farm employment in Grant and Harney counties (average annual in 2005). Local government, retail trade, and services employ the most people in Grant and Harney counties, (Oregon Employment Department 2003). The area surrounding the project area is rural, and has a disproportionately high unemployment compared with the Oregon state average and the National average. Grant County is in its sixth consecutive year of declining non-farm employment, and "this is quite possible the longest ongoing downturn any local labor market area in Oregon has ever experienced" (Kohrman 2003).

Environmental Consequences – Employment and Income

Alternative 1 - No Action

Direct and Indirect effects:

This alternative would not harvest timber and therefore, would not support direct, indirect, and induced employment, or increased income to local economies. Declining trends in timber harvesting from National Forest lands would continue in the future and contribute to declines in wood products employment over the next two decades. Changes in the economic base and wood products infrastructure for the impact area would also continue to be influenced by fluctuations in market prices, international market conditions, changes in technology, and industry restructuring.

Alternative 2 - Proposed Action

Direct and Indirect Effects:

In general, the primary effect on timber harvest-related employment would occur from commercial harvesting associated with the action alternative over the next two years. Financially viable sales would be necessary to provide opportunities for timber harvest-related employment. Based upon the harvest data and the IMPLAN multipliers provided, small increases in employment would be expected (Table E-4).

Table E-4: Total Economic Benefit

	Alternative	
	No Action	**Proposed Action**
Volume (ccf)	**0**	**28,634**
Employment		
Direct (Jobs)	0	83
Indirect (Jobs)	0	52
Total (Jobs)	**0**	**135**
Income		
Direct ($)	0	$2,400,675
Indirect & Induced ($)	0	$1,549,672
Total ($)	**0**	**$3,950,347**
Employment coefficients are 0.0029 direct jobs per ccf and 0.0018 indirect jobs per ccf. The direct income coefficient is $83.84 per ccf and $54.12 indirect and induced income per ccf Employment Coefficients for non-commercial thinning projects are unavailable.		

Contracts for the noncommercial areas and activities will also provide jobs through contracting; this is not estimated in the employment estimates in Table E-4.

The distribution of economic impacts would depend on the location of the timber purchaser awarded the contracts at the time of the sale, the availability of equipment and skills in the impact area, and the location and availability of the wood processing facilities and related infrastructure. Processors outside of Northeast Oregon could also potentially bid on the sales and distribute the jobs and income effect to other counties in the Blue Mountains or outside of the area entirely.

As Table E-3 shows, the proposed action would generate between $1,549,672 and $3,950,347 in direct, indirect, and induced local income.

Based upon the commercial volume harvested, the proposed action would support approximately 135 jobs over the 2-year period, both direct and indirect, and contribute approximately 25 percent toward the 2005 annual average of 530 jobs of timber-related employment.

Cumulative effects:

The Malheur National Forest Land and Resource Management Plan established an allowable sale quantity (ASQ) for the forest of 38.4 million cubic feet or 211 million board feet (MMBF) average per year. An ASQ is an upper limit for the plan period, not proposals for sale offerings or an assigned target. Actual sale levels, depend on factors such as limitations of modeling, changes in law and regulations, changes in budgets, and site-specific conditions. The Regional Foresters Eastside Forest Plans Amendment 2 (1995) and PAC FISH and INFISH in 1995 are Forest Plan amendments that were developed in response to some of these changing factors. A combination of the factors listed above has resulted in a trend of overall decline in the Malheur National Forest's annual offering of timber volume since the 1990 Forest Plan went in to effect.

The selection of the no action alternative has the potential to continue the decline of timber-related employment in the rural communities of Grant and Harney Counties. Continued declining trends in timber harvesting from the National Forest System (NSF) lands would potentially continue to impact wood products employment and associated indirect employment. Cumulative loss in timber-related jobs could affect the remaining infrastructure and capacity of the local rural communities, and could disrupt the dependent local goods and services industries.

The proposed action alternative would provide some potential short-term economic relief by utilizing commercially thinned sawlogs. This material would potentially be used to support the three saw mills operating in the John Day/Prairie City area. The amount of local economic relief would be determined by whether the purchaser is local or distant, what mills(s) local or distant actually received the logs, and the price for the lumber. These cumulative economic effects could cause beneficial “quality of life” social effects, especially when combined with other ongoing Forest Service Timber sales within Grant and Harney Counties that are providing employment and income. There are foreseeable projects in the two counties in various stages of planning that potentially may add to the Forest's annual timber offerings for 2006 or 2007. For example, the Merit and 16 Road projects on the Prairie City Ranger District, the Crawford project on the Blue Mountain Ranger District, and the Mud, Baked and Dry projects on the Emigrant Creek Ranger District. These ongoing and foreseeable projects are expected to add cumulatively to the employment and income of Grant and Harney counties within the life of the Canyon Creek project.

Based upon the commercial volume harvested, the proposed action would support approximately 135 jobs over the 2-year period, both direct and indirect, and contribute approximately 25 percent toward the 2005 annual average of 530 jobs of timber-related employment.

Existing Condition – Environmental Justice

The population of the area is predominately white, followed by American Indians. The region is sparsely populated, and contains low populations of minorities (5.5% of the Grant County population, 5.4% of Baker County, 9.9% of Harney County (Kohrman 2003; United States Census Bureau 2003). The primary American Indian tribes involved are the Burns Paiute Tribe, Confederated Tribes of the Umatilla Reservation and Confederated Tribes of the Warm Springs Reservation. Some contracts are reserved for award to minority businesses under the USDA Office of Small and Disadvantaged Business Utilization and the Small Business Administration, although overall contract amounts to these groups has declined since 1998 (Kohrman 2003).

Environmental Consequences – Environmental Justice

Alternative 1 - No Action

Direct and Indirect Effects:

The No Action alternative would have no direct impact to minority or low-income populations. However, it would not help provide employment opportunities implementing harvest and thinning activities.

Cumulative Effects:

There will not be any foreseeable cumulative effects from the No Action alternative.

Alternative 2 – Proposed Action

Direct and Indirect Effects

With implementation of the proposed action alternative, there would not be disproportionately high and adverse human health or environmental effects on minority or low-income populations. The actions would occur in a remote area and nearby communities would mainly be affected by economic impacts as related to contractors implementing harvest and thinning activities. Racial and cultural minority groups are often prevalent in the work forces that would implement prescribed fire, tree planting, herbicide application, or thinning activities. Contracts contain clauses that address worker safety.

Effects on civil rights, including those of minorities and women, would be minimal. Activities associated with the action alternative would be governed by Forest Service contracts, which are awarded to qualified purchasers regardless of race, color, sex, religion, etc. Such contracts also contain nondiscrimination requirements. While the activities identified here would create jobs and the timber harvest would provide consumer goods, no quantitative output, lack of output, or timing of output associated with these projects would affect the civil rights, privileges, or status quo of consumers, minority groups, and women.

Cumulative Effects:

There will not be any foreseeable cumulative effects from the Proposed Action alternative.

Existing Condition – Economic Efficiency

Volumes, costs, and revenues from the commercial units were analyzed for cost effectiveness. The derivation of the commercial unit data is described in the Harvest Viability section of this report.

Environmental Consequences – Economic Efficiency

Alternative 1 - No Action

Direct and Indirect Effects:

The public would incur no costs, nor realize any benefits of timber harvest in this area. No Action would yield a present net value of 0 due to the data limitations (described in the “Methodology and Assumptions” section) for quantifying economic benefits and costs beyond those identified at the project level. This value ignores the risks to forest health, vigor, and fire resistance that would increase without implementation of this project, and the resulting losses in timber values and non-market benefits. Data limitations do not allow for the quantification of this risk, however, this risk would negatively affect present net value.

Ongoing costs associated with management of the area, including the continuation of economic losses in stand values from recurring forest health problems, would continue.

Table E-5: Estimated Net Present Value

Proposed Action	
Total Project Area (Acres)	5141
Commercial Harvest Units	
Average Bid Price ($/ccf)	$82.41
Discounted Revenues	$2,140,000
Discounted Costs	$1,950,000
Present Net Value	$190,000
Present Net Value per Acre	$37

Market benefits that could occur as a result of the proposed activities include increases in forest productivity and value for the remaining trees by eliminating competitive stress and reducing the risk of growth-limiting insect attack.

Externalized costs such as those resulting from damage to soils, losses in wildlife habitat, and mobilized sediment in local streams are not well defined or measurable at the project level in terms that provide comparison of assigned dollar values. Refer to other sections on environmental consequences in this EA for a discussion whether these external effects would occur. The other sections of this EA also discuss the non-economic benefits to human and environmental resources for a relative comparison between alternatives.

Cumulative Effects:

The economic efficiency of other past, ongoing, or foreseeable future activities would not affect, and not be affected by any effects not already described.

Alternative 2 – Proposed Action

Direct and Indirect Effects

Table 5 shows the Proposed Action would have a present net value of $190,000 and would have a net value per acre of $37.

This economic analysis assessed the proposed action in terms of harvest viability, local employment and income, and economic efficiency as measured by cost effectiveness. Table 6 summarizes the results of the analysis.

Table E-6: Summary of Economic Measurement Criteria Estimates for All Alternatives

	No Action	Proposed Action
Area Treated (Acres)	0	5141
Commercial Volume (ccf)	0	28,634
Commercial Bid Rates ($/ccf)	0	$82.41
Local Employment* (jobs)	0	135
Local Income	0	$3,950,347
Discounted Revenue	0	$2,140,000
Discounted Costs	0	$1,950,000
Present Net Value	0	$190,000
Present Net Value per Acre	0	$37

Heritage

Introduction

Cultural resources are fragile and irreplaceable resources that chronicle the history of people utilizing the forested environment. Cultural resources include:

- Historic properties, places eligible for inclusion to the National Register of Historic Places (NRHP) by virtue of their historic, archaeological, architectural, engineering, or cultural significance. Buildings, structures, sites, and non-portable objects (e.g., signs, heavy equipment) may be considered historic properties. Traditional Cultural Properties (TCPs), localities that are considered significant in light of the role it plays in a community's historically rooted beliefs, customs, and practices (Parker and King, 1998), are also considered historic properties. Historic properties are subject to the National Historic Preservation Act's Section 106 review process.
- American Indian sacred sites that are located on federal lands. These may or may not be historic properties.
- Sites of cultural use of the natural environment (e.g., subsistence use of plants or animals), which must be considered under NEPA.

Regulatory Framework

The legal framework that mandates the Forest to consider the effects of its actions on cultural resources is wide-ranging. In this case, Section 106 of the National Historic Preservation Act (NHPA) of 1966 (amended in 1976, 1980, and 1992) is the foremost legislation that governs the treatment of cultural resources during project planning and implementation. Federal regulations such as 36 CFR 800 (Protection of Historic Properties), 36 CFR 63 (Determination of Eligibility to the National Register of Historic Places), 36 CFR 296 (Protection of Archaeological Resources) and Forest Service Manual 2360 (FSM 2360) clarify and expand upon the NHPA.

The National Environmental Policy Act (NEPA) of 1969 is also a cultural resource management directive as it calls for agencies to analyze the effects of their actions on sociocultural elements of the environment. Laws such as the National Forest Management Act (NFMA) of 1976, the Archaeological Resources Protection Act (ARPA) of 1979, the Native American Graves Protection and Repatriation Act (NAGPRA) of 1990, Executive Order 13007 (Indian Sacred Sites) Executive Order 13084 (Consultation and Coordination with Indian Tribal Governments), also guide Forest Service decision-making as it relates to Heritage. The American Indian Religious Freedom Act (AIRFA) of 1978 requires that federal agencies consider the impacts of their projects on the free exercise of traditional Indian religions. Executive Order 13175 (EO 13175), Consultation and Coordination with Indian Tribal Governments, November 6, 2000, directs federal agencies to engage in regular and meaningful consultation and collaboration with tribal officials in the development of federal policies that have tribal implications and to strengthen the United States government-to-government relationship with Indian tribes.

The Malheur National Forest Land and Resource Management Plan and the Malheur Forest National Forest Cultural Resource Inventory Plan (Thomas 1991) have been developed to tier to the previously mentioned laws and corresponding Forest Service manual direction as it sets forth resource management goals, objectives, and standards. Forest-wide management standards that are pertinent for this cultural resource effects analysis include:

Analysis Methods

Previous archaeological research in the Canyon Creek WUI Project Area and vicinity has largely been restricted to heritage resource surveys and small-scale test excavations conducted by personnel affiliated with or under contract to the Malheur National Forest. Most of these surveys were limited to timber sale activities.

A new cultural resource survey was conducted on National Forest lands associated with the project area and the full results are found in Heritage Research Associates Report No. 276, "Canyon Creek Wildland Urban Interface Cultural Resource Inventory Survey" (Musil 2004). The Canyon Creek WUI Cultural Resource Inventory Survey was conducted in the fall of 2003 as part of a treatment process for identifying and protecting cultural resources within the Canyon Creek WUI Project area. A total of 1,792 acres was surveyed. Prior to the 2004 cultural resource survey, 64 sites within the project area were on record. As a result of the latest survey, ten additional sites have been recorded; all were lithic scatters. In addition, six new isolated finds (not managed and not eligible for the National Register) and 41 of the previously recorded sites were revisited. The eligibility of the ten new sites for nomination to the National Register has not been determined at this time. The entire Canyon Creek Wildland Urban Interface project area has now been surveyed to today's standards (Thomas 1991) for cultural resources.

Existing Condition

There are extensive fragile and nonrenewable cultural resources located on the Malheur National Forest. These include prehistoric sites representing American Indian activities up until the time of European contact and influence; protohistoric sites representing unrecorded Indian activity after the influence of European contact; and historic remains of European and American settlement and exploration. The project area has many cultural resource sites representative of those found throughout the forest.

Ethnographic and Historical Background

The archaeological record suggests that hunter-gatherer land-use practices in the Blue Mountains generally intensified as populations and competition for available resources increased on the Southern Columbia Plateau over time (USDA Forest Service 2003).

At the end of the Pleistocene, land use in the Canyon Creek area was probably ephemeral with hunter-gatherers foraging for a broad spectrum of resources over extensive ranges. As the climate became more arid in the mid-Holocene and low-land habitats became degraded, hunter-gatherers from the Great Basin and Columbia Plateau started using the Blue Mountains and exploiting resources in the Canyon Creek area. Most of the interior Pacific Northwest experienced its peak prehistoric population density at about 2,500 B.P. Complex pit houses were being established on the lower John Day River, the Deschutes River, and in lakeside environments within Harney Basin (USDA Forest Service 2003).

During the ethnographic period, the primary occupants of the watershed were the Northern Paiute who wintered near Canyon City; although tribes from the Columbia Plateau such as the Umatilla, Tenino, Cayuse, Walla Walla, and Nez Perce also periodically visited the area. The Northern Paiute were semi-nomadic hunter-gatherers. The band associated with the Canyon Creek Watershed is known as the Hunipuitöka, named for the huni'bui root found in their territory (Blyth 1938:403). Very little information is available on the Hunipuitöka. Most of our knowledge of Northern Paiute life in this region comes from data gathered on the neighboring Wadatöka (Couture 1978; Couture et al. 1986; Whiting 1950**).**

Between 1826 and 1831 there were several European-sponsored forays made into the Upper John Day River subbasin. Led by Peter Skene Ogden and John Work of the Hudson's Bay Company, trapping brigades trapped beaver and river otter throughout the Blue Mountains. Ethnographic data suggests that John Work traveled north through the Canyon Creek watershed in July of 1831 as his party trapped their way from the Silvies River to the John Day River.

The Canyon Creek watershed witnessed the familiar phases of boom and bust mining activities that were recurrent throughout the West. At the point of discovery in 1862, mining focused on excavating and washing the alluvial gravels of Canyon Creek. Soon after, prospectors, suppliers, and camp followers rushed to the area, and the mining camp on Canyon Creek grew to a population of nearly 5,000 people. "Mining and miners provided a market for many services and goods, and merchants, farmers and stock raisers were drawn to the mining area. Settlement of northeast Oregon ...during the 1860s came primarily from the west and the Willamette Valley. Early wagon roads were constructed ...linking settlements and markets around the region" (Ayres et al. 1978:45).

The discovery of gold in Canyon Creek also stimulated the building of roads throughout the region. The Dalles Military Road was constructed in 1867, and it connected the city of The Dalles with Fort Boise via Canyon City. Prior to the construction of the Dalles Military Road, the town of Canyon City was established and served as a central supply hub for miners and mining operations located throughout the watershed and all of Grant County (Mosgrove 1980).

Overall regionally there was a slight increase in settlement with more ranches in outlying areas being established. The population relied mainly on livestock grazing and timber. In 1906 Theodore Roosevelt established the Blue Mountain Forest Reserve to manage the resources in the forests of Canyon Creek and the entire Blue Mountain region. In 1908 the Malheur National Forest was created. Afterwards the US Forest Service became an increasingly important aspect of the local economy (Mosgrove 1980).

The emphasis on fire suppression increased in the 1930s and was a primary mission of the Forest Service by the time the Civilian Conservation Corps (CCC) was established in 1933. A camp of 150 enrollees was established in 1937 in Canyon Creek at the confluence of Vance Creek and Canyon Creek. The CCC began development of National Forest Service lands by constructing roads, fences, lookout towers, corrals, signs, markers, and trails (Mosgrove 1980). In the Canyon Creek watershed, the CCC constructed the Fall Mountain Lookout Tower, Wickiup Campground, and several roads.

Another important development of the early 20th century was logging and lumber production, which became a central focus of the local economy. After reaching a high level in the 1980’s and early 1990’s, the amount of timber cut on the National Forests has been decreasing.

Prehistoric Cultural Resources

The most frequently encountered prehistoric archaeological resources in the Canyon Creek project area are scatters of lithic remains that are distributed in variable densities and are related to occupations of hunter-gatherers that span several thousand years. Obsidian and cryptocrystalline silicate (chert, flint) materials are both commonly present within archaeological assemblages. These lithic scatters are generally of limited area (less than 5 acres), and several display potential for buried archaeological deposits. Before the most recent cultural resource survey (Musil 2004) there were 57 known prehistoric or combination prehistoric/historic sites recorded in the project area. Ten additional prehistoric (lithic scatter) sites were recorded during the inventory survey completed for this project (Musil 2004.)

Over the course of the last century, many of the recorded sites have been impacted by a variety of land management activities. According to previous site records, combined affects of timber harvest, livestock grazing, and road construction have resulted in moderate to major impacts to several of the known sites.

There is one known basalt quarry within the project area where material was gathered for tool-making purposes. It is believed that most, if not all, obsidian material was transported from nearby sources outside the project area. There are no known burial sites or house pit locations.

Tribal Interests/Rights

Presently, there are no specific places within the project area's affected environment that have been determined to be important for traditional American Indian land uses. The Burns Paiute have, however, expressed a concern regarding the population and distribution of culturally important plant species on all parts of the forest during previous consultation. Stream bottoms along Canyon Creek and Vance Creek and their tributaries provide habitat suitable for hardwood shrubs of interest to the tribe; those are *Prunus virginiana* (chokecherry), *Salix* spp. (willow), and *Populus tremuloides* (quaking aspenAnything specific to this allotment and upland vegetation

Historic Archaeological Resources

Historic archaeological resources may include foundations or structural ruins, or features such as privy pits, trash dumps, and blazed trees. Sites with historic archaeological components in the planning area are believed to be associated with Depression-era livestock grazing activities, mining, and early Forest Service land management. Site constituents for this type of deposit typically include scatters of solder-sealed tin cans, tobacco tins, bottle glass, nails, and miscellaneous fragments of tin and iron hardware that are greater than 50 years of age.

According to Blue Mountain Ranger District Heritage Program files, seven eligible or potentially eligible historic sites or sites with both prehistoric and historic components in the project area have been recorded. The condition of the archaeological record of the historic period is extremely poor. Resources that were deposited by cultural occupation since the middle of the 19th century are almost always situated at or very near to the surface of the ground and are more vulnerable to surface disturbances such as trampling, burning, and artifact collecting. Some sites have been altered by timber harvest, livestock grazing, road construction, recreation, and fire-related impacts.

Environmental Consequences

Introduction

This section of the report consists of a non-quantitative analysis of the direct, indirect, and cumulative effects of commercial and pre-commercial timber harvest, post-harvest treatments, and road management elements of the project on cultural properties and resources in the project area.

A project is considered to have an adverse effect on cultural properties when it results in the alternation of characteristics that qualify the property for the National Register of Historic Places. The cultural properties that have been identified within the Canyon

Creek WUI Project area are eligible or potentially eligible (unevaluated) for the NRHP on the bases of their ability to yield scientific information that is important to studies of prehistory or history. Therefore, proposed activities that modify the patterning of surface or buried archaeological deposits are considered to result in an adverse effect. Project effects that enhance site stability and the potential effects of a no action alternative are also discussed.

Alternative 1 – No Action

Direct and Indirect Effects

If the no action alternative is pursued, there will be no direct effect on the existing condition of the cultural resources identified within the Canyon Creek Project area. Forest stands and habitats within and surrounding significant historic properties and areas are potentially important for traditional use by regional tribes and would remain in their existing conditions. However, cultural properties within the Canyon Creek area and in adjacent areas would continue to be in jeopardy of damage or destruction by wildfire under the no action alternative. Wildfires burning through historic sites can destroy wooden structures and other wooden features, melt glass artifacts and cause additional heat damage to other classes of historic artifacts and features. Additionally, wildfires that exceed 300 degrees Celsius can damage obsidian hydration layers (Solomon 2000, Buenger 2003).

Cumulative Effects

Current fuel conditions are partially a result of past human caused cumulative effects such as those listed in Appendix C. The No Action Alternative would not reduce fuel loads across the landscape within the Canyon Creek project area and not incrementally reduce risks that the resource will experience future sever wildfire events. The threat of severe or moderately-severe wildfire will not contribute to the long-term stability of heritage sites. Therefore, the No Action Alternative may result in a detrimental cumulative effect to heritage resources.

Alternative 2 – Proposed Action

Direct and Indirect Effects

Because ground based logging activities and to a lesser extent, helicopter logging, can be detrimental to all site types, all NRHP eligible or potentially eligible cultural sites will be avoided/protected from all commercial harvest activities. Therefore, timber harvest activities will have no direct effect on any archaeological or historic resources in the Canyon Creek WUI Project area as long as the project design elements are observed.

The pre-commercial and commercial thinning, shelter wood harvest and under story removal proposed under this alternative will reduce the chance of wildfire, and therefore will indirectly have a positive effect by protecting heritage sites from potential damage. In a similar fashion, the proposed prescribed burning, at temperatures and duration that will not impact lithic scatter sites, will reduce the potential for wildfires that may burn hot (>300 degrees C.) and for a sufficient duration to damage obsidian lithic materials.

Many of the cultural resource properties within the analysis area are lithic oriented prehistoric sites. Studies have shown that fire exceeding 300 degrees Celsius can damage obsidian hydration layers (Buenger 2003, Solomon 2000). Under the terms of the Management Strategy for the Treatment of Lithic Scatter Sites (Keyser et al. 1988), the deployment of low intensity prescribed fire (less than 300 degrees C.) within the established perimeter of lithic scatter sites will have negligible to minimal effects on the scientific or scholarly values that such sites hold.

Another activity associated with prescribed burning is the construction of fire handlines. Since this activity can have a direct affect on heritage sites by destroying the artifacts or features and/or changing their context, no fire handlines will be constructed through NRHP eligible or potentially eligible cultural sites.

Since concentrated fuels can reach high temperatures, and in turn, affect the integrity of lithic scatter sites, the project design elements do not permit the burning of concentrations of fuels, such has hand piles and burning or grapple piling and burning, within the boundaries of known lithic oriented archaeological properties.

Historic sites that include fire sensitive aboveground features such as architecture, wooden structural remains, and glass and metallic artifacts would be protected through project design criteria. Any eligible or potentially eligible historic sites located within the prescribed burn areas will be protected during any burning activities through avoidance or application of fire retardant.

The lithic scatter archaeological sites that have been identified in the project area could be directly impacted by reforestation measures that are conducted in their vicinity under this proposal. The proposed action would reforest a shelter wood harvest area by planting conifer tree seedlings on 1,010 acres.

Activities associated with the construction of temporary roads and landings, as well as road closing or decommissioning can also degrade the integrity of archaeological sites. The action alternative would construct approximately two miles of temporary road to access skyline landings, allow a landowner to construct about 200 feet of road to access private property, and construct about 250 tractor landings and 42 helicopter landings (each is about 100 ft. by 100 ft. in size).

Cumulative Effects

Previous timber harvest projects, prescribed fire, wildfires and associated suppression activities, mining, livestock grazing, Forest road construction, and fence construction have had incremental negative effects on the cultural properties that have been identified within the Canyon Creek WUI Project area. With the implementation of the project design elements for heritage resources, there is minimal risk of additional incremental degradation of the cultural properties associated with the proposed action for this project.

Ground-based logging systems can present some risks to archaeological resources. Since site identification efforts were limited to surface surveys, it is possible that site boundaries may no be delineated with complete accuracy and that efforts to avoid sites during the timber harvest activities may not be entirely successful. It is likewise possible that undocumented archaeological resources in buried contexts may be inadvertently disturbed. Mechanical damage of the archaeological record is irreversible and permanent in duration. This risk is also cumulative, in that it increases in relation to the amount of ground based logging activities conducted in the area.

The proposed action reduces fuel conditions across the landscape within the Heritage resource area to some extent, and incrementally reduces the risk that the resource will experience future severe wildfire events. Actions reducing the likelihood of a severe or moderately-severe wildfire will contribute to the long-term stability of cultural properties in the project area. The risks of fire-sensitive historic properties sustaining serious damage or destruction from wildfires will diminish as stands move toward a more fire-tolerant composition of species.

Pre-commercial thinning, commercial harvest and prescribed burning can improve ground visibility considerably. Given the practice of dispersed recreation, improved ground visibility in the project area can make artifacts within sites more visible to members of the general public. The greater visibility of these artifacts makes them more subject to illegal collection which can be a cumulative negative affect to the integrity of the sites.

Consistency With Direction and Regulations

Heritage and Tribal interests are regulated by federal laws that direct and guide the Forest Service in identifying, evaluating and protecting heritage resources. The proposed action would comply with federal laws. The Malheur National Forest Plan tiers to these laws, therefore the proposed action will meet Forest Plan standards. With the completion of the Heritage inventory under the terms of the 2004 PMOA and by providing the interdisciplinary team with appropriate input as per NEPA, all relevant laws and regulations have been met.

Irreversible and Irretrievable Commitments

There are no irreversible and irretrievable commitments of resources that may result from the proposed action with respect to cultural resources

Findings and Disclosures

Several laws and executive orders require project-specific findings or other disclosures and are included here. The project complies with the following and other relevant legal requirements and coordination, and regulations. These apply to all alternatives considered in detail in this EA.

National Forest Management Act

All project alternatives fully comply with the Malheur Forest Plan. This project incorporates all applicable Forest Plan forest-wide standards and guidelines and management area prescriptions as they apply to the Project Area, and complies with Forest Plan goals and objectives. This includes additional direction contained in all amendments. All required interagency review and coordination has been accomplished; new or revised measures resulting from this review have been incorporated.

The Forest Plan complies with all resource integration and management requirements of 36 CFR 219 (219.14 through 219.27). Application of Forest Plan direction for the Canyon Creek WUI project ensures compliance at the project level.

The National Environmental Policy Act (NEPA) of 1969, as amended

NEPA establishes the format and content requirements of environmental analysis and documentation, such as the Canyon Creek WUI Project. This project is consistent with all requirements.

Treaty with the Walla Walla, Cayuse, and Umatilla Tribes, June 9, 1855, and Treaty with the Tribes of Middle Oregon, June 25,1855 and Public Law 92-488

These treaties established “That the exclusive right of taking fish in the streams running through and bordering said reservation is hereby secured to said Indians, and at all other usual and accustomed stations, in common with citizens of the United States, and of erecting suitable house for curing the same; also the privilege of hunting, gathering roots and berries, and pasturing their stock on unclaimed lands, in common with citizens, is secured to them.” All actions to be taken must fully consider and comply with Native American treaty rights.

Law 92-488 recognizes the Burns Paiute Tribe and their reservation. As a Federally recognized tribe, the Burns Paiute Tribe retains rights of inherent sovereignty.

The project area falls within lands ceded by the Confederated Tribes of the Warm Springs. It is south of the ceded lands of the Confederated Tribes of the Umatilla but within their declared area of interest. The Project Area is within the traditional and current use area of the Burns Paiute Tribe and is on land that is part of their former Indian reservation. Consultation with these tribes on this proposal continues to occur.

Relationship Between Local Short-term Uses of Man's Environment and the Maintenance and Enhancement of Long-term Productivity [42 U.S.C. 4332 (C)(iv)]

The Multiple Use - Sustained Yield Act of 1960 requires the Forest Service to manage National Forest System lands for multiple uses (including timber, recreation, fish and wildlife, range, and watershed). All renewable resources are to be managed in such a way that they are available for future generations. Maintaining the productivity of the land is a complex, long-term objective. The Proposed Action protects the long-term productivity of the area through the use of specific Forest Plan standards and guidelines, design criteria, and design measures.

Endangered Species Act (ESA)

Neither alternative is anticipated to have a direct, indirect, or cumulative effect on any threatened or endangered species in or outside the project area. Biological evaluations have been completed. Concurrences from the responsible federal agency, for any threatened or endangered species potentially inhabiting the project area were not required for this project because the Biological Evaluation determined that there are no effects to any threatened or endangered species. Consultation with NOAA or USFWS is not necessary for fisheries because the area is part of an inland fishery and contains no ESA fish species. The Magnuson-Stevens Fishery Conservation and Management Act as amended (1996) does not apply to the Project Area because it is an inland fishery.

The Migratory Bird Treaty Act of 1918 and the Migratory Bird Executive Order 13186

The purposes of this Act are to establish an international framework for the protection and conservation of migratory birds. The Proposed Action alternative has been designed to enhance landbird richness. The Proposed Action is consistent with the 1918 Migratory Bird Treaty Act (MBTA) and the Migratory Bird Executive Order 13186. The Proposed Action was designed under current Forest Service policy for landbirds. The Northern Rocky Mountains Bird Conservation Plan (Altman 2000) and the U.S. Fish and Wildlife Service's Birds of Conservation Concern (USFWS 2002) were reviewed for effects disclosure. The Proposed Action alternative was designed to protect or enhance priority habitats for landbird species, including neotropical migratory species.

Clean Water Act

The design of project activities is in accordance with Forest Plan standards and guidelines, Best Management Practices, and applicable Forest Service manual and handbook direction. Project activities are expected to meet all applicable State of Oregon water quality standards. No effects on water quality or 303(d) listed streams are expected because none of the proposed actions are expected to remove vegetation which shades streams.

Floodplains and Wetlands (Executive Orders 11988 and 11990) and Prime Farmland, Rangeland, and Forestland

Wetlands are not expected to be affected by the proposed activities because the implementation of PACFISH RHCA's is expected to be sufficient in extent to protect wetland functions. Floodplain function is not expected to be reduced compared to the existing condition by any project activities. There are no prime farmlands, or wild and scenic rivers within the project area. All alternatives are in accordance with the Secretary of Agriculture Memorandum 1827 for prime farmland, rangeland, and forestland.

Executive Order 12962 (aquatic systems and recreational fisheries)

This project is not likely to impact the quantity, function, sustainable productivity, and distribution of recreational fisheries per Executive Order 12962, Recreational Fisheries.

Executive Order 13112 (invasive species)

All alternatives are consistent with the Forest Plan and other direction with respect to invasive species.

Forest and Rangeland Renewable Resources Planning Act (RPA) of 1974 (as amended):

This act directed the Secretary of Agriculture to prepare a Renewable Resources Assessment and updates. The USDA Forest Service Forest Inventory and Analysis unit provides updates for this assessment.

National Historic Preservation Act

Cultural resource surveys of varying intensities have been conducted following inventory protocols approved by the State Historic Preservation Officer SHPO). Native American communities have been contacted and public comment encouraged. The consultation and concurrence process with SHPO has been concluded. No significant effects on known cultural resources are anticipated. The Forest Specialist has certified that for this project the Forest complies with Section 106 of the National Historic Preservation Act, under the terms of the 2004 Programmatic Agreement between Advisory Council on Historic Preservation (ACHP), SHPO, and the United States Forest Service, Region 6.

Clean Air Act

During project implementation, underburning will adhere to the Oregon Smoke Management Plan and the State Implementation Plan of the Clean Air Act. Burning will be accomplished under smoke dispersion conditions that will minimize smoke impacts and protect air quality. Conducting during air mass instability will allow a high percent of the smoke to disperse. Past experience has shown that significant air quality declines are limited in scope to the general burn area and are of short duration. Those that will most likely be impacted are residences along Canyon Creek, Canyon City and John Day. The roads in the area will be signed as necessary during implementation. The proposed activities will not significantly affect public health or safety.

Environmental Justice (Executive Order 12898)

Executive Order 12898 requires that federal agencies adopt strategies to address environmental justice concerns with the context of agency operations. With implementation of any of the proposed actions, there would be no disproportionately high or adverse human health or environmental effects on minority populations or low-income populations. There will be short term smoke impacts from prescribed burning to some of the residences along Canyon Creek, in Canyon City, and John Day. Racial and cultural minority groups could be in the work forces that implement project proposals. Contracts for the proposed work contain clauses that address worker safety and employment practices. Implementation of any project activities is not anticipated to cause disproportionate adverse human health or environmental effects to minority or low-income populations.

Energy Requirements and Natural or Depletable Resource Requirements and Conservation Potential:

The Canyon Creek WUI Project has been designed to conform to applicable laws and regulations pertaining to natural or depletable resources, including minerals and energy resources. In terms of petroleum products, the energy required to implement any of the action alternatives is negligible when viewed in light of production costs and the effects on the national and worldwide petroleum reserves.

CHAPTER 4 – CONSULTATION AND COORDINATION

The Forest Service consulted the following individuals, tribes, Federal, state and local agencies, and non-Forest Service persons during the development of this environmental assessment:

List of Preparers

Interdisciplinary Team

Name	Expertise
Linda Batten	Environmental Coordinator, IDT Leader
Teri Corning-Sevey	GIS/Data Services
Scott Cotter	Fisheries
Patrick Haynal Mary Robertson	Archaeology
Brian Hoefling Sue Burton Cindy McArthur	Range/Noxious Weeds
Vicki Lundbom	Engineering and Transportation Planning
Charlotte McCumber	Economics
Robert (Hersh) McNeil	Soil Science
Ken Schuetz	Wildlife Biology
Lori Stokes	Fire and Fuels Management
Mary Lou Welby	Hydrology
Eric Wunz	Silviculture, IDT Leader
Nancy Hafer	Botany
Roy Beal	Visuals/Scenery
Curt Qual	Collaboration/Stewardship
Shannon Winegar	Recreation

Contributors

Tribes

Confederated Tribes of the Warm Springs Reservation

Confederated Tribes of the Umatilla Indian Reservation

Burns Paiute Tribe

Federal, State, and Local Agencies

Bureau of Land Management (BLM), John Day

USDI, United State Fish and Wildlife Service

National Oceanic and Atmospheric Administration (NOAA) Fisheries

Oregon State Historic Preservation Office (SHPO)

Oregon Department of Fish and Wildlife

Grant County Court

Collaborators and Affiliation (if it was listed on the sign-in sheets during the collaborative process)

John and Lindy Bastian	Landowner/Grant County Snowballer's
Gerald and Jean Sagert	Oregon Hunter's Association/Landowner
Ray and Liz Moles	Landowner
Arleigh Isley	Grant County Public Forest Commission
Dave Traylor	Grant County Public Forest Commission
Gene Emery	
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Ken Speakman	Landowner
Judy Stimac	Landowner
Robert and Judith Reed	Landowner
Jay Carniglia	Landowner
Larry Lassen	Landowner/Permittee
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Ron and Sally Greb	Landowner
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Dean Elliott	Oregon Hunter's Association
Dan Bishop	Prairie Wood Products
Boyd Britton	Grant County Court
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Persons who offered written comment early in process without further input

Karen Coulter	Blue Mountains Biodiversity Project
Ted Ferrioli	
Frank Hanson	
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Dorman Gregory	
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Persons who gave verbal or written comments outside the collaborative process

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Tim Lillebo	Oregon Natural Resource Council (now Oregon Wild)
Asante Riverwind	Sierra Club
Lisa Dolittle	Gifford Pinchot Task Force

Persons who responded during the scoping process

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Chandra LeGue	Oregon Natural Resource Council (now Oregon Wild)
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Dan Becker	
Jeff Fields	Nature Conservancy

CHAPTER 5 – REFERENCES CITED

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Appendix Contents

Appendix A - Unit Information

Introduction

This appendix lists the various actions incorporated into the treatment units. Refer to the maps in Appendix B for the locations of the units and a graphic representation of the treatments.

Table A-1: Unit Information

Unit Numbers	Silv Rx	Connectivity Corridor Acres	Rx Fire *	Logging System	Fuel Treatment	Post Harvest Treatment	Planting	Acres
2	PCT9				GP			42
6	PCT9				HP			36
8	PCT9				HP			57
10	PCT7				HP			22
12	HUR			T	WTY/GP	PCT		29
16	HUR			T	WTY/GP	PCT		21
18	HUR			T	WTY/GP	PCT		57
36	HTH50		Underburn	T	WTY/GP	PCT		12
46	HTH50			T	WTY/GP	PCT		9
47	HTH50			T	WTY/GP	PCT		2
48	HRS			T	WTY/GP	UTR	Plant	9
50	HTH50			T	WTY/GP	PCT		4
52	HRS		Underburn	T	WTY/GP	UTR	Plant	13
53	PCT9		Underburn		GP			18
54	PCT9		Underburn		GP			43
56	PCT9		Underburn		GP			15
58	HTH50		Underburn	T	WTY/GP			143
60	HTH50		Underburn	T	WTY/GP	PCT		10
62	HRS			H	HP	UTR	Plant	25
66	PCT9				HP			34
80	PCT7				HP			25
82	HTH50			T	WTY/GP	PCT		6
84	HTH50			T	WTY/GP	PCT		34
86	PCT9				HP			14
88	HTH50			H	GP	PCT		26
89	HTH50			T	WTY/GP	PCT		48
90	HRS			S	HP	UTR	Plant	26
91	HTH40			H	HP	PCT		6
92	PCT9				HP			8
94	HTH50			H	GP/HP	PCT		48
95	HTH50			T	WTY/GP	PCT		30
106	HRS			H	HP	UTR	Plant	22
107	HRS			T	WTY/GP	UTR	Plant	13
109	HRS			S	HP	UTR	Plant	4
111	HRS			S	HP	UTR	Plant	4

112	HRS			T	WTY/GP	UTR	Plant	44
113	HRS			S	YTA/HP	UTR	Plant	12
114	HUR			S	HP	PCT		35
115	HUR			T	WTY/GP	PCT		18
117	HUR			H	HP	PCT		25
121	HRS	7		H	HP	UTR	Plant	52
127	PCT9				HP			43
128	PCT9				HP			9
130	PCT9				HP			15
132	PCT9				HP			11
134	PCT9				HP			35
136	PCT9				HP			38
138	PCT9				HP			32
139	PCT9				HP			9
140	HRS			H	HP	UTR	Plant	84
142	HTH50			H	HP	PCT		24
144	HTH50			H	HP	PCT		53
146	HTH50			H	HP	PCT		36
148	HTH50			H	HP	PCT		33
149	HTH50			H	HP	PCT		35
150	HTH50			H	HP	PCT		35
152	HUR			H	HP	PCT		63
156	HTH50			S	HP	PCT		28
157	HTH50			T	WTY/GP	PCT		61
158	HRS			S	YTA/HP	UTR	Plant	37
160	HRS			S	YTA/HP	UTR	Plant	33
164	HRS			S	HP	UTR	Plant	76
166	HRS			H	HP	UTR	Plant	24
172	HRS			S	HP	UTR	Plant	24
176	HRS			T	WTY/GP	UTR	Plant	43
177	HRS			H	HP	UTR	Plant	9
178	HRS			H	HP	UTR	Plant	28
180	HRS			H	HP	UTR	Plant	17
181	PCT9				HP			6
182	HRS			H	HP	UTR	Plant	80
183	PCT9				HP			9
185	PCT9				HP			7
190	PCT9				HP			28
192	HTH50			T	WTY/GP	PCT		84
194	HTH50	25		T	WTY/GP	PCT		25
196	HUR			T	WTY/GP	PCT		43
198	HUR			T	WTY/GP	PCT		112
200	HRS			S	HP	UTR	Plant	54
202	HRS			S	HP	UTR	Plant	28
209	HTH50			T	WTY/GP	PCT		14
210	HTH50			T	WTY/GP	PCT		50
211	HTH50			T	WTY/GP	PCT		13

213	HTH50			T	WTY/GP	PCT		16
214	PCT9				GP			21
218	HRS			H	HP	UTR	Plant	45
220	HUR			H	HP	PCT		12
222	PCT9				HP			50
228	HRS			H	GP	UTR	Plant	44
230	HUR			T	GP	PCT		8
234	HRS			H	HP	UTR	Plant	65
235	HRS			S	YTA/HP	UTR	Plant	36
236	HTH50			H	HP	PCT		36
238	PCT9				HP			28
240	HTH50			T	GP	PCT		21
246	HRS			H	HP	UTR	Plant	30
300	HTH50		Underburn	H	HP	PCT		20
301	HTH50		Underburn	T	WTY/GP	PCT		6
302	HTH50		Underburn	T	WTY/GP	PCT		14
303	HTH50		Underburn	H	HP	PCT		14
304	HTH50		Underburn	T	WTY/GP	PCT		75
305	PCT9		Underburn		HP			9
306	PCT9		Underburn		GP			45
308	HTH50		Underburn	T	WTY/GP	PCT		20
310	HTH50		Underburn	T	WTY/GP	PCT		28
311	PCT9		Underburn		GP			67
312	HTH50		Underburn	T	WTY			67
314	PCT9		Underburn		HP			47
316	HTH50		Underburn	H	GP/HP			59
317	HTH50		Underburn	T	WTY/GP	PCT		15
318	HTH50		Underburn	T	WTY/GP	PCT		51
320	HTH50		Underburn	T	WTY/GP	PCT		22
322	HTH50		Underburn	H	HP	PCT		13
323	HTH50		Underburn	T	WTY/GP	PCT		4
324	HTH50		Underburn	T	WTY/GP	PCT		43
325	PCT9		Underburn		HP			26
328	PCT9				GP			18
336	HTH50		Underburn	T	WTY/GP	PCT		109
338	HTH50	35	Underburn	T	WTY/GP	PCT		35
340	HTH50	7	Underburn	T	WTY/GP	PCT		7
341	HTH50		Underburn	T	WTY/GP	PCT		14
342	HTH50		Underburn	T	WTY/GP	PCT		8
344	HTH50		Underburn	T	WTY/GP	PCT		24
346	HTH50		Underburn	T	WTY/GP	PCT		9
348	HTH50		Underburn	T	WTY/GP	PCT		46
349	HTH50			T	WTY/GP	PCT		4
350	HTH50			H	HP	PCT		8
352	PCT9				HP			21
354	PCT9				HP			43
355	PCT9				HP			5

358	PCT9				HP			24
364	PCT9				HP			7
366	PCT9				HP			25
367	HTH50			T	WTY	PCT		29
368	HTH50			H	HP	PCT		24
369	HTH50			T	WTY	PCT		31
370	HTH50			H	HP	PCT		111
371	HTH50			T	WTY	PCT		35
372	PCT9				HP			41
373	HTH50			T	WTY	PCT		49
380	PCT9		Underburn		GP			11
382	HTH50		Underburn	T	WTY/GP	PCT		37
384	PCT9		Underburn		HP			14
386	HTH50	46	Underburn	T	WTY/GP	PCT		46
388	HTH50		Underburn	T	WTY/GP	PCT		36
390	HTH50		Underburn	H	HP	PCT		24
392	PCT9	66	Underburn		HP			98
394	HTH50	14		T	GP/HP	PCT		14
396	HTH50			H	GP	PCT		11
398	PCT9				GP			8
400	PCT9				GP			33
402	HTH50			H	GP	PCT		21
404	HTH60			T	GP/HP	PCT		19
405	HTH60		Underburn	H	HP	PCT		18
504	HRS			T	WTY/GP	UTR	Plant	25
506	HUR			H	HP			29
510	HTH50			T	WTY/GP	PCT		59
512	PCT9				GP			41
514	HTH50		Underburn	T	WTY/GP			53
517	HTH50			S	HP	PCT		19
518	HTH50			T	WTY	PCT		11
519	HTH50		Underburn	H	HP	PCT		26
520	HUR		Underburn	T	WTY	PCT		22
521	HTH50		Underburn	T	WTY	PCT		14
522	PCT9		Underburn		HP			23
532	PCT9				HP			22
536	PCT9				HP			23
538	PCT9	26			HP			97
544	HTH50			S	YTA/HP	PCT		7
545	HTH50			T	WTY	PCT		19
546	HUR			H	HP	PCT		27
550	PCT9				HP			27
552	HTH50			H	HP	PCT		9
553	HTH50			S	HP	PCT		35
554	HTH50			S	HP	PCT		35
555	HTH50			H	HP	PCT		37
556	HUR			H	HP	PCT		157

558	PCT9				HP			12
560	HUR			H	HP	PCT		18
562	PCT9				HP			38
564	HTH50			H	HP	PCT		47
568	HTH50			H	HP	PCT		14
570	PCT9				HP			36
572	PCT9				HP			15
576	HUR			T	WTY/GP	PCT		16
578	HUR			H	HP	PCT		194
580	PCT9				GP			49
582	HUR			H	HP	PCT		8
583	HUR			T	WTY/GP	PCT		23
584	HTH50			T	WTY/GP	PCT		10
586	HTH50			T	WTY/GP	PCT		8
588	HUR			H	HP	PCT		84
592	PCT9				HP			27
594	PCT9				HP			43
600	HTH50		Underburn	H	HP	PCT		15
601	HTH50		Underburn	S	HP	PCT		4
602	HTH50		Underburn	H	HP	PCT		7
603	HTH50		Underburn	H	HP	PCT		19
604	HTH50		Underburn	T	WTY/GP	PCT		21
605	HTH50		Underburn	S	HP	PCT		12
612	HTH50		Underburn	H	HP	PCT		17
614	HTH50		Underburn	H	HP	PCT		14
616	PCT9				HP			10
618	HTH50			T	WTY/GP	PCT		30
619	HTH50			H	HP	PCT		8
620	HTH50			H	HP	PCT		14
621	HTH50			H	HP	PCT		10
622	HTH50			H	HP	PCT		24
624	PCT9				HP			17
626	PCT9				HP			9
628	PCT9				HP			30
630	PCT9				HP			7
632	PCT9				HP			36
642	HTH50		Underburn	T	WTY/GP	PCT		29
644	HTH50		Underburn	T	WTY/GP	PCT		19
646	HTH50		Underburn	T	WTY/GP	PCT		15
648	HTH50		Underburn	T	WTY/GP	PCT		21
650	HTH50		Underburn	H	GP/HP			84
654	HTH50			T	WTY/GP	PCT		18
662	HTH50		Underburn	T	WTY/GP	PCT		60
664	PCT9		Underburn		HP			38
666	PCT9		Underburn		HP			15
700	HTH50			H	GP	PCT		14
702	HTH50			H	HP	PCT		19

704	PCT9				HP			9
706	HTH50			S	HP	PCT		5
708	HTH50			T	WTY			30
709	HTH50			H	HP			60
710	PCT9				HP			22
712	PCT9	34			HP			34
		260	**Total Connectivity Acres**			**Total Treatment Acres**		**7018**

* This table only shows the prescribed underburning that is planned inside the treatment units. There is additional burning planned in areas not proposed for mechanical treatment. Refer to the prescribed burning table for the total area planned to be burned.
Most units can supply small diameter logs for non-sawlog uses if there is an economic market for the material. The likely areas for this to occur are the tractor logging system units, due to lower costs.

Silvicultural Prescriptions
HRS - Regeneration to Seral Species (1010 acres)
HTH60 - Commercial Thin to average of 60 ft2/acre basal area (37 acres)
HTH50 - Commercial Thin to average of 50 ft2/acre basal area (3103 acres)
HTH40 - Commercial Thin to average of 40 ft2/acre basal area (10 acres)
HUR - Understory Removal (1000 acres)
PCT7 - Precommercial Thin to 7" DBH (50 acres)
PCT9 - Precommercial Thin to 9" DBH (1830 acres)

Logging System
T- Tractor (2400 acres)
S – Skyline (520 acres)
H – Helicopter (2240 acres)

Fuel Treatment
WTY – Whole Tree Yarding
GP – Grapple Piling
HP – Hand Piling

HP (3790 acres)
GP (550 acres)
GP/HP (230 acres)
WTY (310)
WTY/GP (2030 acres)
WTY/HP (130 acres)

Post Harvest Treatment
UTR – Undesirable Tree Removal (1010 acres)
PCT – Precommercial Thinning (3610 acres)

Appendix B – Maps

Appendix C - Cumulative Effects

Introduction

This appendix discloses actions considered in the cumulative effects sections of each resource in Chapter 3. In most cases, past and ongoing activities are incorporated into each resource's existing conditions because they help explain the current condition of the resource. Past and ongoing activities are also considered in cumulative effects in the context of how past or ongoing actions affect present conditions and how future actions increase, reduce, or do not change these conditions. This list includes all reasonably foreseeable projects expected to occur within each resources' defined scope of analysis (including all projects that overlap each resources cumulative impact area). This listing is consistent with the Council on Environmental Quality guidance letter of June 24, 2005.

Table C-1: Actions Considered in Cumulative Effects Analysis for the Canyon Creek WUI Project

Past Actions	Description	Date
Wildfire, associated fire suppression efforts, and fire line rehabilitation	Every year there are usually several small wildfires ignited by lightning and are usually rapidly suppressed. Fires in recent history that have escaped initial attack are the 636 acre Scalp Fire in 1986, the 600 acre Table Mtn. Fire in 1988, and the 230 acre Cabin Fire in 1994.	1920-present
Reforestation of burned areas	Areas of high mortality have been planted to native conifers	1980-1995
Timber harvest on National Forest and associated activities	Regeneration on 2014 acres, overstory removal on 3913 acres, commercial thinning, and salvage on 768 acres has occurred since 1979. Data on earlier harvests were not available but mostly concentrated on removal of large ponderosa pine trees.	1910-1995
Precommercial thinning/fuels reduction	Thinning on 3606 acres	1979-1995
Riparian corridor fence	½ mile installed on lower East Fork of Canyon Creek	1990
Road building and maintenance	177 miles of road have been constructed in the analysis area for fire suppression, timber harvest, and public access. Many of the roads were built for tractor logging and are in stream bottoms and poorly located in steeper areas for skyline yarding. 96 miles are still open for use at this time.	1920-present
Road closures	66 miles of road were closed and15 miles were decommissioned within the analysis area.	1990-present
Noxious weed treatments	Treatment of noxious weeds sites by hand pulling of weeds near or within the analysis area	1990-present
Livestock grazing and installation of grazing improvements	Grazing has been occurring in this area since the early days of settlement. Both sheep and cattle were grazed in the beginning, but only cattle have been grazed recently.	1850-present
Snowmobiling	There are several designated snowmobile trails that follow roads in the project area.	1970-present
Timber harvest on private lands	Most private lands have been harvested and few old growth trees remain, most stands are younger small	1850-present

	diameter trees.	
Precommercial thinning and fuel treatment on private lands	Thinning of trees and slash treatment around homes for fire hazard reduction	1990-present

Present and/or Ongoing Actions	Description
Fire suppression	Every year there are usually several small wildfires ignited by lightning and the goal is to rapidly suppress them as there is an unnatural buildup of live and dead fuels.
Fuels treatment, fuels reduction on BLM and private land	The Little Canyon Fuels Reduction project encompasses BLM managed lands on Little Canyon Mtn. near Canyon City. Vegetation treatments are mostly thinnings followed by piling and burning of slash.
US and State Highway	Use and maintenance of Highway 395
County Highway	Use and maintenance of County Road 65
Livestock grazing and installation of grazing improvements	Grazing on the Fawn Springs, Seneca, and Sugar Loaf grazing allotments is currently permitted in the analysis area. In addition there are two on/off allotments.
Noxious weeds	Ongoing identification of weed sites and treatment by pulling.
Road maintenance	Ongoing maintenance of Forest Service roads including ditch cleaning, vegetation removal, and culvert replacement.
Special Use Permits (SUP)	Electronic sites at Fall Mountain Lookout, powerline right of ways.
Hazard tree treatment	Ongoing identification and felling of hazard trees along public roads.
Mining activities	Primarily rock quarrying for roads.
Snowmobiling	There are several designated snowmobile trails that follow roads in the project area.
Private roads	Ongoing use for access and routine maintenance.
Private land	Ongoing timber harvest and fuel reduction projects.
Private land development	New home construction
Stream improvement activities on private land	Irrigation dam replaced to improve fish passage

Future Action	Description	Date
Canyon Creek culvert replacement	Proposal to replace two culverts on Canyon Creek which are partial barriers to adult salmonids and complete barriers to juvenile salmonids and improves fish passage at one culvert on Canyon Creek and may or may not replace the culvert.	2007-2008
Fire hazard reduction	Commercial and precommercial thinning and fuel treatment for 3 miles along Highway 395 south of Starr Ridge.	2007
Tree clearing around lookout	Cutting of trees that have grown up and are obscuring the view from the Dry Soda Lookout.	2007
Prescribed burning	Once stands are treated to reduce the current fuel loads they will be in suitable condition to begin reintroducing fire into blocks of land within the project area.	2010 and into the future

Appendix D – Collaboration Comments

This appendix contains a summary of the collaboration comments, who made them, and how they were resolved during the collaboration process. The comments have been grouped into five similar topics and are presented in the following tables.

- Wildlife
- Burning
- Economics/Utilization
- Fuels Reduction
- Other Concerns

For more detailed information see the project record on file in the District office.

Appendix E – National Fire Plan Project ESA Compliance Statement

Project Compliance with the Endangered Species Act Consultation Requirements, Using the Counterpart Consultation Regulations

USDA Forest Service

Project Name: Canyon Creek WUI Fuels Reduction Project

State: Oregon

Forest Service Region: Pacific Northwest Region

National Forest: Malheur N. F.

Ranger District: Blue Mountain R. D.

Date of Completed BE or BA: Fisheries and Wildlife BE/BAs – Signed December 21, 2006

Name of Journey-Level Biologists who Ensured the Adequacy of the BE or BA:
Scott Cotter (Fisheries) and Ken Schuetz (Wildlife)

As proposed this project is within the scope of, and will support, the National Fire Plan because:

The Canyon Creek WUI Fuels Reduction Project will take action on reducing hazardous fuels within a portion of the Grant County Community Fire Protection Plan through local cooperative planning. The project area is a forested area that is adjacent to private lands that contain ranches, homes and outbuildings, and timberlands. The Malheur National Forest annually experiences severe thunderstorms with numerous fires ignited during a single storm. Recent wildfires have threatened private and public lands and property and large unbroken blocks of heavy fuels have made firefighting difficult.

The Canyon Creek WUI Fuels Reduction Project is an authorized hazardous fuels project under HFRA because it would use appropriate methods to reduce hazardous fuels on qualifying Federal Lands that are within the designated WUI.

The effects analysis completed and documented in the BE or BA resulted in a call of Not Likely to Adversely Effect (NLAA) or No Effect (NE). This was done under the Section 7 Counterpart Regulations of the Endangered Species Act (Federal Register, December 8, 2003) and is in compliance with those regulations and the March 3, 2004, Alternative Consultation Agreement between the Forest Service, Fish and Wildlife Service, and National Marine Fisheries Service.

Signature of Line Officer:________________________________

Name of Line Officer: Gary L. (Stan) Benes

Title of Line Officer: Forest Supervisor

Date: December 21, 2006

Appendix F – Aquatics Biological Evaluation

AQUATIC BIOLOGICAL EVALUATION

for

Threatened, Endangered, and Sensitive (TES) Aquatic Species

Blue Mountain Ranger District

Malheur National Forest

Canyon Creek Wildland Urban Interface Project

Project Location

A. HUC 4: Upper John Day (17070201)

B. HUC 5: Canyon Creek (1707020107)

C. HUC 6:

1. Upper Canyon Creek (170702010701),
2. East Fork Canyon Creek (170702010702),
3. Vance Creek (170702010703)

Prepared and Reviewed By:

_*/S/ Scott Cotter*_______________________ Date_12-19-2006__

Scott Cotter, District Fisheries Biologist

I. Summary

Table 1 - Threatened, endangered and sensitive (TES) species considered in this analysis of the Canyon Creek WUI project and the effects determination for the No Action and Action alternatives.

Species	Status	Occurrence	Alt. 1 No Action	Alt. 2 Proposed Action
Aquatic Species				
Columbia River Bull Trout *Salvelinus confluentus*	T	H, N	NE	NE
Columbia River Bull Trout Designated Critical Habitat	N	HN	NE	NE
Mid-Columbia River Steelhead *Oncorhynchus mykiss*	T	HD, D	LAA	NLAA/BE
Mid-Columbia Steelhead Designated Critical Habitat	D	HD	NLAA	NLAA/BE
Chinook Salmon EFH[1]	MS	HD	NAE	NAE
Interior Redband Trout *Oncorhynchus mykiss*	S	HD, D	MIIH	MIIH/BI
Westslope Cutthroat Trout *Oncorhynchus clarki lewisi*	S	HD, S	MIIH	MIIH/BI
Mid-Columbia River Spring Chinook *Oncorhynchus tshawytscha*	S	HD, S	MIIH	MIIH/BI
Columbia Spotted Frog *Rana luteiventris*	S, C	HD, S	MIIH	MIIH/BI
Malheur Mottled Sculpin *Cottus bairdi ssp.*	S	HN, N	NI	NI

[1]Chinook salmon waters are designated Essential Fish Habitat by the Magnuson-Stevens Act.

Status

E	Federally Endangered
T	Federally Threatened
S	Sensitive species from Regional Forester's list
C	Candidate species under Endangered Species Act
D	Designated Critical Habitat
N	Designated Critical Habitat Not within Analysis Area
MS	Magnuson-Stevens Act designated Essential Fish Habitat

Occurrence

HD	Habitat Documented or suspected within the project area or near enough to be impacted by project activities
HN	Habitat Not within the project area or affected by its activities
H	Historical Occurrence
D	Species Documented in general vicinity of project activities
S	Species Suspected in general vicinity of project activities
N	Species Not documented and not suspected in general vicinity of project activities

Effects Determinations

Threatened and Endangered Species

NE	No Effect
NLAA	May Effect, Not Likely to Adversely Affect
LAA	May Effect, Likely to Adversely Affect
BE	Beneficial Effect

Sensitive Species

NI	No Impact
MIIH	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
WIFV	Will Impact Individuals or Habitat with a Consequence that the Action May Contribute to a Trend Towards Federal Listing or Cause a Loss of Viability to the Population or Species
BI	Beneficial Impact

Designated Critical Habitat

NE	No Effect
LAA	May Effect, Likely to Adversely Affect
NLAA	May Effect, Not Likely to Adversely Affect

Chinook Salmon Essential Fish Habitat

NAE	No Adverse Effect
AE	Adverse Effect

II. Introduction

This Biological Evaluation (BE) satisfies requirements of Forest Service Manual 2672.4 requiring the Forest Service to review all its planned, funded, executed or permitted programs and activities for possible effects on proposed, endangered, threatened or sensitive species. The BE process is intended to review the Canyon Creek WUI Project in sufficient detail to determine effects of alternatives on species in this evaluation and ensure proposed management actions would not:

- Likely jeopardize the continued existence, or cause adverse modification of habitat, for a species that is proposed (P) or listed as endangered (E) or threatened (T) by the USDI Fish and Wildlife Service or NOAA National Marine Fisheries Service; or
- Contribute to the loss of viability for species listed as sensitive (S) by USDA Forest Service, Region 6, or any native or desired, non-native species; nor cause any species to move toward federal listing (FSM 2672.4).

The following sources were used during the prefield review phase to determine the presence or absence of PETS species in the Canyon Creek WUI Project area:

1. Malheur N.F. GIS database
2. Regional Forester's (R6) sensitive animal list (1989, updated 11/15/2000)
3. Forest Service stream survey reports, Blue Mountain Ranger District, John Day, OR

4. Oregon Natural Heritage Program (ORNHP) database.

5. Draft aquatic species and habitat – Canyon Creek Wildland Urban Interface. Prepared for the U.S. Forest Service, Malheur National Forest, Blue Mountain Ranger District, John Day, Oregon by PBS Engineering & Forestry, LLC (PBS 2004).

6. Canyon Creek Watershed Analysis

III. Project Description

See Chapter 1 of the Canyon Creek WUI Project Environmental Assessment (EA) for a complete description of the project area and Chapter 2 for a description of the proposed action, design criteria and mitigation. See Appendix C of the EA for a list of past, ongoing and reasonably foreseeable future projects; all activities on this list have been considered in the cumulative effects analysis for each species in this BE.

IV. Existing Condition of Aquatic Habitat

The quality of fish habitat is affected by conditions within the stream channel and riparian areas along the channel. This section presents information on riparian and instream conditions. Stream surveys have been completed on four streams within the analysis area, however, only Vance Creek and Canyon Creek are Category 1 streams (Table 2).

Table 2. Stream Habitat Surveys Conducted in the Canyon Creek WUI Analysis Area.

Stream	Survey Year	Agency	RHCA Category	Reach No.'s In the Analysis Area	Surveyed Length (mi.)
Vance Creek	1993	USFS	1	1-3	3.0
South Fork Vance Creek	1993	USFS	2	1	1.4
Fawn Creek	1993	USFS	2	1	0.9
Canyon Creek	1993	USFS	1	1	1.1

1) USFS=U.S. Forest Service

PACFISH RMOs and Forest Plan Amendment 29 DFCs

Important aquatic habitat elements as defined by PACFISH and/or Forest Plan Amendment 29 include: 1) pool frequency, 2) water temperature/stream shading, 3) large woody debris, 4) bank stability, 5) width to depth ratio, and 6) embeddedness. These habitat elements are important in maintaining aquatic habitat function and health. Stream survey information was analyzed to compare existing habitat conditions to Forest Plan Riparian Management Objectives (RMOs)/Desired Future Condition (DFC) for aquatic habitat (Table 3).

Table 3. Fish habitat summary data for Category 1 streams in the Canyon WUI Fisheries Analysis Area.

Stream Name	Pools/ Mile	Pieces LWD/Mile[7]	% of Units Embedded[5]	% of Habitat Units With Dominant Particles < 2mm	Wetted W/D Ratio	% Stable Banks[6]
Vance Creek	38[1]	36	62	33	9.0	87
Canyon Creek[4]	40[2]	5	18	4	19.5	90
PACFISH RMO	96[1] 56[2]	20	--	**--**	<10	>80
Amend 29 DFC	75-132[1] 38-66[2]	80-120[3]	<20	--	<10	>90

Notes: 1) channels of <10 feet in width, 2) channels of >10 to 20 feet in width, 3) mixed conifer ecosystem, 4) – Reach 1 only, 5) Embedded > 35%, 6) – Extrapolated from Riparian Area Inventory – Pace Transect, 7) Stream survey protocol in 1993 included not only large woody material within the bankfull channel, but also leaning trees that have the potential to fall into the stream.

Pool Frequency

Pool frequency is a gage of aquatic habitat diversity, and is an indicator of the degree to which streams are capable of supporting a varied and complex community of fish species. Pools are important for providing rearing habitat for juvenile fish and cool-water refuge areas for adult fish during periods of low flow and elevated temperatures. Pool spacing varies by channel morphology (Rosgen 1996). Deep pools also provide important habitat for adult chinook salmon and steelhead trout.

Pool habitat can be reduced where management activities result in reductions of pool forming elements (e.g. LWD), changes in bedload (e.g. large increases in fine sediment), or changes in channel morphology (e.g. widening or straightening).

Stream surveys indicate that the Forest Plan DFC/RMO for pool frequency is not being met in Vance Creek and Canyon Creek (Table 3).

Water Temperature/Stream Shading

Water temperature influences the metabolism, behavior, and health of fish and other aquatic organisms. Fish can survive at temperatures near extremes of suitable temperature ranges. However, growth is reduced at low temperatures because all metabolic processes are slowed. At the opposite extreme, growth is reduced at high temperatures because most or all energy from food must be used for maintenance needs. Fish are also more susceptible to diseases near the extremes of a species suitable temperature ranges.

The Forest Plan water temperature standard is for no measurable increase in maximum water temperature, and maximum water temperatures below 64°F within migration and rearing habitat and below 60°F within spawning habitats (PACFISH RMO). In general, juvenile and chinook salmon, redband trout, and juvenile steelhead will occupy water that is from 55 to 64°F. Upper lethal temperatures range from about 75°F for steelhead to about 80°F for chinook salmon. Mean maximum water temperatures are above the suitable range for salmonid species present during summer months in Canyon Creek within the analysis area (Table 4).

Table 4. Average maximum stream temperatures in the Canyon Creek WUI Analysis area.

Stream	Location	Years Analyzed	Mean 7 Day Mean Max Temp (°F)
Vance Creek	Near USFS Bdy.	1999-2000	54.3
Canyon Creek	At USFS Bdy.	1999-2000 2002-2005	74.2

Riparian stream shading is critical in regulating water temperature extremes and providing instream cover against predation. Stream temperatures increase following disturbance to riparian vegetation (i.e., harvest, grazing, or fire) (Beschta and Taylor 1988). Given the high temperatures found within the Canyon Creek watershed and the importance of riparian vegetation in regulating extreme temperatures, it is important to identify stream reaches that are limited in shade and ultimately may be limited in providing quality instream habitat to fish species. In addition, it is known that shade from conifers and deciduous trees and shrubs functions differently. In winter, cold temperatures can be moderated by conifer shade acting as thermal cover.

Vegetation along streams in the project area is highly variable. Only a few streams have stands of larger trees with closed canopies stretching along most of their length. Most streams have a patchy distribution of forest and non-forest/open vegetation types along their length.

Stream shading was evaluated for the Canyon Creek watershed analysis. Color stereo-pair aerial photographs were examined for most Category 1, 2, and 4 streams within the watershed. Evaluations were conducted on a reach-by-reach basis using reaches delineated according to Rosgen Level I methodology. A high stream shade rating was given when the stream water surface and banks were not visible and canopy cover exceeded 70%. A moderate rating was given when at least one stream bank was evident and there was 40 to 70% canopy cover. A low rating was given when both stream banks were visible and canopy cover was less than 40%. Topographic shading was not evaluated.

Table 5: Shade canopy classes given for each subwatershed in the Canyon Creek Wildland Urban Interface.

		Shade Class (miles)			Shade Class (percent)		
Subwatershed	**Total Miles**	**High**	**Moderate**	**Low**	**High**	**Moderate**	**Low**
Vance Creek	12.8	0.5	4.1	8.1	4	32	64
Upper Canyon Creek	6.3	0	2.8	3.5	0	44	56

Vance Creek

The Vance Creek subwatershed is dominated by stream reaches with low stream shading. Of the 12.8 miles of stream examined within the Vance Creek subwatershed, over 60% was rated as having low stream shade (Table 4). Four of 10 reaches examined had over 80% of their stream length rated as having low stream shade. Only Fawn Creek and the lower portion of Vance Creek have any portion of the reach rated as high. In general, stream shading along Vance Creek involves a patchwork of stream cover separated by areas of exposed stream channel. One of the tributaries to Vance Creek has mixed vegetative cover, and the other major tributary is completely exposed to direct sunlight. Despite the low to moderate shade cover, lower water temperatures are found in Vance Creek. The lower temperatures may be attributed to the presence of springs or subsurface flow. Stream shade for most other streams within the subwatershed may be a limiting factor for moderating stream temperatures.

Upper Canyon Creek

Three of the six reaches within this subwatershed have over 90% of their stream length rated as low stream shade. None of the reaches have any length rated as high. Stream shading along Sugarloaf Gulch is a mix of segments with low and moderate shade. The lower reach of Wickiup Creek has moderate levels of stream shade; whereas, the upper reach 100% of its length having little to no stream shade. Likewise, the portion of Canyon Creek within the project area has little or no shade. Overall, stream shading in the Upper Canyon Creek subwatershed is low (Table 5).

Large Woody Debris

LWD plays an important role in forested stream reaches. LWD aids in dissipating stream energy, trapping sediment, and the formation of pools and associated aquatic habitat.

Quantity of LWD in streams can be altered by removal of streamside trees for timber production or salvage of instream pieces. Timber has been harvested from areas adjacent to streams in the project analysis area. In extreme cases, large increases in peak flows and/or large increases in channel width can result in destabilization of instream pieces and subsequent transport downstream thus resulting in a decrease in LWD.

Riparian forests, especially individual trees that are within ½ to ¾ tree length of the stream channel, produce LWD that is recruited into a stream where it creates critical habitat features for aquatic species. The Malheur National Forest recognizes the role of LWD. Forest Plan Amendment #29 specifies a range in the number of pieces of LWD to be maintained for each mile of stream in certain ecotypes. In this analysis, the current condition of the riparian zones was rated with respect to near-term (10 to 20 years) LWD recruitment potential.

Near-term LWD recruitment potential was evaluated for most Category 1, 2, and 4 streams on National Forest System (NFS) lands of Canyon Creek watershed, based upon a modified method described by the Washington Forest Practices Act (WFPB 1997) and the USFS Region 6 Level II Stream Survey protocols. Evaluations were made of streams that would act as sources for LWD into known fish-bearing streams during periods of high flows and flood events. Evaluations were conducted on a reach-by-reach basis using reaches delineated according to Rosgen Level I methodology.

Riparian zones in the two subwatersheds are dominated by stands with a low potential for LWD recruitment in the near term (Table 6). Overall, more than half of the riparian zones along the stream reaches examined were rated as low potential for LWD recruitment in the near term.

Vance Creek Subwatershed

The Vance Creek subwatershed offers little potential for near-term LWD recruitment (Table 6). There are no riparian zone stands in this subwatershed that have a high LWD recruitment potential. Most stream reaches in the subwatershed have 100% or nearly 100% of the reach rated as low LWD recruitment potential. Only 2 of 14 reaches examined have a moderate LWD recruitment potential exceeding 14% of the area within the reach. Based on this analysis, Vance Creek subwatershed is not expected to produce or transport appreciable amounts of LWD in the near term. Stream surveys indicate that the Forest Plan DFC for LWD quantity is not being met in Vance Creek, however, the PACFISH RMO is being met (Table 3).

Upper Canyon Creek Subwatershed

Four of the seven reaches examined within the Upper Canyon Creek subwatershed in the project area have over 80% of the area rated as low recruitment potential. Only Sugarloaf Gulch has over 70% high recruitment potential, and the lower reach of Wickiup Creek has moderate potential for LWD recruitment. Overall, this subwatershed has a low potential to recruit LWD. Stream surveys indicate that the Forest Plan DFC/RMO for LWD quantity is not being met in Canyon Creek (Table 3).

Table 6: LWD Recruitment Potential Determined from 1:12,000 Aerial Photography by Subwatershed for Canyon Creek Wildland Urban Interface.

		Area (acres)[1]			Area (percent)		
Subwatershed	**Total Acres**	**High**	**Moderate**	**Low**	**High**	**Moderate**	**Low**
Vance Creek	340	0	52	288	0	15	85
Upper Canyon Creek	129	34	23	72	26	18	56

[1]Acres are approximate and were calculated using GIS (Geographic Information System).

Embeddedness/Fine Sediment

Composition of the stream substrate is an important feature of aquatic habitat. Cobble and gravel substrates provide habitat for a diverse assemblage of benthic macroinvertebrates as well as eggs and early life stages of numerous fish species. Macroinvertebrates represent a substantial portion of the diet available to various fish species.

Filling of interstitial spaces (i.e. the gaps between rocks on the stream bottom) with fine sediment (particles < 2 mm in size) eliminates habitat for many macroinvertebrates. Fish eggs and early life stages can also be buried and smothered when interstitial spaces are embedded with fine sediment. Winter habitat for juvenile salmonids is also lost as interstitial spaces are embedded with fine sediment.

Embeddedness was rated as either yes or no at the time stream surveys were completed on Vance Creek and Canyon Creek. In order for embeddedness to have been rated as yes for that reach, the substrate must have been embedded to a degree greater than 35 % for the majority of the reach.

Embeddedness data is no longer collected during Region 6 stream surveys. Instead, stream substrate data is collected using pebble count procedures. Either methodology can be used to estimate the amount of fine sediment in streams. Adverse impacts to macroinvertebrates and fish can occur where fine sediment exceeds 20% of the surface area of the streambed or embeddedness exceeds 20%.

Fine sediment in streams is a normal component of salmonid habitat; however, major disruption of the system occurs when sediment levels substantially exceed natural levels. Deposition of fine sediment can eliminate habitat for aquatic insects; reduce density, biomass, and diversity of aquatic insects; reduce permeability of spawning gravels; and reduce emergence of fry from redds (Nelson et al. 1991). Studies have shown that an increase in 1-3mm size sand from 20% to 30% can decrease emergent survival of salmonid species from 65% down to 40% (Phillips et al. 1975). Fine sediments are known to impact fry emergence and survival, and fine sediment (<6.5mm in size) levels above 40% can effectively eliminate salmonid populations and many macroinvertebrate species (Everest and Harr 1982).

Increases in fine sediment can occur from both increases transport of fine sediment from upland areas and from destabilized stream banks. Increases can result from both episodic sources such as wildfires or from chronic sources such a native surface roads. Episodic sources normally result in short-term increases that return to pre-disturbance levels through recovery processes. Chronic sources can result in long-term changes of stream channels and aquatic habitat. Numerous roads in the project area have been identified as potential sources of fine sediment based on field reviews and professional judgment (see Watershed Section and Map 3.5 in Canyon Creek Watershed Analysis).

Stream surveys recorded whether measured units were embedded to a degree greater than 35 percent, not greater than 20 percent, therefore it is not possible to determine whether Vance Creek or Canyon Creek meet or do not meet Forest Plan DFC. However, stream surveys indicate that approximately 62 percent and 18 percent of the measured units were embedded greater than 35 percent in Vance Creek and Canyon Creek, respectively (Table 3).

Width-to-Depth Ratio

The Forest Plan DFC/RMO for width-to-depth ratio is based on wetted width and depth. A large wetted width-to-depth ratio indicates a wide shallow stream channel morphology. Wide shallow streams are prone to increases in stream temperatures due to their high surface area to volume ratio. Shallow streams also provide little habitat for fish, due to the lack of water depth.

Width to depth ratios can be increased by increases in peak flows, direct bank alteration, or increases in sediment or a combination of these factors. Conversely, reductions in these factors can lead to reductions in width to depth ratios.

Canyon Creek exceeded the Forest Plan DFC/RMO for width-to-depth ratio in 1993. Vance Creek met the width-to-depth ratio RMO/DFC in 1993 (Table 3).

Bank Stability

The Forest Plan DFC for stream bank stability is for 90% of the banks to be stable. Channel types differ in their sensitivity to management activities due to differences in bank erosion potential and the influence of streamside vegetation on bank stability. Data available from the 1993 stream surveys was not adequate to type streams based on Rosgen stream classification, therefore channel typing was not done on Vance Creek or Canyon Creek. Riparian Area Pace Transect surveys were conducted in 1993 and determined that streambank stability in Vance Creek did not meet Forest Plan DFC and Canyon Creek was right at the standard (Table 3).

Fish Passage Barriers and Stream Improvements

Within the WUI boundary, only two culverts were identified as potential barriers to fish passage based on a recent survey of culverts within the watershed. Only one of these culverts is on Forest Service land. These culverts present barriers to juvenile but not adult salmonids and are expected to be replaced as a separate future project. Naturally low streamflows and water withdrawals can block fish from accessing critical rearing and spawning habitat. In 1991 three log weirs were installed on private land on Canyon Creek to provide adult Chinook salmon holding habitat (ODFW 2006). Those log weirs are still functional and may help to provide deep pools which spring Chinook salmon may hold in throughout the summer months until they spawn in September. Without such deep pools in which to hold in, Chinook salmon may not be able to get up to spawning habitat due to low flows when spring Chinook move upstream into Canyon Creek from the mainstem John Day River. These weirs also benefit steelhead by providing rearing habitat for juveniles. In 2006 an irrigation dam on private land on Canyon Creek is expected to be replaced to improve fish passage (ODFW 2006).

V. Environmental Baseline of Species Considered in this Assessment

The Canyon Creek watershed is home to populations of Middle Columbia summer-run steelhead trout (Oncorhynchus mykiss), redband trout (O. mykiss gairdneri), westslope cutthroat trout (O. clarki lewisi) and Middle Columbia spring-run chinook salmon (O. tshawytscha). Columbia spotted frogs (Rana luteiventris) may be present in the watershed. Malheur mottled sculpin (Cottus bairdi ssp.), identified as a Forest Service sensitive species and indicated as being present on the Malheur National Forest, is not found in the John Day River Basin (Markle and Hill 2000). Bull trout (Salvelinus confluentus) were historically present in the Canyon Creek watershed but are now thought to be absent. In July 1985, a single bull trout was trapped in a diversion trap in Canyon Creek downstream of the mouth of East Fork Canyon Creek, however, no bull trout have been documented in the Canyon Creek watershed since that time (Buchanan et al. 1997). There is no designated bull trout critical habitat in the Canyon Creek watershed. Therefore, Malheur mottled sculpin, bull trout, and bull trout critical habitat will not be discussed further in this BE.

Threatened, Endangered, and Sensitive aquatic species documented to occur in the Canyon Creek WUI project area or near enough to be potentially affected by project activities are listed below:

Mid-Columbia River Steelhead (*Oncorhynchus mykiss*)

Status: Federal – Threatened (24 March 1999)

Critical Habitat designated: September 2, 2005 (became effective - 2 January 2006)

Global Conservation Status Rank Reasons:

> Small breeding range in the middle Columbia River basin, Washington, and Oregon; continued declines in abundance; increasing percentage of hatchery fishes in natural escapements; genetic introgression and detrimental ecological interactions with hatchery stocks are potential problems. The John Day, Deschutes, and Yakima Rivers support the largest native, natural spawning stocks in the Middle Columbia River Distinct Population Segment (DPS).

The total run size for the Columbia River during the pre-1960 era might have been in excess of 300,000. This number was reduced to somewhat below 200,000 by early 1980. The most recent 5 year average run size was 142,000, with a naturally produced component of 39,000. The Middle Columbia River DPS comprises the majority of this run estimate. Serious declines have however, occurred in the John Day basin.

Environmental Baseline

Middle Columbia steelhead trout were listed by the National Marine Fisheries Service (NMFS) as threatened under the federal ESA on March 25, 1999 (64 FR 15417). Critical habitat for Mid-Columbia steelhead was designated on September 2, 2005 (70 FR 52630). Critical habitat is present in Vance Creek and Canyon Creek within the analysis area.

The Mid-Columbia River steelhead trout is named for the timing of their adult spawning run. The name "summer" refers to the time of year the fish enter the Columbia River for migration to the middle portion of the Columbia River, between Mosier Creek in Oregon and the Yakima River in Washington. First time spawning fish are generally 4-5 years old. Individuals are capable of spawning more than once before they die, though spawning more than twice is rare. Adult steelhead trout in this DPS spend up to one year in fresh water prior to spawning. These fish can utilize headwater areas for spawning purposes and require clean gravels with nearby resting pool habitat during the three to six week spring spawning period. Steelhead eggs incubate 1.5 to 4 months before hatching which varies with water temperature. Juveniles spend 1-4 (generally 2) years in fresh water before migrating to the ocean as smolts. While in the fresh water rearing stage, young steelhead prefer a water temperature range between 10-13° C, adequate pool habitat, and cover in the rearing streams.

Most steelhead trout spawning and rearing occurs in the second to fourth order streams in a forested environment. Even when small streams are not accessible to migrating fish, because of barriers or steep gradients, they are vitally important to the quality of downstream habitats. Steelhead trout spawning and rearing occurs in the lower 2 miles of Vance Creek. The lower section is on private land and beyond management by the Forest Service. There is a diversion just above the mouth of Vance Creek that is a resident fish barrier but may be passable to steelhead during high flows. Canyon Creek within the project analysis area also contains steelhead spawning are rearing habitat.

The Primary Constituate Elements (PCEs) of steelhead critical habitat include sites essential to support one or more life stages of the DPS (sites for spawning, rearing, migration, and foraging). These sites in turn contain physical or biological features essential to the conservation of the DPS (for example, spawning gravels, side channels, forage species). The specific PCEs applicable to this project include:

- Freshwater spawning sites with water quantity and quality conditions and substrate supporting spawning, incubation and larval development. These features are essential to conservation because without them the species cannot successfully spawn and produce offspring.

- Freshwater rearing sites with water quantity and floodplain connectivity to form and maintain physical habitat conditions and support juvenile growth and mobility; water quality and forage supporting juvenile development; and natural cover such as shade, submerged and overhanging large wood, log jams and beaver dams, aquatic vegetation, large rocks and boulders, side channels, and undercut banks. These features are essential to conservation because without them juveniles cannot access and use the areas needed to forage, grow, and develop behaviors (e.g., predator avoidance, competition) that help ensure their survival.

- Freshwater migration corridors free of obstruction with water quantity and quality conditions and natural cover such as submerged and overhanging large wood, aquatic vegetation, large rocks and boulders, side channels, and undercut banks supporting juvenile and adult mobility and survival. These features are essential to conservation because without them juveniles cannot use the variety of habitats that allow them to avoid high flows, avoid predators, successfully compete, begin the behavioral and physiological changes needed for a life in the ocean, and reach the ocean in a timely manner. Similarly these features are essential for adults because they allow fish in a non-feeding condition to successfully swim upstream, avoid predators, and reach spawning areas on limited energy stores.

Interior Redband Trout (*O. mykiss gairdneri)*

Status: USFS Region 6 Sensitive

Global Conservation Status Rank Reasons:

Still widespread in interior western North America, but with local declines and extirpations. The global range includes the Columbia River basin east of the Cascades to barrier falls on the Kootenay, Pend Oreille, Spokane, and Snake Rivers; the upper Frazier River basin above Hell's Gate; and Athabasca headwaters of the Mackenzie River basin, where headwater transfers evidently occurred from the upper Frazier River system (Benke 1992). In the Columbia River basin, nearly all upriver and many lower river stocks appear to be improving after having declined (Nehlsen et al. 1991). Many stocks in the Columbia River basin are, however, threatened by mainstem passage problems, habitat damage (due to past logging, road construction, mining, and grazing, which can decrease water quality and increase siltation), and interactions with hatchery fishes (Nehlsen et al. 1991).

Environmental Baseline

There are four different populations of redband trout in the Blue Mountains. These are: 1) sympatric populations with steelhead, 2) isolated allopatric populations in anadromous watersheds, 3) allopatric populations in the Great Basin portion of the Blue Mountains, and 4) allopatric populations in watersheds that formally supported anadromous populations (N.F. Malheur and Upper Malheur Rivers). There is little data on current population trends of the redband, however, the four population types do not face the same level of threats from management activities. Redband populations in this project area are primarily of sympatric origin. Overall, the Interior redband trout have the most extensive area of all game fishes in the Blue Mountains. They are in the smallest headwater areas as well as in the largest rivers of the Blue Mountains. Within the project analysis area, redband trout spawn and rear throughout the entire length of Canyon Creek and throughout approximately 3 miles of Vance Creek.

Interior redband trout (sensitive) are assumed to be the resident form of the anadromous steelhead. Most redband spawning and rearing occurs in the second to fourth order streams in the forested environment. Even when small streams are not accessible to migrating fish because of barriers or steep gradients, they are vitally important to the quality of downstream habitats. Their distribution within the proposed project area and habitat needs, are similar to the steelhead. However, redband spawning may occur in areas with insufficient flow for steelhead spawning.

Mid-Columbia River Spring Chinook Salmon (*O. tshawytscha*)

Status: USFS Region 6 Sensitive

Environmental Baseline

Chinook salmon exhibit two behavioral forms: ocean-type and stream-type. Ocean-type Chinook salmon juveniles migrate to the ocean within the first year of life; whereas, stream-type juveniles typically spend one or more years in fresh water before migrating to the ocean. In the Canyon Creek watershed, Chinook salmon are of the stream-type form. Adults return to the mainstem John Day River in May and June and the Canyon Creek watershed in late June and early July (ODFW 2004). The adults hold in deeper, cooler water in July and August and spawn in September (ODFW 2004). Stream-type or spring-run fish spawn in smaller tributaries than ocean-type fish. Spawning in these tributaries is dependent on high spring flows from snowmelt or spring storms. Juvenile Chinook salmon are commonly found in tributaries to the John Day River where spawning has not occurred, including Canyon Creek (ODFW 2004). Juvenile chinook salmon apparently move upstream from the John Day River during summer to seek out cooler water found in the Canyon Creek watershed (ODFW 2004, Edwards 2004). These juveniles move back to the mainstem John Day River from October through December as air temperatures drop and fall rains begin (ODFW 2004). These juveniles overwinter in the mainstem and begin their migration to the ocean sometime between February and April (ODFW 2004). Spawning in the watershed is sporadic, only occurring 3 times in the past 20 years (ODFW 2004). The specific reasons for the sporadic spawning may be associated with streamflows in the watershed (ODFW 2004). Chinook salmon may spawn and rear in Canyon Creek from the mouth upstream to approximately East Gulch, however, this portion of Canyon Creek flows entirely through private land inholdings, within the analysis area.

The status of this species has been under review by the NMFS which determined in February 1999 that listing was not warranted at that time. Returning adults in the John Day River basin range from 400 to 3,000 with the vast majority spawning in three main areas: the upper North Fork John Day, the upper MFJD, and the upper mainstem John Day.

Chinook Salmon Essential Fish Habitat (EFH)

The Magnuson-Stevens Fishery Conservation and Management Act (MSA), as amended by the Sustainable Fisheries Act of 1996 (Public Law 104-267), requires the inclusion of EFH descriptions in Federal fishery management plans. In addition, the MSA requires Federal agencies to consult with NMFS on activities that may adversely affect EFH.

Congress defined EFH as "those waters and substrate necessary to Chinook salmon for spawning, breeding, feeding, or growth to maturity. "The EFH guidelines further interpret the EFH definition as:

> Waters include aquatic areas and their associated physical, chemical, and biological properties that are used by fish and may include aquatic areas historically used by fish where appropriate substrate includes sediment, hard bottom, structures underlying the waters, and associated biological communities necessary means the habitat required to support a sustainable fishery and the managed species' contribution to a healthy ecosystem and "spawning, breeding, feeding, or growth to maturity" covers a species' full life cycle.

Westslope Cutthroat Trout (*O. clarki lewisi*)

Status: USFS Region 6 Sensitive

Environmental Baseline

The John Day River basin has been identified as one of six major river basins in which interior Westslope cutthroat trout (O. clarki lewisi) reside. Three life-history forms are found in this species: resident (lives in small streams), fluvial (migrates between small streams and rivers), and adfluvial (migrates between lakes and streams). The resident form of westslope cutthroat trout is found in the Canyon Creek watershed; although, historically cutthroat may have been of the fluvial form in Canyon Creek and its tributaries (Shepard et al. 2003). Spawning typically occurs between April and June when water temperatures range between 43°F and 48°F (6°C to 9°C), and these fish rarely live longer than four years (Behnke 2002). Westslope cutthroat trout may spawn and rear in Canyon Creek within the project analysis area.

The westslope cutthroat trout differ from other fish in their relatively small size and their feeding habits. These species specialize as invertebrate feeders and, consequently, do not compete directly with more piscivorous (fish-eating) species like bull trout (Behnke 2002). In addition to habitat degradation, hybridization with nonnative rainbow trout and displacement by brook trout in small streams represent the common biological threats to the species (Behnke 2002). In the Canyon Creek watershed, the westslope cutthroat trout is considered a genetically unaltered species illustrating greater than 99% genetic purity. Consequently, they have been identified as a core conservation population (Shepard et al. 2003).

Columbia Spotted Frog (*Rana luteiventris*)

Status: USFS Region 6 Sensitive; Candidate for Federal listing under the Endangered Species Act

Environmental Baseline

The Columbia spotted frog is on the Regional Forester's sensitive species list and is a candidate for Federal listing under the Endangered Species Act. Spotted frogs are highly aquatic and are rarely found far from permanent water. Breeding habitat is usually in shallow water in ponds or other quiet waters along streams. Breeding may also occur in flooded areas adjacent to streams and ponds. Adults may disperse overland in the spring and summer after breeding. Habitat has been degraded by past management activities, such as livestock grazing, road construction along streams, and timber harvest adjacent to streams, lakes ponds, springs, and marshes.

The Columbia spotted frog is considered present in all subbasins on the Malheur National Forest. It is assumed this species is widely distributed in the project area. Limited habitat surveys have been conducted specifically for spotted frogs; however, habitat probably exists along most low gradient (less than 2%) perennial and some intermittent streams within the project area. No survey records or sightings are recorded from the project analysis area.

VI. Potential Effects of No Action and the Proposed Action on Aquatic TES Species and Steelhead Critical Habitat

The following analysis addresses the potential effects of the Canyon Creek WUI project on aquatic TES species. Based on topography, drainage patterns and the preliminary effects analysis, the analysis area includes the following streams: Vance Creek to its confluence with Canyon Creek and Canyon Creek from Wickiup Campground downstream to approximately the mouth of Berry Creek.

The following is a site-specific analysis of the potential effects for no action and the proposed action. The potential direct and indirect effects of the project have been evaluated for the following parameters: water quality (temperature, sediment, chemical contaminants), habitat access (physical barriers), fish habitat elements (substrate embeddedness, Large Woody Debris (LWD), pool frequency and quality, large pools), channel condition and dynamics (width to depth ratio, stream bank condition, floodplain connectivity), flow/hydrology (change in peak/base flows), drainage network, watershed conditions (road density and location, disturbance history).

Cumulative effects of all past, present and foreseeable actions are described in how they potentially modify the fish habitat and populations beyond direct and indirect effects of this project.

Determinations and rationale for "effects calls" for each species are stated immediately under each alternative.

Alternative 1, No Action

In order to compare this alternative to the other alternatives, it is necessary to identify some of the actions that will not occur under this alternative:

- No vegetative treatments would occur.
- There would be no prescribed fire treatments, which could affect riparian vegetation.
- There would be no road management activities other than routine road maintenance, which is an ongoing program.

Effects Calls

- Determination: Mid-Columbia Summer Steelhead (T): "May Affect, Likely to Adversely Affect" (LAA)
- Steelhead Designated Critical Habitat: "May Affect, Not Likely to Adversely Affect" (NLAA).
- Interior Redband Trout (S): "May Impact Individuals or Habitat, but will not likely contribute toward federal listing or loss of viability to the population or species" (MIIH).
- Chinook Salmon (S): "May Impact Individuals or Habitat, but will not likely contribute toward federal listing or loss of viability to the population or species" (MIIH).
- Chinook Salmon Essential Fish Habitat: "No Adverse Effect" (NAE).
- Westslope Cutthroat Trout (S): "May Impact Individuals or Habitat, but will not likely contribute toward federal listing or loss of viability to the population or species" (MIIH).
- Columbia Spotted Frog (S): "May Impact Individuals or Habitat, but will not likely contribute toward federal listing or loss of viability to the population or species" (MIIH).

Direct and Indirect Effects

Water Quality

Temperature: With no vegetative treatments or prescribed burning in riparian areas, there would be no short term effect on water temperature. Riparian areas within this project area are not large enough to act as fire breaks for high intensity wildfires. Because fuels would remain untreated under this alternative, all streams in the area with existing conifer or hardwood shading would be at risk for losing shade and incurring increasing summer water temperatures in the future due to an increasing risk, over time, of a high intensity, stand replacement wildfire. Increased width-to-depth ratios from sediment pulses following such a wildfire could raise stream temperatures by increasing the surface area exposed to solar radiation. Additionally, the immediate water temperature increase resulting from a high intensity fire as it goes through a riparian area (over the stream) can lead to direct mortality of fish and spotted frogs. Mean maximum water temperatures are already above the suitable range for salmonids in Canyon Creek while the abnormally cool water temperatures in Vance Creek make it a good potential candidate for fisheries restoration and an important cool water source for Canyon Creek (Table 4).

Ongoing road maintenance activities located within RHCA's would not reduce existing stream canopy cover sufficiently to adversely affect streamside shading or water temperature. Considering the risk of high intensity, stand replacement wildfire under the no action alternative, there is a potential adverse effect in the long term.

Sediment: The activities with the highest potential for affecting sediment input to streams are related to road maintenance, or a lack thereof. Road related impacts most likely to contribute high sediment inputs would be plugged culverts leading to washed out road fills, undersized culverts at stream crossings leading to high water velocities and subsequent erosion at culvert outlets, or sediment channeled on road surfaces and routed through road-side ditches and cross-drain culverts to streams. Under this alternative, there would be no road management activities other than routine road maintenance. This can be considered a no effect, or no change from the existing condition, in the short term, however, at existing funding levels road maintenance is not expected to keep up with all needs. This alternative would not do anything to reduce impacts of the existing road system. It would be expected that sedimentation from existing roads would increase over time, unless other projects are implemented to address these impacts.

The quality of fish habitat could be reduced in the long-term because fuels would remain untreated under this alternative. A high intensity, stand replacement wildfire could result in a scale and severity of effects that is uncharacteristic of this habitat type. Such a wildfire may transport fine ash, remove soil cover, kill bank-stabilizing plant roots, and potentially increase water run-off rates. The quality of fish habitat would decline until vegetation along burned portions of streams recovered (an estimated 5-10 years). Indirectly, given the risk of a high intensity, stand replacement wildfire under the no action alternative, a higher erosion potential exists for a certain period following such an event. Intense storm events (greater than a six year event) immediately following a wildfire that burned in steep terrain and had large areas of high severity wildfire may result in concentrated run-off, resulting in more sediment transport directly into fish bearing streams and potentially resulting in increased width-to-depth ratios. This could result in adverse effects in the long term.

Chemical Contaminations/Nutrients: With no proposed actions using chemicals near streams, there is a no effect. Only road maintenance activities would occur within RHCA's. Work might entail grading roads or cleaning culverts. Fuels and lubricants would not be stored in RHCA's and the Malheur National Forest has a spill plan in place for emergencies.

Habitat Access

Physical Barriers: No physical barriers from road/stream crossings limiting aquatic TES species would be created or removed as a result of this alternative. There would be no effect to this indicator.

Habitat Elements

Substrate Embeddedness: While there is no way to rate substrate embeddedness against Forest Plan standards, embeddedness does appear high in Vance Creek, with 62 percent of the measured habitat units recorded as embedded (Table 3). There is a risk of an adverse effect from a sediment pulse following a large stand replacement wildfire, however it is likely that embeddedness would decrease over time as near stream large wood falls into the stream and subsequent high flow events sort substrate and wash fines out of the system. It would be critical that land management activities do not exacerbate the situation following such a wildfire.

Large Woody Debris (LWD): LWD aids in dissipating stream energy, trapping sediment, and the formation of pools. LWD is not meeting Forest Plan standards in either Vance Creek or Canyon Creek for the type of forested system they drain (Table 3). The Vance Creek subwatershed is not expected to produce or transport appreciable amounts of LWD in the near term (Table 6). Within the Upper Canyon Creek subwatershed, only Sugarloaf Gulch has a high LWD recruitment potential. Overall, this subwatershed has a low potential to recruit LWD (Table 6). The no action alternative would have no effect on LWD in the short term, however there is a risk of a large stand replacement wildfire which may result in increased levels of large wood over current levels.

Pool Frequency and Quality: Existing levels of pool habitat are below the Forest Plan standard for Vance Creek and Canyon Creek (Table 3). Pool habitat can be reduced where land management activities result in reductions of pool forming elements (e.g. LWD), changes in bedload (e.g. large increases in fine sediment) or changes in channel morphology (e.g. widening or straightening). Current low levels of quality pool habitat would be maintained.

Large Pools: Deep, large pools are important loci for thermal regulation and buffering. Deep pools buffer stream temperature extremes and provide areas of low stream energy to reduce physiological stress on fish. Deep pools often signal a stable river system. In contrast, a lack of deep pools may signal stream aggradation. Of the 42 pools identified in the stream survey for Reach 1 of Canyon Creek, within the analysis area, only eight pools were at least three feet deep.

Off-Channel Habitat: The potential for off-channel habitat is limited along Vance Creek, although Canyon Creek has potential for off-channel habitat within the analysis area. The no action alternative is not likely to reduce off-channel habitat to the point where it can no longer support juvenile rearing with such features as depth, shade, submerged and overhanging large wood, or aquatic vegetation.

Refugia: The no action alternative is not likely to reduce the complexity of refugia to the point where these areas no longer are able to provide adequate hiding or foraging cover to support juvenile rearing.

Channel Condition and Dynamics

Wetted Width/Maximum Depth Ratio: Width to depth ratios can increase with increased bank instability and sedimentation. See discussion on sediment. The no action alternative would have no effect on this parameter in the short term. In the long term, roads and culverts currently impacting streams would continue to do so as road maintenance is not likely to keep up with all needs. Additionally, there is a risk of a stand replacement wildfire of sufficient size and intensity to result in increased peak flows and stream channel instability which can result in increased width to depth ratios.

Stream Bank Condition: See above sections on sediment and wetted width/maximum depth ratio. Limited road maintenance may improve stream bank condition at stream road crossing locations. Streambanks immediately downstream from culverts which are impacting stream banks would continue to erode from water velocities at peak or near peak flows. This would maintain the current condition.

Floodplain Connectivity: The road system would remain as it is. Roads impacting floodplain connectivity would continue to impact this indicator. This would maintain the current condition.

Hydrology/Flow

Change in Peak/Base Flows: Road systems affect peak flows by extending the drainage network (see below) and increasing delivery efficiency to the stream channel. As described below this alternative would not change peak flows from the existing condition.

Drainage Network Increase: Road management activities have the greatest potential to affect the drainage network. Road maintenance may result in a reduction of the drainage network by adding relef drainage structures and reducing the channeling of water in ephemeral draws. However, the limited amount of regularly scheduled road maintenance would not likely keep up with impacts on the landscape from the existing road system. This alternative is expected to maintain the baseline condition in the short-term and potentially increase the drainage network in the long-term.

Watershed Conditions

Road Density and Location: Stronghold populations of salmonids are associated with higher elevation forested lands and the proportion declines with increasing road densities (Quigley et al. 1996). The higher the road density, the lower the proportion of subwatersheds that support strong populations of key salmonids. Specifically, Quigley et al. (1996) shows a strong correlation with road densities of 2 miles/mile2 or higher and reduction of strong populations of salmonids. Further reductions of strong salmonid populations were identified at densities of 3 miles/mile2 and 4 miles/mile2 or greater. Roads in the project area that occur within 100 feet of streams or cross streams commonly impact fish and fish habitat more than roads located in uplands.

Table 7: Road/Stream Interaction Information

	[1]Entire Subwatershed (Public & Private)			
Subwatershed	**Total Road Miles**	**Road Miles within 100 ft. of Cat. 1-4 Channels**	**Stream Crossings on Roads**	**Total Road Density Mi/ Mi^2**
Vance Creek	113	18	172	3.88
East Fork Canyon Crk	1.3	0.1	3	0.05
Upper Canyon Crk	125	20	181	3.44
Total	240	38	356	N/A

[1] Note: Rounding road miles during calculations may result in minor (0.1) mile discrepancies. This information was derived from the Malheur National Forest GIS.

Road densities would remain above 3 miles/mile2 in Vance Creek and Upper Canyon Creek subwatersheds and miles within 100 feet of Category 1-4 channels would remain high (Table 7). There are nearly 39 miles of roads that likely impact streams due to proximity (100 feet or less). This alternative would not change road densities or location in the project area. Road densities and roads in close proximity to streams would remain at detrimental levels in all subwatersheds except for East Fork Canyon Creek which is primarily wilderness.

Roads in RHCA's would continue to confine stream channels and restrict spotted frog habitat by inhibiting the expansion of wetlands that were reduced or degraded by road construction where these habitats originally existed.

Potential Effects to Steelhead Critical Habitat

The planning area is within designated critical habitat for Mid-Columbia River steelhead. The specific PCEs that may be affected by the no action alternative include freshwater spawning, freshwater rearing, and freshwater migration corridors. The specific critical habitat unit affected by the no action alternative is:

HUC 5: Canyon Creek (1707020107)

Freshwater spawning sites

Water Quantity

Road systems affect peak flows by extending the drainage network and increasing delivery efficiency to the stream channel. As described below, this alternative would not change peak flows from the existing condition. The effects of road maintenance activities in this alternative on peak/base flows would maintain current conditions.

Due to the inherent variability of hydrologic characteristics these changes are unlikely to be measurable without intensive sampling over many years. Beaver are expected to repopulate the analysis area over time. Beaver dams may result in water storage both in ponds and off-channel in valley bottoms and floodplains which would augment late season stream flows.

Water Quality

The activities with the highest potential for affecting sediment input to streams are related to road maintenance, or a lack thereof. Road related impacts most likely to contribute high sediment inputs would be plugged culverts leading to washed out road fills, undersized culverts at stream crossings leading to high water velocities and subsequent erosion at culvert outlets, or sediment channeled on road surfaces and routed through road-side ditches and cross-drain culverts to streams. Under this alternative, there would be no road management activities other than routine road maintenance. This can be considered a no effect, or no change from the existing condition, in the short term, however, at existing funding levels road maintenance is not expected to keep up with all needs. This alternative would not do anything to reduce impacts of the existing road system. It would be expected that sedimentation from existing roads would increase over time, unless other projects are implemented to address these impacts. Given the risk of a high intensity, stand replacement wildfire under the no action alternative, a higher erosion potential exists for a certain period of time following such an event. Intense storm events (greater than a six year event) immediately following such a wildfire that burned in steep terrain and had large areas of high severity burn may result in concentrated run-off, resulting in sediment transport directly into fish bearing streams. Due to the inherent variability of hydrologic characteristics these changes are unlikely to be measurable without intensive sampling over many years.

Historically beaver dams within the analysis area captured sediment and created deep pool habitat that benefited fish. Higher water tables resulted in larger (wider) riparian areas with appropriate vegetation associations present and showing plant reproduction and vigor.

Minimal input of nutrients from livestock feces is expected. Because these inputs are expected to be minimal, it is unlikely that water quality would be impaired.

Freshwater rearing sites

Water Quantity

See discussion above.

Water Quality

See discussion above.

Water Temperature

With no vegetative treatments or prescribed burning in riparian areas, there would be no short term effect on water temperature. There is an increasing risk, over time, of a high intensity, stand replacement wildfire. Riparian areas within this project area are not large enough to act as fire breaks for high intensity wildfires. Since there would be no treatment to reduce the risk of stand replacement wildfires, all streams in the area with existing conifer or hardwood shading, would be at risk for losing shade and incurring increasing summer water temperatures in the future. Ongoing road maintenance activities located within RHCA's would not reduce existing stream canopy cover sufficiently to adversely affect streamside shading or water temperature.

Anecdotal evidence suggests that beaver were abundant within the Canyon Creek watershed prior to the arrival of fur trappers in the area and numerous accounts of recent beaver activity was noted in stream survey field notes from Vance Creek in 1993. The net effect of beaver dams may be to lower water temperatures by increasing bank storage, which leads to increased base flow levels (CCWA 2003).

Food

If the beaver population within the watershed increases, the carrying capacity of fish habitat would likely increase with more complex habitats for aquatic invertebrates, increased levels of detritus, lower summer water temperatures, lower embeddedness, and greater terrestrial and aquatic insect (food) abundance. Minshall (2003) found that the effect of fire on macroinvertebrates, in otherwise intact, unfragmented stream ecosystems is not catastrophic nor is recovery exceptionally long term, even where extended periods of fire suppression have occurred.

Freshwater migration corridors

Free Passage

This alternative would not obstruct steelhead migration corridors.

Water Quantity

See discussion above.

Water Quality

See discussion above.

The affects to all of the MPI Habitat Indicators were rated as “maintain”. This rating means that the function of the indicator does not change with the action.

Due to the fact that none of the indicators are likely to be degraded with the no action alternative, but there may be minor affects that are considered insignificant, the Forest has made the determination that the no action alternative is “May Affect, Not Likely to Adversely Affect” Mid-Columbia Steelhead Critical Habitat.

Summary of Direct and Indirect Effects on Aquatic TES Species

Alternative 1 (No Action)

In summary, there is an increasing risk, over time that this alternative would result in adverse effects to steelhead trout, redband trout, Chinook salmon, westslope cutthroat trout, and Columbia spotted frogs, because of increasing impacts from the existing road system and from the risk of high intensity, stand replacement wildfire. As noted by Dunham et al. (2003), the effects of wildfires depend on a variety of factors including their timing, location, area, extent, and intensity. Other factors include the characteristics of the ecosystems and the species affected along with other indirect physical and ecological linkages. While such events can cause short term negative effects, such as those listed below, over long time periods the resulting habitat conditions may be more productive then in areas where natural disturbance has been suppressed (Dunham et al. 2003). Wildfires can have a number of detrimental effects to stream channels such as decreasing stream channel stability, increasing discharge and affecting discharge variability, altering coarse woody debris delivery and storage, increasing nutrient availability, increasing sediment delivery and transport, increasing solar radiation and altering water temperature regimes (Dunham et al. 2003). In cases where natural stream processes are already impaired such as Vance Creek and Canyon Creek, the recovery of the stream ecosystem from the effects of wildfire is likely to be slower, more sporadic, and potentially incomplete (Minshall 2003). These future impacts could reach a magnitude of "Likely to Adversely Affect" for steelhead trout because of the short term water temperature increase due to a high intensity fire burning through the riparian area can lead to direct mortality of fish in the stream at that time. These impacts would not cover a large enough area to result in a WIFV determination for redband trout, Chinook salmon, westslope cutthroat trout, or Columbia spotted frogs (see Table 1 definitions).

Alternative 2 – Proposed Action

Effects Calls - Determination:

- Mid-Columbia Summer Steelhead (T): "May Affect, Not Likely to Adversely Affect (NLAA) with long-term Beneficial Effect" (BE).

- Steelhead Designated Critical Habitat: "May Affect, Not Likely to Adversely Affect (NLAA) with long-term Beneficial Effect" (BE).

- Interior Redband Trout (S): "May Impact Individuals or Habitat, but will not likely contribute toward federal listing or loss of viability to the population or species (MIIH) with long-term Beneficial Impact" (BI).

- Chinook Salmon (S): "May Impact Individuals or Habitat, but will not likely contribute toward federal listing or loss of viability to the population or species (MIIH) with long-term Beneficial Impact" (BI).

- Chinook Salmon Essential Fish Habitat: "No Adverse Effect (NAE).

- Westslope Cutthroat Trout (S): "May Impact Individuals or Habitat, but will not likely contribute toward federal listing or loss of viability to the population or species (MIIH) with long-term Beneficial Impact" (BI).

- Columbia Spotted Frog (S): "May Impact Individuals or Habitat, but will not likely contribute toward federal listing or loss of viability to the population or species" (MIIH).

Direct and Indirect Effects

Water Quality

Temperature: Timber harvest units, landings, and all temporary roads would be located outside RHCA's under Alternative 2. Restricting these activities to areas outside of RHCA's would prevent adverse impacts to existing stream shading. RHCA widths are sufficient for Category 1 and 2 streams to prevent removal of trees that provide stream shading. Hand thinning and pile burning is planned for Units 132 and Unit 558, along fish bearing reaches of Vance Creek and Canyon Creek, respectively. No thinning would occur within 60 feet of these streams and trees would not be directionally felled into the no cut zone. Hand piles in RHCA's would be located at least 50 feet away from live and intermittent stream channels and not in riparian vegetation.

Prescribed fire activities would occur in RHCA's. Burning activities would mimic low intensity fires that are characteristic of natural burning patterns that tend to occur in riparian areas. This technique would result in a patchy distribution of burned and unburned areas in RHCA's based on the Malheur National Forest's experience with past prescribe burning activities in RHCA's using the same technique. Ignition of prescribed fire is planned within RHCA's on approximately 210 acres and would occur under strict burn prescriptions. In other burn blocks, fire from upslope burning units which is within prescription, would be allowed to back into RHCA's. Design elements include retention of at least 95% of stream shade and a goal of less than 5% actual exposed mineral soil within RHCA's. The prescribed burning would occur when moisture and climate conditions would minimize the potential for a high intensity burn. Although some mortality of overstory trees may occur, loss of shade which could affect stream temperature is not expected to occur. Prescribed burning is not expected to burn in the moist riparian hardwood communities along Wickiup Creek. Burning in the ponderosa pine communities along Fawn Springs tributary to Alder Gulch is expected to be low intensity and rarely kill trees in this fire adapted community. Burning would be excluded from Vance Creek by the burn boundary which is a road. Longer term beneficial effects could result from increased riparian vegetative vigor, as a result of these low intensity, mosaic burns in riparian areas. In a recent study Beche et al. (2005) found that a fall prescribed fire within the riparian zone of a mixed-conifer forest in El Dorado County, California was patchy in terms of intensity, consumption, and severity. Additionally they found that although 49.4% of all tagged trees (>11.5 cm/4.5 in.) and snags were scorched by the prescribed fire, only 4.4% of all tagged trees were dead one year after the prescribed fire. In general the trees killed by the prescribed fire were small and located near areas of high litter accumulation (Beche et al. 2005).

Water withdrawals for dust abatement during haul activities would occur. Water withdrawals would be in accordance with the 2005 Malheur National Forest Road Maintenance Biological Assessment (BA) and NMFS guidance (with the exception that drafting would be permitted before sunrise and after sunset) (see Appendices A and B). During logging operations, water trucks take advantage of cooler temperatures and lack of evaporation by watering before sunrise to maximize efficiency of water treatment. Use of these procedures would ensure that water withdrawals do not result in a measurable increase in water temperatures.

There are no additive cumulative effects to water temperature in fish habitats from this project in addition to other past, present and foreseeable projects and therefore will result in a neutral effect to water temperature. No change to water temperature baseline is expected.

Sediment: Timber harvest units, landings, and temporary roads would not be located in RHCA's under Alternative 2. Restricting these activities to areas outside of RHCA's would minimize the potential for sediment delivery to fish bearing streams. There would be soil disturbance associated with commercial timber harvest and other proposed activities, primarily as a result of tractor skidding, and subsoiling of skid trails and landings. The risk of sediment from these activities reaching streams providing fish habitat is negligible, due to the likelihood that sediment will remain within unit boundaries as described in the Soils section. In most cases sediment generated from these activities, which has the potential to move off-site during rare large storm events, would be captured in the RHCA buffer.

There is also the potential for generating sediment from non-commercial thinning operations and burning hand piles. The risk of sediment from these activities reaching fish habitat is negligible because they do not involve heavy equipment and design elements have been developed to reduce the risk of sediment delivery to streams.

While high intensity prescribed fire has the potential to result in exposed soil, which in turn poses a potential for sediment transport off-site, the design elements for the proposed prescribed burning in this project would minimize that risk. Burn plan prescriptions would include parameters for weather and fuel moisture conditions, percent duff removal, percent mineral soils exposed, and others, which will set the sideboards to keep fire intensity to a level that would not result in soil loss. The ignition and limited use of fire within RHCA's described above would result in a low risk of generating sediment along perennial streams. Hand lines would not be permitted within RHCA's thus reducing the risk of sediment being channeled to intermittent or perennial stream channels. Beche et al. (2005) conducted intense post-precribed fire monitoring (e.g. pebble counts, longitudinal profiles, cross-sections) and observed little to no change in stream sediment composition 1 year post-fire. Similarly, they observed little to no change in stream channel morphology and no substantial change in erosion or deposition in the surveyed reaches (Beche et al. 2005). The prescribed burning would be expected to burn across Category 4 RHCA's, since these would be dry during the burning operations. However, as mentioned in the Soils section, because burning would take place so as to avoid decreasing ground cover below LRMP standards; the potential for erosion from these areas would not be significant. The potential for some sediment movement in some of these intermittent channels which could reach fish habitat is low, except under rare, intense storm events.

New Road Construction: A new road approximately 200 feet long would be constructed on a ridge top across National Forest Lands to provide access to private property near Unit 570. This access would allow the property owner to conduct vegetation treatments and timber harvest on his property to reduce the fire hazard and to improve forest health. The alternative access route entirely on his property would be located near the riparian area of Canyon Creek and may increase the potential to cause sedimentation and other adverse impacts. This new road is outside of the RHCA. Because of the location and design criteria for this road, it is not expected that any sediment generated from the construction or use of this road would reach fish bearing streams. The risk of causing enough sedimenatation to Canyon Creek to affect fish habitat is negligible.

Temporary Road Construction: The proposed action includes construction of approximately 2 miles of temporary road. Approximately 0.8 miles are new temporary road and approximately 1.0 mile is existing roads which were previously decommissioned and would be returned to their existing state after use. All temporary roads are located entirely outside of RHCA's. Temporary roads are not part of the Forest road system, and they would be "decommissioned" after use. (The treatments applied are the same as decommissioning, but since the roads are never part of the Forest road system, the term does not technically apply.) Similar to the new road construction described above, these are low standard, low profile roads. The main difference between decommissioning these roads and closing the roads as described above, is that as needed to assure revegetation of the road surface, the roads would be scarified, or subsoiled. As stated in the Soils section, personal observations by the soil scientist indicate that sediment generated from temporary road construction and use would be deposited within 20 feet of the road edge. Because of the location and design elements for these roads, it is not expected that any sediment generated from the construction, use, or "decommissioning" of these roads, would reach fish bearing streams.

Haul Road Use: There will be an opportunity to perform road maintenance on up to 86 miles of Forest roads commensurate with commercial uses associated with project activities. The type of road maintenance activities which may occur on roads used for commercial haul could include:

- Blading and shaping of road surface and ditches
- Construction or reshaping of drain dips or grade sags
- Construction of waterbars/cross ditches
- Spot rocking of road surface
- Brush removal from roadway
- Felling and or removal of hazard trees
- Minor realigning of road junctions
- Cleaning culverts
- Seeding
- Removing excess materials from roadway

Because the maintenance work accomplishments will be commensurate with use, the amount actually accomplished will vary depending on existing road conditions, season of use and other factors. When road maintenance work is accomplished, commensurate with use, it would help to ensure that haul roads are kept in an appropriate condition so as to avoid deterioration of conditions and reduce erosion and sediment output from haul roads.

Approximately 14 miles of commercial haul routes are located within RHCAs. Of these 14 miles within RHCAs, approximately 4.3 miles are over native surface roads. The Malheur National Forest has a policy (with direction from PACFISH RF-2) to regulate traffic during wet periods to minimize erosion and sediment delivery. This includes log haul, as well as, any other vehicle traffic. Mitigation measures such as dust abatement (mainly for safety reasons), hauling on dry or frozen ground, and ceasing haul activities during muddy conditions are highly effective at minimizing sediment input to streams.

Because haul roads would receive pre/during and post haul maintenance, commensurate with use, and the majority of these roads are near intermittent tributaries, upstream from fish habitat; the magnitude of haul road use on sedimentation is insignificant, and therefore would result in a neutral effect.

Reopening of Closed Roads: Approximately 46 miles of currently closed roads would be opened for timber harvest and then effectively reclosed. Of these 46 miles to be opened, approximately 4 miles are located within RHCAs. Of these 4 miles approximately 3.4 miles are native surface and 0.6 miles are improved surface roads. These closed roads were previously analyzed to derive subwatershed road densities under Alternative 1 (No Action alternative). The baseline condition of these roads was considered to be similar to open roads, with respect to the level of vegetation recovery, even though it is recognized that some of these roads have grown-in to varying degrees (i.e., 6500104, 6500247).

Reopening these closed roads would not change road densities already analyzed under the Alternative 1. Road densities and roads in close proximity to streams would remain at detrimental levels in all subwatersheds except for East Fork Canyon Creek which is primarily wilderness.

As mentioned in the Watershed section of the EA, Best Management Practices associated with the proposed activities are expected to control most run-off and sediment transport under common run-off events. However, because the proposed activities would be implemented in sub-drainages which have been previously disturbed by management activities, including roading at densities in excess of five miles/square mile, a slight probability exists that previous disturbance would become connected to ground disturbance associated with the proposed actions.

The magnitude of reopening closed roads on sedimentation is insignificant, and therefore would result in a neutral effect for the following reasons: 1) reopened roads would receive pre/during and post haul maintenance, commensurate with use, and would be effectively reclosed after use, 2) the majority of these reopened roads (42 miles) are not located in RHCAs and those that are within RHCAs (4 miles) are upstream from fish habitat, and 3) as noted in the Soils section of the EA, the effects of either alternative on mass movement would be negligible because soil stability ranges from moderately stable to very stable (Appendix I). Soils that are highly susceptible to gully and streambank erosion (valley floor and meadow soils) are for the most part located on private lands along Canyon Creek (Appendix I-10), and are not associated with these reopened roads.

Road Maintenance: Roads used within the sale area would receive road maintenance at a level commensurate with use. Road maintenance includes several activities that potentially result in sedimentation from the road prism to the ditch line, or the adjacent slope. Typical road maintenance activities could include: blade and shape road including existing drainage dips, grade sags, and waterbars, repair damaged culverts, place rock in some existing drainage dips and grade sags, place rock in wet areas of road, brushing, remove hazard trees, and dust abatement.

Project design elements and protective measures from the 2005 Malheur National Forest Road Maintenance BA would be followed for the replacement, removal, or installation of ditch-relief culverts (see Appendix C).

The longer term effects of road maintenance, commensurate with use, are to maintain or improve existing road conditions. Road maintenance, commensurate with use, may decrease chronic sedimentation in some locations. Improving drainage, removing ruts and rills from the driving surface, and adding less erosive surfacing material would reduce detachment and transport of sediment. This is especially important for roads within RHCA's. Because road maintenance activities would be commensurate with use, it is possible that if winter logging occurs, little to no road maintenance may be necessary and therefore would not occur. Alternatively, if operations occur in the summer, road maintenance, commensurate with use, may occur on all or nearly all of the roads.

The overall effect to the baseline conditions of sediment is the slight effects over the short term or long term would be insignificant enough to move the baseline levels of sediment in spawning habitat of steelhead, Chinook salmon and redband trout.

Chemical Contaminations/Nutrients: The Forest Service would require a Hazardous Substances Plan and a Prevention of Oil Spill Plan from the contractor to be reviewed and approved prior to implementation of activities including prescribed fire. Refueling and fuel storage sites would be located at least 150 feet away from live streams. Other chemicals used may include saw gas and oil, and fuels used to ignite fires. All have the potential to adversely affect aquatic TES species, if they were to enter nearby stream systems. Handling procedures and spill plans would minimize the risk of potential effects. In the event of the need for fire suppression actions, no chemicals or retardant would be used within 150 feet of water or wetlands. There is minimal risk of an accidental spill from logging equipment, vehicles used to transport crews, equipment, ignition materials, or fire suppression activities in the event of an escaped prescribed burn.

Beche et al. (2005) found that ash deposition from the prescribed fire appeared to have a minimal impact on stream water chemistry with increases in some water chemistry parameters ($SO4^-$, total P, $CA2^+$, and $Mg2^+$). It should be noted that their study area had low to moderate hillslopes and so accelerated erosion and ash delivery would not be expected. Most of the areas within the Canyon Creek WUI project area have hillslopes ranging from 35 to 60% (~60% of the watershed) with some slopes as steep as 150% or greater (CCWA 2003). It might be expected that these same water chemistry parameters would also increase with the proposed prescribed burning in this alternative, at least temporarily.

Dust abatement proceedures would adhere to the Road Maintenance Specification in the Dust Abatement plan. Lignin sulfonate, magnesium chloride, or water may be used for dust abatement, as needed, during periods of heavier vehicle use associated with commercial timber harvest activities. Chemical dust abatement will be avoided on the 14 miles of commercial haul routes located within RHCAs. When the chemical treatments are used, these treatments are applied in spring-early summer, to provide dust abatement for the operating season. The maximum potential use would be an annual application during the years of commercial timber harvest. Water for application would come from the following designated water sources: Wickiup Campground on Canyon Creek, and near the powder house on Forest Service Road 3920 on Vance Creek.

Because handling procedures, refueling restrictions and spill plans would be in place and there is a low probability of a fuel spill when lighting in RHCAs, there is a neutral effect of the project to streams from chemical or nutrient contamination. No change to baseline levels of nutrients or chemical contaminants are expected.

Habitat Access

Physical Barriers: No physical barriers from road/stream crossings limiting TES aquatic species would be created or removed as a result of this alternative. A neutral effect to fish passage barriers will result from this project.

Habitat Elements

Substrate Embeddedness: See the previous discussion on sediment. No change to the baseline conditions are expected for embeddedness in steelhead, Chinook salmon or redband trout habitat.

Large Woody Debris (LWD): Approximately 14 miles of commercial haul routes are located within RHCAs. Felling of danger trees for human safety along haul routes in RHCA's has the potential to reduce the supply of LWD to stream channels and therefore pool habitat. Under PACFISH, trees may be felled in RHCA's when they pose a safety risk (PACFISH Standard RA-2). All trees felled in RHCA's for safety reasons would be kept on site in accordance with PACFISH Standard RA-2 to meet woody debris objectives.

Prescribed fire activities would occur in RHCA's. Burning activities would mimic low intensity fires that are characteristic of natural burning patterns in riparian areas. This technique would result in a patchy distribution of burned and unburned areas in RHCA's. Using these techniques, mortality of understory trees may occur in burned patches but few overstory trees would be killed. Fire intensities would not be high enough to consume trees or downed wood large enough to function as LWD (> 20" dbh) in stream channels therefore burning activities would not result in a reduction of pool habitat. Consumption of coarse wood near stream channels greater than 4"dbh would be minimized. Beche et al. (2005) found that prescribed fire did not change the amount or movement of LWD in their study reach relative to unburned streams. They did note, however, that in other less intensely studied reaches snags fell into the stream channel.

There is a neutral or slightly positive effect to large wood and its recruitment from the project because instream wood will not be physically removed from RHCA's, snags may fall into streams as a result of prescribed fire activities, some roadside danger trees may be felled into stream channels, ephemeral draws or floodplains, and the reduction in stocking densities following burning activities may increase the vigor of larger trees in the overstory.

Pool Frequency and Quality: Timber harvest units, landings, and all temporary roads would be located outside RHCA's under Alternative 2. Restricting these activities to areas outside of RHCA's would prevent adverse impacts to existing pool habitat and future pool habitat. Current low levels of quality pool habitat would be maintained.

Large Pools: Current low levels of quality large pool habitat would be maintained.

Off-Channel Habitat: This baseline indicator would be maintained.

Refugia: This baseline indicator would be maintained

Channel Condition and Dynamics

Wetted Width/Maximum Depth Ratio: Proposed timber harvest activities would not result in increases in width to depth ratios since heavy equipment associated with felling and yarding activities would not be operated in RHCA's and therefore would not result in alteration of banks or bank vegetation.

Since no significant change to flow, sediment supply and streambank conditions are expected, no change to baseline conditions for width to depth ratios are expected.

Stream Bank Condition: Timber harvest units, landings, and all temporary roads would be located outside RHCA's under Alternative 2. Increases in fine sediment of a magnitude that would result in destabilization of stream channels from ground disturbing activities associated with timber harvest activities are unlikely to occur because RHCA buffers are sufficient to trap the majority of fine sediment produced by these activities.

Minor impacts to stream bank stability may occur as a result of prescribe burning activities in RHCA's (see Sediment discussion). However, streambank stability baseline conditions are not expected to change as a result of the project.

Floodplain Connectivity: No road construction, or other activity is proposed, which could result in disconnecting any floodplain function from the adjacent stream.

Hydrology/Flow

Change in Peak/Base Flows: Approximately 8,000 acres would receive treatment, including 5,150 acres of commercial timber harvest fuel reduction, 1,900 acres of non-commercial fuel reduction, 7,050 acres of surface fuel treatment by piling and burning, and 3,000 acres of fuel treatment by underburning (2,050 acres in harvest and thinning units and 950 outside of treatment units). Reducing the number of trees growing on a site can result in increased summer base streamflow, by reducing evapotranspiration.

With the level of canopy reduction in this proposed action, the expected magnitude of the increase in base flow would be negligible. The Watershed section of the EA reports that no measurable changes in water quantity or runoff regime are expected because less than 30% of the vegetation in the project area would be cut (Troendle 1982). In addition, in eastern Oregon, it appears that more than 30% of a watershed vegetated with mixed conifer or lodgepole must be cut before changes in water quantity or runoff regime are measurable (Helvey & Fowler 1995). Cutting higher proportions is probably required to result in similar responses for watersheds vegetated with drier plant associations typical of the project area; the project treats less than 30% of the watershed.

Approximately 3,000 acres would receive underburning. A large portion of this is in areas where a primary objective is to reduce ground fuels (duff and needle layer). In this type of prescribed burning, about 60% of the area within the unit boundary typically burns, and fire intensity is low. There would be some mortality of very small trees, but very limited loss of larger trees. Also, there would typically be less than 5% actual exposed mineral soil within RHCAs. With the percentage area treated in any given year, and the low intensity of the prescribed burning, the risk of increased peak flows of a magnitude to affect channel stability and sedimentation would be insignificant.

Drainage Network Increase: See discussion on sediment. New road construction is limited to only 200 feet and new temporary road construction is limited to 0.8 miles, therefore only a slight increase in drainage network is expected, however this baseline indicator would remain unchanged because all temp roads would be effectively closed after use.

Watershed Conditions

Road Density and Location:

This alternative would not change road densities or location in the project area. Effects to this indicator would be negligible. See discussion on sediment.

Road densities and roads in close proximity to streams would remain at detrimental levels in all subwatersheds except for East Fork Canyon Creek which is primarily wilderness. Roads in RHCA's would continue to confine stream channels and restrict spotted frog habitat by inhibiting the expansion of wetlands that were reduced or degraded by road construction where these habitats originally existed.

New road construction is limited to only 200 feet, all outside of the RHCA. The use of this road is not likely to lead to direct sedimentation because of the distance to Canyon Creek. Effects from temporary roads are likely to be minimal because there are only 1.8 miles of temporary roads and because of the distance to fish bearing streams from temporary roads.

Disturbance History:

The fuel loading is approximately 16 tons per acre, with half or more of this fuel loading being in the 3"+ DBH size class. Litter and duff accumulations are higher than those which historically accumulated. The fuel loading is not consistent with the forest types and fuel loads of Fire Regime 1, the frequently occurring surface fires that historically maintained low fuel loadings. The tree canopy is multi-layered and interlocking in many areas, which is not characteristic of historic conditions in the hot dry and warm dry forests. In an uncontrolled fire situation, crown torching would be frequent in many areas. Crown bulk density, the weight of tree crowns over an area, is currently moderate to high. Wildfire would burn as a stand replacing crown fire, with high rates of spread and severity to the vegetation and the soils. The dense stands of trees provide a continuous path for crown fire to spread across long distances. Fires would have long spotting distances and would show high resistance to control. In most of the project area, natural fire occurrence under these conditions cannot be managed for resource benefit.

Alternative 2 would have an effect on features of the disturbance history within this watershed, however no measurable changes in water quantity or runoff regime are expected because less than 30% of the vegetation in the project area would be cut (Troendle 1982). In addition, in eastern Oregon, it appears that more than 30% of a watershed vegetated with mixed conifer or lodgepole must be cut before changes in water quantity or runoff regime are measurable (Helvey & Fowler 1995). Cutting higher proportions is probably required to result in similar responses for watersheds vegetated with drier plant associations typical of the project area; the project treats less than 30% of the watershed.

Under Alternative 2, fuel loading would be approximately 5 to 15 tons per acre, with half or more of this fuel loading being in the 3”+DBH size class of fuels depending on where in the natural fire cycle the area is. Duff accumulations would be relatively low. Canopy base height would be maintained at sufficient height from frequent low-intensity fires that only occasional torching would occur. Crown bulk density, the weight of tree crowns over an area, would be sufficiently low that even if surface flame lengths were high enough to reach the crown, fire would not spread in a stand replacing type of crown fire. The canopy would be open, more characteristic of historic densities in the warm dry forests. Fire would remain primarily as a surface fire, with high rates of spread but exhibiting low severity to the larger fire dependent trees and the soils. Fires would have short spotting distances, and would show much less resistance to control compared to a crown fire. Fire could be managed for resource benefit, if desired and appropriate.

Riparian Habitat Conservation Areas:

Prescribed burning in RHCA’s is not expected to expose mineral soil due to the design elements described in Chapters 1 and 2 of the EA. Consequently prescribed burning is not expected to contribute to watershed hazard or detrimentally affect stream or riparian condition.

Under Alternative 2, small material (<9 in. d.b.h.) would be thinned from selected stands (about 60 acres in six units) in the outer part of RHCA’s along Vance Creek, Canyon Creek, and some other streams. Fuels would be hand piled and burned. The small amounts of mineral soil expected to be exposed following pile burning in RHCA’s are not expected to connect into areas that concentrate run-off and increase erosion risk due to the design elements described in Chapters 1 and 2 of the EA. These elements would result in dispersing burning though time and allow for recovery of ground cover between ignitions of closely spaced piles. Thinning would result in healthier stands in which large trees would be expected to live and grow more rapidly than under the existing condition as described in the Vegetation Section of the EA, providing large woody debris for future recruitment. Fire hazard would also be reduced, likely resulting in low intensity fire burning in treated areas. In the event of wildfire entering these RHCA's, little mortality would be expected. Prescribed fire could be used routinely to maintain healthy stand conditions. Vegetation in the inner portion of RHCA's is not expected to be affected by the proposed activities as they would be implemented at least 25 feet away and because of higher humidities found in these areas. Future prescribed fire or wildfire would be expected to burn with low intensity. It is unlikely that low intensity fire would fully consume organic matter on the soil surface and expose mineral soil so erosion hazard would not be changed. Low intensity fire is not expected to burn wetter riparian vegetation; it would naturally die out within the inner RHCA's. Conditions in other RHCA's**,** where fuels would not be treated (such as wildlife corridors) and fuel loads would remain high, would be similar to those described for Alterative 1, resulting in higher severity burns locally. Consequently the proposed activities in RHCA's are consistent with PACFISH standards FM1 and 4 because they would maintain or improve conditions in RHCA's. No change to the baseline conditions for RHCA's will result from this project.

Disturbance Regime:

Alternative 2 would have an effect on features of the disturbance history within this watershed, however project elements would have a neutral effect on flow regime and sediment regime of the streams in the project area as a whole. The most likely effect on watershed hazard under Alternative 2 is little or no change across the landscape compared to the Existing Condition since BMP's associated with the proposed activities are expected to control most run-off and sediment transport under common run-off events. However, because the proposed activities would be implemented in sub-drainages which have been previously disturbed by management activities, including roading at densities in excess of five miles/square mile, a slight probability exists that previous disturbance would become connected to ground disturbance associated with the proposed actions.

While these connections would be expected to extend channels headward, runoff is not expected to be concentrated enough to cause accelerated erosion or to deliver increased sediment to live streams in most locations under common rainfall events. Hazard increases in sub-drainages such as those in Upper Canyon Creek Watershed, Alder Gulch, Fawn Creek, Vance Creek, and others in the Vance Creek Subwatershed where existing disturbance and proposed tractor and skyline harvest are located lower in the sub-drainage. The extended drainage network would also increase watershed hazard associated with future rare run-off events. Watershed hazard is reduced about five years after implementation as ground cover recovers to slow run-off from common events and trap sediment. Large run-off events tend to exceed the potential of ground cover to slow run-off and trap sediment. Disturbance associated with past activities would continue to recover except where recovery is interrupted as described above. Proposed yarding increases watershed hazard less than that used in past harvest because BMP's and design elements direct implementation onto side slopes, out of the more sensitive ephemeral draws. Compaction in draw bottoms, typically resulting from past practices, tends to increase watershed hazard under large run-off events because of opportunities for erosion to be initiated and accelerated due to soil structure changes. Locating skid trails on sideslopes also permits drainage control to be effective.

Watershed hazard is expected to be reduced under Alternative 2 because removal of fuels typically results in reduced fire behavior which often reduces the area where uncharacteristic fire occurs. Reduced fire behavior results in less severe effects to soil. Less severe effects to soil typically results in less erosion and sediment delivery to streams compared to uncharacteristic fire behavior. Because fuels would be reduced and low intensity fire would be expected over much of the project area, with a reduction in uncharacteristic fire behavior, watershed hazard is expected to be reduced in nine subwatersheds immediately after treatment (year 1). The return to low intensity fire behavior would be expected to counter the effects of ground disturbing activities in the event of wildfire. Watershed hazard would be reduced in up to 15 sub-drainages at year 5 because ground cover on disturbed areas would have recovered. The watershed hazard in the other four sub-drainages would remain at low to moderate levels.

Potential Effects to Steelhead Critical Habitat

The planning area is within designated critical habitat for Mid-Columbia River steelhead. The specific PCEs that may be affected by the proposed action include freshwater spawning, freshwater rearing, and freshwater migration corridors. The specific critical habitat unit affected by the proposed action is:

HUC 5: Canyon Creek (1707020107)

Freshwater spawning sites

Water Quantity

Road systems affect peak flows by extending the drainage network and increasing delivery efficiency to the stream channel. As described above, this alternative is not expected to change peak flows from the existing condition. The effects of road maintenance activities in this alternative on peak/base flows would maintain current conditions.

Due to the inherent variability of hydrologic characteristics these changes are unlikely to be measurable without intensive sampling over many years. Beaver are expected to repopulate the analysis area over time. Beaver dams may result in water storage both in ponds and off-channel in valley bottoms and floodplains which would augment late season stream flows.

Water Quality

The activities with the highest potential for affecting sediment input to streams are related to road maintenance, or a lack thereof. Road related impacts most likely to contribute high sediment inputs would be plugged culverts leading to washed out road fills, undersized culverts at stream crossings leading to high water velocities and subsequent erosion at culvert outlets, or sediment channeled on road surfaces and routed through road-side ditches and cross-drain culverts to streams. Except for minor improvements associated with road maintenance, commensurate with use, similar conditions as described under Alternative 1 - with regard to road maintenance, would continue and it would be expected that sedimentation from existing roads would increase over time, unless other projects are implemented to address these impacts. Watershed Hazard is expected to increase slightly in the short term, for up to five years, under the most common run-off events. Some activities such as those associated with ground-based and skyline systems and the construction of selected temporary roads would increase the exposure of mineral soil and the potential for drainage linkages to develop. Improvement in RHCA stand conditions is expected to reduce watershed hazard locally. Considering the effects of all the activities, watershed hazard is expected to increase for up to five years until ground cover recovers to Forest Plan standards.

Freshwater rearing sites

Water Quantity

See discussion above.

Water Quality

See discussion above.

Water Temperature

No effects on water quality or 303(d) listed streams are expected because none of the proposed actions are expected to remove vegetation which is providing shade from stream side areas. Proposed actions to improve stand conditions by commercial thinning would remove vegetation from along intermittent streams or from the outer portions of fish-bearing RHCA's. Other parameters which may affect water quality also affect watershed hazard; since no changes are expected in watershed hazard along perennial or fishbearing streams, no changes in water quality are expected.

Food

If the beaver population within the watershed increases, the carrying capacity of fish habitat would likely increase with more complex habitats for aquatic invertebrates, increased levels of detritus, lower summer water temperatures, lower embeddedness, and greater terrestrial and aquatic insect (food) abundance. Beche (2005) found that prescribed fire had little to no effect on macroinvertebrate communities.

Freshwater migration corridors

Free Passage

This alternative would not obstruct steelhead migration corridors.

Water Quantity

See discussion above.

Water Quality

See discussion above.

The affects to all of the MPI Habitat Indicators were rated as "maintain". This rating means that the function of the indicator does not change with the action.

Due to the fact that none of the indicators are likely to be degraded with the Proposed Action, but there may be minor affects that are considered insignificant, the Forest has made the determination the Proposed Action is “May Affect, Not Likely to Adversely Affect” Mid-Columbia Steelhead Critical Habitat.

Cumulative Effects

All of the activities in Appendix C have been considered for their cumulative effects on aquatic TES species. The following discussion focuses on those past, ongoing and reasonable foreseeable future activities that may contribute adverse effects to aquatic TES species or their habitat.

Common to Both Alternatives

Since the 1850s the Canyon Creek watershed has been subjected to a variety of land-use practices. Practices have included beaver trapping, mining, fire suppression, road construction, timber harvest and grazing activities on public and private land. These activities have reduced aquatic TES species habitat quality and complexity in and adjacent to project area streams.

Historically, fire has been the most widespread disturbance in the Canyon Creek watershed (CCWA 2003). Wildfires within the watershed would have had a higher frequency of occurrence prior to European settlement of the area, but fires would generally have been of lower intensity than under a fire-suppression strategy. Sediment inputs would probably have been more frequent due to this fire pattern but would have been short-lived as vegetation returned quickly to the burned areas (CCWA 2003). Recent fires that have occurred in the analysis area have burned approximately 1,466 acres since 1986. Areas of high mortality have been planted with native conifers. Wildfire suppression may have altered natural disturbance regimes that contribute to watershed structure and function (CCWA 2003). Fire exclusion has caused the build-up of fuels, overstocking of trees, and has created a situation where the possibility exists for a catostrophic wildfire. With a probable historic fire-return interval of five to 15 years, as many as 10 fire cycles have been eliminated from this ecosystem (CCWA 2003). Even catostrophic wildfires can burn internally patchy with areas of low to moderate burn severity or islands of unburned vegetation. Evidence suggests that fires and disturbance in general can pose greater threats to fishes when their habitats become fragmented and otherwise altered by human activities (Dunham et al. 2003). Other human influences can interact with fire and when taken cumulatively can negatively affect aquatic TES species (e.g. habitat loss, degradation, and fragmentation, and nonnative species invasions, such as the introduction of brook trout into this watershed) (Dunham et al. 2003).

Data on earlier harvests is not available, however logging has been occurring in the watershed since about 1877. Since 1979 timber harvest has occurred on approximately 6,695 acres of Forest Service lands within the analysis area. These harvest activities likely reduced the amount of LWD in perennial streams within the analysis area. The amount of LWD and coarse wood available for delivery from intermittent drainages during storm events was also likely reduced. Pre-commercial thining has occurred on approximately 3,606 acres. These activities may have reduced the risk of high intensity, stand replacement wildfire although sediment may have been delivered to stream channels if watershed Best Management Practices (BMP's) were not being implemented at the time.

Approximately 177 miles of road have been constructed in the analysis area for fire suppression, timber harvest, and public access. Many of the roads were built for tractor logging and are in stream bottoms and poorly located in steeper areas for skyline yarding (Table 7). Some 66 miles of road have been closed and 15 miles or road have been decommissioned within the analysis area.

Open and closed roads can account for most of the sediment problems in a watershed because they are a link between sediment source areas (skid trails, landings, and cut slopes, etc.) and stream channels. They directly affect the channel morphology of streams by accelerating erosion and sediment delivery and by increasing the magnitude of peak flow (Furniss et al. 1991). Wemple (1994) focused on the interaction of forested roads with stream networks in Western Oregon and found that nearly 60% of the road network drained into streams and gullies, and are therefore, hydrologically integrated with the stream network. From a qualitative standpoint, the following assumptions can be used as general indicators of sediment delivery risk associated with roads: 1) the higher the road density the higher the potential for sediment yield increases due to the larger acreage of exposed surfaces, 2) the more drainage ways that are crossed the higher probability that direct sediment introduction would occur, and 3) the greater the distance, or higher on the slope, that the road is from the drainage network, the less probability for delivered sediment to occur (erosion may occur but is less likely to be routed to the stream).

Surface erosion is highly dependant on soils, road surfacing and condition, road grade, traffic volumes, and the effectiveness and spacing of drainage structures. The greatest surface erosion problems occur in highly erodible terrain, particularly landscapes underlain by granitic soils, soils of the Clarno formation, and certain highly fractured or weathered rock types. Studies have found that sediment delivery to stream systems is highest in the initial years after road construction, although raw ditch-lines and road surfaces with little binder can remain chronic sources of sediment. Native surface roads (mostly Maintenance Level 1 and 2 roads) are generally greater chronic sediment sources than surfaced, higher standard roads.

Drainage structure, function, and spacing are keys to minimizing the amount of surface flow, which directly affects surface erosion. The spacing of drain or ditch relief structures depends on the road gradient, road surface and ditch soil types, runoff characteristics, and the effects of concentrated runoff on slopes below the road. FSH and other manuals provide guidelines for drainage structure spacing. Drainage structures should be close together on silt-sand soils with little to no binder on steep slopes and further apart on gravel road surfaces with moderate binder and little to no fines on flat or minimum grades.

The majority of open and closed roads, 56% in the Vance Creek subwatershed and 76% in the Upper Canyon Creek subwatershed, are native surface roads. Native surface roads are more likely to contribute fine sediment to streams that can adversely affect aquatic habitat compared to roads with other surface types. Most native service roads, if used other than during dry or frozen conditions cannot tolerate much traffic without rutting causing other resource problems. Adverse affects to aquatic TES species are more likely to occur where native surface roads are located adjacent to Category 1 streams. High densities of native surface roads in the Vance Creek and Upper Canyon Creek subwatersheds are likely sources for the high fine sediment levels in Vance Creek and Canyon Creek.

Livestock grazing has been occurring in this area since the early days of settlement. Historic sheep and cattle grazing have produced changes in some riparian areas. It is unknown as to the extent that past or historic grazing activities have contributed to degradation of the watershed compared to other management activities. In 1991, 6.5 miles of riparian corridor fence was installed on private land along Canyon Creek and in 1990 approximately 1/2 mile of riparian corridor fence was installed on lower East Fork of Canyon Creek (ODFW 2006). Because most of Canyon Creek is corridor fenced the effects of open range livestock accessing Canyon Creek and East Fork Canyon Creek have been reduced. Concerns for the aquatic resources in the past 30 to 40 years have led to changes in the grazing strategy and have produced dramatic improvements in most riparian areas throughout the John Day Basin.

Beaver were abundant in the Canyon Creek watershed prior to the arrival of fur trappers (CCWA 2003). Beaver dams trap sediment, reduce water velocity, and can redistribute water as hyporheic flow. The net effect of beaver dams may be to lower water temperatures by increasing bank storage, which leads to increased base flow levels (CCWA 2003).

In 1991 three log weirs were installed on private land on Canyon Creek to provide adult chinook salmon holding habitat (ODFW 2006). Those log weirs are still functional and may help to provide deep pools which spring chinook salmon may hold in throughout the summer months until they spawn in September. Without such deep pools in which to hold in, chinook salmon may not be able to get up to spawning habitat due to low flows when spring chinook move upstream into Canyon Creek from the mainstem John Day River. These weirs also benefit steelhead by providing holding habitat for adults and rearing habitat for juveniles.

Currently much of the reductions in shade and increases in sediment load due to past public land management activities is recovering and would continue to recover under the proposed action, in the absence of a high intensity, stand replacement wildfire. However, other ongoing road, recreation, special use, hazard tree treatments, private land development, and mining activities on public and private lands taken cumulatively may fragment and maintain less than desirable aquatic conditions within or in proximity to the analysis area.

Alternative 1 – No Action

Road maintenance activities if performed on a regular basis would help to ensure that culverts are cleaned out and maintained, waterbars and other drainage features are properly constructed and maintained, and would result in reduced levels of fine sediment entering streams within the analysis area. However, at existing funding levels road maintenance would not keep up with all needs. It would be expected that sedimentation from existing roads would increase over time, unless other projects are implemented to address these impacts.

The Little Canyon Fuels Reduction project would continue on BLM lands on Little Canyon Mountain and fire suppression activities would continue on public and private lands in the analysis area. The effects of fuels reduction within the watershed is likely to reduce the short-term risk of high intensity, stand replacement wildfire. Active fire suppression alone without treatments or prescribed burning would increase the risk of high intensity, stand replacement wildfire in the long-term.

In 2006 an irrigation dam on private land on Canyon Creek is expected to be replaced to improve fish passage (ODFW 2006). Improved fish passage would benefit aquatic TES fish by making it easier for them to migrate to spawning areas and escape warm water areas and move upstream into cooler water refugia.

Commercial and pre-commercial thinning and fuel treatment along three miles of Highway 395 south of Starr Ridge is likely to reduce the risk of wildfire and is likely to benefit aquatic conditions in Bear Gulch and lower Vance Creek.

A new road may still be constructed by a private landowner to conduct vegetation treatments and timber harvest on his property, to reduce the fire hazard, and to improve forest health. If he does not build the 200 foot long ridgetop road described in the proposed action, the only potential access route located entirely on his property would be near the riparian area of Canyon Creek and may increase the potential to cause sedimentation and other adverse impacts associated with new road construction near fish bearing streams.

The Canyon Creek Culvert Replacement project would benefit aquatic TES species in Canyon Creek and allow unhindered upstream migration of all life stages of salmonids. Replacement of these culverts would ensure that juvenile salmonids would be able to escape warm water areas and be able to freely migrate upstream to cooler water areas during summer months. Currently, juvenile salmonids are only able to move downstream through the existing culverts, but are not able to migrate back upstream to cool water refugia at these locations.

Alternative 2 – Proposed Action

Continued livestock grazing is unlikely to degrade habitat pathways or indicators at the 5th field HUC level and is unlikely to retard near natural rates of recovery for PACFISH RMOs at either project, subpopulation or watershed-scale in the Upper John Day River subbasin when management practices, proposed actions, conservation measures and monitoring are implemented as proposed. Consequently no cumulative effects on Vance Creek or Canyon Creek are expected to develop from the proposed activities following common run-off events.

Road maintenance activities if performed on a regular basis would help to ensure that culverts are cleaned out and maintained, waterbars and other drainage features are properly constructed and maintained, and would result in reduced levels of fine sediment entering streams within the analysis area. However, at existing funding levels road maintenance would not keep up with all needs. It would be expected that sedimentation from existing roads would increase over time, unless other projects are implemented to address these impacts. Detrimental impacts from the proposed action are not expected to reach fish bearing streams because expected effects would be small enough so as to meet the Forest Plan standards, and because water quality BMP's and other design criteria would be in place. Consequently no cumulative effects on Vance Creek or Canyon Creek are expected to develop from the proposed activities following common run-off events.

The Little Canyon Fuels Reduction project is expected to continue on BLM lands on Little Canyon Mountain and fire suppression activities would continue on public and private lands in the analysis area. The effects of fuels reduction within the watershed is likely to reduce the risk of high intensity, stand replacement wildfire.

In 2006 an irrigation dam on private land on Canyon Creek is expected to be replaced to improve fish passage (ODFW 2006). Improved fish passage would benefit aquatic TES fish by making it easier for them to migrate to spawning areas and escape warm water areas and move upstream into cooler water refugia. No additional cumulative effects are expected with implementation of the proposed action.

The Canyon Creek Culvert Replacement project would benefit aquatic TES species in Canyon Creek and allow unhindered upstream migration of all life stages of salmonids. Replacement of these culverts would ensure that juvenile salmonids would be able to escape warm water areas and be able to freely migrate upstream to cooler water areas during summer months. Currently, juvenile salmonids are only able to move downstream through the existing culverts, but are not able to migrate back upstream to cool water refugia at these locations. Minor amounts of fine sediment may be generated with the replacement of these culverts, however, because detrimental impacts from the proposed action are not expected to reach fish bearing streams, no cumulative effects on Canyon Creek are expected to develop from the proposed activities following common run-off events.

Of the activities proposed in this alternative, only prescribed burning, pile burning, limited pre-commercial thinning, and certain road maintenance and log haul activities could affect sediment input to fish bearing streams. All other activities would occur outside of RHCA's, and associated buffering should be sufficient to trap any mobilized soil resulting from external ground disturbance. Prescribed burning, as described in the direct and indirect effects section, could creep down to streams and remove soil cover and although ground cover would decrease, especially during fall burns, effects from prescribed burning would be minor. Burning would take place so as to avoid decreasing ground cover below Forest Plan standards, so erosion would not be significant (see Soils report). The risk of sediment reaching fish habitat from non-commercial thinning operations and burning hand piles is negligible because these activities are done by hand and design elements have been developed to reduce the risk of sediment delivery to streams. Because haul roads would receive pre/during and post haul maintenance, commensurate with use, and the majority of these roads are near intermittent tributaries, upstream from fish habitat; the magnitude of haul road use on sedimentation is insignificant.

As a result, the cumulative increase in sediment would be negligible. Consequently no cumulative effects to fish habitat on Vance Creek or Canyon Creek are expected to develop from the proposed activities following common run-off events.

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APPENDIX A – General Water Drafting Guidance for Road Maintenance and Non-emergency Fire Use for Watersheds with Anadromous Fish in the Blue Mountain Tri-Forest Area

Within the Blue Mountain Tri-Forest area (Malheur National Forest, Umatilla National Forest, and Wallowa Whitman National Forest), water drafting regularly occurs to accomplish road maintenance activities as well as control fires. Because of the wide distribution of Endangered Species Act (ESA) listed anadromous salmonids within the Tri-Forest area, and frequency of drafting water for Federal activities, there is potential for water drafting activities interfering with ESA listed anadromous salmonids. This is particularly true in northeast Oregon where streams used for water are small and support ESA-listed anadromous salmonids.

Water drafting for road maintenance activities can happen at any time of the year, though the largest water withdrawals typically occur in spring. Water is used to soften soil for road shaping, grading, and rocking. These activities usually involve tanker trucks ranging from 500 gallons to 3500 gallons which fill their tanks from local surface water sources and distribute water on roads as they drive. Most tankers used for this application are equipped with power take off (PTO) pumps which are powered by the vehicles engine. PTO pumps for these types of tankers typically range from about 150 gallons per minute (gpm) (approximately 0.3 cubic feet per second (cfs)) to about 550 gpm (approximately 1.2 cfs) and are often not capable of varying pump rates. Because these types of pumps are capable of removing large volumes of water at high rates, and streams available for water drafting are often small, it is important to avoid or minimize the potential to harm or harass ESA listed anadromous salmonids.

Water drafting for prescribed fire use can vary from use of small pumps (less than 40 gpm/ 0.1 cfs) for direct use with hoses to larger pumps as described above for filling tanks or water tenders.

Regardless of pump rate, physical damage to redds, spawning adults, or juveniles can occur from incorrect placement of water drafting equipment. Proper equipment handling and placement in sensitive areas is important to reduce the likelihood of direct harm of ESA listed anadromous salmonids.

This document provides guidance for water drafting activities mainly associated with road maintenance and non-emergency fire suppression activities in the Blue Mountain Tri-Forest area (Umatilla, Malheur, and Wallowa Whitman National Forests). The goal is to create an understandable and workable protocol that will allow water drafting to occur while avoiding or minimizing risks to Endangered Species Act (ESA) listed fish.

The following guidance is intended to minimize or avoid adverse effects to listed fish in the Blue Mountain Tri-Forest area when engaging in water drafting activities. As with any activity, site specific or project specific information may require more stringent or relaxed criteria to avoid adverse effects. In addition, compliance with these criteria may not minimize adverse effects to avoid take of listed fish in all cases, and therefore does not preclude the need for consultation. Projects will be reviewed on a case by case basis to ensure that guidance is reasonable, prudent, and adequately avoids or minimizes adverse effects to listed species.

1. Any intake used for drafting water will be screened according to NOAA Fisheries Juvenile Fish Screen Criteria For Pump Intakes for salmonid fry (see Appendix B).

2. Non-stream water (i.e. ponds) sources will be used prior to the use of stream sources whenever feasible.

3. When non-stream sources are unavailable, streams with the greatest flow will be used whenever feasible.

4. Water withdrawal will not reduce stream flow by more than 1/10th. In order to accomplish the lowest reduction of flow from marginal water sources (sources in which water drafting will reduce flows by more than 5%), the lowest drafting rate on pumps that have adjustable draft rates, and the smallest volume tender appropriate for the project will be used. Whenever feasible, marginal water sources will be avoided.

5. During drafting, streams will be monitored for reduced flows. If a flow concern is identified, operators will reduce pumping rates to ensure that flow reduction is not more than 1/10th of the existing stream flow is being removed or discontinue drafting.

6. If marginal water sources are used, withdrawal from single marginal sites will be limited to 18,000 gallons per day.

7. No more than one high-volume pump per site will be used, except sites in which the use of multiple pumps will not measurably decrease stream flows.

8. To avoid disturbing fish that may be spawning, No drafting will occur from any pools which contain adult salmonids.

9. Operators will avoid direct effects to redds or pre-emergence alevins by placing the intake hose in the deepest part of a drafting pool (where redds are unlikely to be present) and will avoid placing equipment on areas that redds are known or suspected to be. Operators will also ensure that tailout areas of pools that are known or suspected to have redds will not be dewatered.

10. 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 will 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 will be deferred, when possible, until fall precipitation reduces the need for water drafting. Spring and fall blading and shaping will minimize demands for water usage, will minimize dust production, and will reduce sediment generated from surface erosion.

11. NOAA Fisheries may periodically review drafting activities to ensure that these measures are adequate for the protection of listed fish.

APPENDIX B – NMFS Juvenile Fish Screen Criteria for Pump Intakes

Developed by:

National Marine Fisheries Service
Environmental & Technical Services Division
Portland, Oregon
May 9, 1996

The following criteria serve as an addendum to current National Marine Fisheries Service gravity intake juvenile fish screen criteria. These criteria apply to new pump intake screens and existing inadequate pump intake screens, as determined by fisheries agencies with project jurisdiction.

Definitions used in pump intake screen criteria

Pump intake screens are defined as screening devices attached directly to a pressurized diversion intake pipe. Effective screen area is calculated by subtracting screen area occluded by structural members from the total screen area. Screen mesh opening is the narrowest opening in screen mesh. Approach velocity is the calculated velocity component perpendicular to the screen face. Sweeping velocity is the flow velocity component parallel to the screen face with the pump turned off.

Active pump intake screens are equipped with a cleaning system with proven cleaning capability, and are cleaned as frequently as necessary to keep the screens clean. Passive pump intake screens have no cleaning system and should only be used when the debris load is expected to be low, and

1. if a small screen (less than 1 CFS pump) is over-sized to eliminate debris impingement, and

2. where sufficient sweeping velocity exists to eliminate debris build-up on the screen surface, and

3. if the maximum diverted flow is less than .01% of the total minimum streamflow, or

4. the intake is deep in a reservoir, away from the shoreline.

Pump Intake Screen Flow Criteria

The minimum effective screen area in square feet for an active pump intake screen is calculated by dividing the maximum flow rate in cubic feet per second (CFS) by an approach velocity of 0.4 feet per second (FPS). The minimum effective screen area in square feet for a passive pump intake screen is calculated by dividing the maximum flow rate in CFS by an approach velocity of 0.2 FPS. Certain site conditions may allow for a waiver of the 0.2 FPS approach velocity criteria and allow a passive screen to be installed using 0.4 FPS as design criteria. These cases will be considered on a site-by-site basis by the fisheries agencies.

If fry-sized salmonids (i.e. less than 60 millimeter fork length) are not ever present at the site and larger juvenile salmonids are present (as determined by agency biologists), approach velocity shall not exceed 0.8 FPS for active pump intake screens, or 0.4 FPS for passive pump intake screens. The allowable flow should be distributed to achieve uniform approach velocity (plus or minus 10%) over the entire screen area. Additional screen area or flow baffling may be required to account for designs with non-uniform approach velocity.

Pump Intake Screen Mesh Material

Screen mesh openings shall not exceed 3/32 inch (2.38 mm) for woven wire or perforated plate screens, or 0.0689 inch (1.75 mm) for profile wire screens, with a minimum 27% open area. If fry-sized salmonids are never present at the site (by determination of agency biologists) screen mesh openings shall not exceed 1/4 inch (6.35 mm) for woven wire, perforated plate screens, or profile wire screens, with a minimum of 40% open area.

Screen mesh material and support structure shall work in tandem to be sufficiently durable to withstand the rigors of the installation site. No gaps greater than 3/32 inch shall exist in any type screen mesh or at points of mesh attachment. Special mesh materials that inhibit aquatic growth may be required at some sites.

Pump Intake Screen Location

When possible, pump intake screens shall be placed in locations with sufficient sweeping velocity to sweep away debris removed from the screen face. Pump intake screens shall be submerged to a depth of at least one screen radius below the minimum water surface, with a minimum of one screen radius clearance between screen surfaces and adjacent natural or constructed features. A clear escape route should exist for fish that approach the intake volitionally or otherwise. For example, if a pump intake is located off of the river (such as in an intake lagoon), a conventional open channel screen should be considered, placed in the channel or at the edge of the river. Intakes in reservoirs should be as deep as practical, to reduce the numbers of juvenile salmonids that approach the intake. Adverse alterations to riverine habitat shall be minimized.

Pump Intake Screen Protection

Pump intake screens shall be protected from heavy debris, icing and other conditions that may compromise screen integrity. Protection can be provided by using log booms, trash racks or mechanisms for removing the intake from the river during adverse conditions. An inspection and maintenance plan for the pump intake screen is required, to ensure that the screen is operating as designed per these criteria.

APPENDIX C – Relevant Project Design Elements for Road Maintenance Activities

STEELHEAD

The following road maintenance activities and the relevant project design elements were described in the Malheur National Forest (MNF) Road Maintenance Biological Assessment and are contained in: National Marine Fisheries Service. 2005. Endangered Species Act - Section 7 Informal Consultation and Management Act Essential Fish Habitat Consultation for the MNF Road Maintenance Activities 2005-2009 – dated January 24, 2005.

Road Reshaping and Blading

Forest roads can be hydrologically connected to fish bearing waters. Precipitation and snow melt can create runoff that, in turn, can create sediment depositions and delivery to those hydrologically connected roads and streams. Maintenance of the road prisms and the water flow controls incorporated in the roadways are vital to minimizing the deterioration of the ability of the water controls to keep sediment from entering stream systems. Reshaping road surfacing is intended to remove irregularities from the road surface, which can cause the concentration of runoff in amounts, which result in soil and aggregate displacement through rills, ruts, and pot holes. Maintenance Level III and IV roads open to travel on an annual basis and possessing crushed aggregate in the base or surface are shaped at least once a year if funding is available.

Road maintenance activities occur primarily from June 15 to October 15 depending on the actual condition of the road and the moisture level. If rutting will occur, the standard practice is to delay maintenance until the road is dry enough to allow equipment to the site without damaging the road. These activities within RHCA's including bull trout and steelhead waters will be completed after July 15 and/or prior to August 15. Proposals to work outside this window will be reviewed by Level 1 prior to taking action to take advantage of moist road surfaces and to document if there is a concern with spawning.

Design Elements

- Side casting of materials will not occur where these materials could be directly or indirectly introduced into a stream, or where the placement of these materials will contribute to destabilization of the slope.
- Before working in a RHCA, all heavy equipment or other machinery will be inspected for hydraulic or other leaks. Leaking or faulty equipment will not be used. Equipment with accumulations of oil, grease, or other toxic materials will be cleaned in pre-approved sites outside RHCA's.
- Undercutting of cut slopes will be avoided during ditch maintenance activities.
- Fuel storage and fueling of equipment will not occur within RHCA's.
- Disposal materials will be deposited in approved disposal areas.

- Grader operators will backslope away from areas adjacent to streams where there is a potential for sediment delivery into streams. Sediment control devices will be placed to trap sediment in hot spots where sediment could reach a stream.
- Grassy areas are maintained around culverts to minimize the potential for sediment delivery to streams from road grading. Sediment control devices will be placed to trap sediment in hot spots where sediment could reach a stream.
- Sloughing material is 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 become narrowed by loss of material from cut banks or by machine removal of the slough, the slough material is hauled to an approved stable waste site where it is deposited and seeded.

Drainage Structure Maintenance

Drainage maintenance is one of, if not, the most important item of maintenance. Drainage maintenance is performed in order to disperse runoff and minimize road-generated sediment and delivery to surface waters. Drainage maintenance includes the maintenance of drainage structures including culverts, water bars, drain dips, and ditches. Actions include removal of coarse and fine materials and brush from catch basins, inlets, outlets, outlet channels, leadoff ditches, trash racks, drop inlets, water bars, open-top culverts, and rolling dips.

Drainage structure work accomplished under maintenance includes opening plugged culverts, adding water bars to road surfaces, maintaining and forming drivable drainage dips into road surface, adding ditch relief culverts, replacing plugged or damaged ditch relief culverts, and cleaning drainage ditches. These proposed actions will be reviewed by Level 1 prior to taking action if they occur within Category 1 or in Category 2 streams where sediment could enter fish habitat.

Plugged culverts are opened using hand shovels or power equipment. The material removed by hand is spread away from drainage so it will not fall or wash back into the drainage channel or structure. When cleaned with backhoe, the material is hauled to a disposal area by dump truck away from areas subject to erosion or discharge into streams. These proposed actions will be reviewed by Level 1 prior to taking action if they occur within PACFISH/INFISH Category 1 or in Category 2 streams where sediment could enter fish habitat unless they are emergency situations and are consulted on under emergency consultation procedures.

Roadside ditches and lead off ditches shall be cleaned of any material, which would obstruct the flow of water. When possible, grassed ditches are not disturbed, except where necessary to re-establish functional drainage.

Water bars are used on roads to disperse water at variable intervals to slow the velocity and decrease the volume of water traveling on the road prism, thus decreasing the risk of sedimentation due to erosion. These water bars are cut into the road surface at spacing intervals, which control the accumulation of water volumes and velocities. Backhoes and excavators are generally used to perform drainage repair or replacement.

Design Criteria

- Waste materials removed during maintenance activities and cleaned materials from culverts and open tops will be deposited in approved disposal areas outside flood plains in pre-approved disposal sites.
- Before working in a RHCA, all heavy equipment or other machinery will be inspected for hydraulic or other leaks. Leaking or faulty equipment will not be used. Equipment with accumulations of oil, grease, or other toxic materials will be cleaned in pre-approved sites outside RHCA's.
- Berms, sediment basins, or sediment traps will be constructed where required to contain sediment from the damage/repair site.

Ditch Relief Culvert Replacement, Installation or Removal

Ditch relief culverts remove water from roadside ditches, decreasing sedimentation to streams by reducing the concentration of water exiting roadside ditches. Replacement, removal, or installation of ditch relief culverts can occur outside RHCA's or in RHCA's, although culverts located in RHCA's are not located in a streambed. Backhoes and excavators are generally used to perform ditch relief culvert construction activities. Ditch relief culvert construction activities outside of RHCA's would occur as part of this consultation but would be limited to dry conditions and would use appropriate sediment control measures to ensure sediment does not reach streams. Ditch relief culverts construction activities occurring inside RHCA's will occur only during dry conditions. Sediment controls will ensure that sediment will not enter streams. The proposed activities will be reviewed by MNF fisheries biologist and will receive approval from the Level 1 Team before being carried out. Culvert removal, replacement, or installation in perennial or intermittent streams will be consulted on separately as a separate project.

Design Criteria

- Work would be done only during dry conditions.
- During installation, efforts are taken to prevent the escapement of soil into streams.
- Sediment filters, hay bales, or other devices will be installed at the culvert outlet if natural filters are not present.
- Culvert work inside RHCA's will be reviewed with engineering and hydrology or fisheries staff and designed to conform the project design criteria, standards, guides, and best management practices of this BA. These activities are subject to review and approval of Level 1.

Sign Maintenance and Construction

When selecting sign locations, sites adjacent to fish bearing streams will be avoided if at all possible to avoid disturbance and potential for sediment delivery to the stream and to prevent the need for brushing for visibility.

Sign maintenance includes: straightening rock basket and sign post, cleaning the sign face, brushing for sign visibility, installing hazard markers that denote road hazards, and replacing missing lag screws. When a sign degenerates to an unacceptable degree it will be replaced. When not applicable to the public, signs will be removed, covered, hinged, turned, or supplemented with another sign that indicates periods of time that signing is applicable. When signs are installed in rock baskets, the rock basket shall be no less than 113 inches circumference and 32 inches high. For posts twelve feet or higher, baskets shall be no less than 151 inches in circumference and 52 inches high. All posts shall be placed to the proper height and be thoroughly tamped in. They shall in no case be less than two feet or a quarter of the post height in the ground, or which is greater. Multiple post installation shall be used on signs 40 inches or more in width. The elevation of the lowest marker (an arrow symbol) will be four feet from near edge of road surface to bottom of sign. Reassurance markers or other single route markers will also be four feet. Destination and warning (any signs other than route markers) should be a minimum of five feet.

Road Snag or Danger Tree Felling

Road maintenance requires snags and danger trees to be felled on all open and seasonally opened roads. Trees are felled to comply with OSHA regulations and to maintain safe driving conditions. Snag falling is the cutting of dead trees, which have either lost their bark or their bark is loosened and there are signs of rot. The snags must be sufficiently tall to reach the traveled way and are leaning toward the road before they become necessary to fall. Danger tree falling is the cutting of a large standing green tree which has either root-sprung, contains butt rot, or has a severe lean in the direction of the travel way. The tree is of such length that it will hit the traveled way if it falls. Much of this work is accomplished through timber sale contracts. These situations will require a review by the Level 1 Team to ascertain if the proposed action is within the NLAA effects determination covered in this BA. All trees will be felled with normal stump heights. When feasible, trees shall be felled so that they land outside the road clearing limits. Trees falling inside the clearing limits shall be treated in the same manner as shown under logging out (see next section) or cleaning and grubbing specifications.

Danger trees within a riparian habitat conservation area (RHCA) will be felled and left onsite.

Logging Out

Logging out is the bucking, removal, and disposal of downed trees, logs, and debris, which have fallen on or across the road bed or lie within the traveled way, thus presenting safety and access concerns. Logging out is performed to provide safe travel for the road users and provide adequate room to achieve road maintenance activities with maintenance equipment. All roads except Maintenance Level I roads require logging out as part of the road maintenance program, unless funding or priorities determine differently. It is intended for all arterial and main collectors to be logged out as early in the year as possible.

Logging out removes fallen trees, snags, or protruding trees that extend into the travel way. Additional width shall be cleared if needed for maintenance. Any wood, slash or debris over four inches in diameter and two feet long either existing or created from logging out operations, will be removed from ditches, drainage channels, traveled way, shoulders, and turnouts and scattered on the downhill slope away from drainage. Trees within the travel way shall be cut, limbed, and placed outside the travel way and turnouts and out of drainages and ditches. Trees standing outside travel way but having branches extending into the area shall be limbed to a height of 14 feet. Trees that are blocking ditches or drainage structures may be cut. Some slash will be used as sediment filters at outlets for cross road drainage. Some of the slash will be chipped and placed on cut or fill slopes or disturbed areas. The chipped material provides sediment control, holds in moisture improving sprouting of native seed, and is incorporated more rapidly into the duff layer.

Any portion of a tree, which has fallen into a RHCA will be left in place outside of the roadway. Merchantable logs outside the RHCA shall be cut and removed from the traveled way to facilitate safe passage and proper maintenance. Non-merchantable logs may be cut any length to facilitate safe removal. If these logs are decked to provide designated firewood to the forest users, the deck will not be adjacent to live streams in order to prevent fuel contamination.

When removing downed logs in the road, which extend into a stream, any material on the fill slope and in the stream will be retained to provide for instream woody debris recruitment. If the woody debris is endangering nearby culverts, bridges, or road fill, the debris will be relocated in its original condition to the fill slope or stream channel downstream of the structure.

Design Criteria

When removing down logs, which extend into a stream, from a road, any material on the fill slope and in the stream will remain (not be removed) to provide for woody debris recruitment, except in cases where the retention of this material would result in a safety concern (i.e. downstream facilities). Any felled hazard trees or blow down in RHCA's will be left in the RHCA and off the roadway.

Roadside Brushing

Roadside brushing is performed to provide visibility, safe stopping distance, clearance for maintenance equipment, unimpeded travel and unobstructed flow of water by the removal of standing vegetation in ditches which may divert water out of the intended course of flow within the clearing limits. Safety and drainage issues will be the primary need for brushing.

On designated open roads, maintenance Level III to V, brush is removed when it reaches a damage threshold described below.

The threshold for roadside vegetation is exceeded when:

- Growth hinders ones view of regulatory and warning signs by blocking the symbol within 200 feet on level III roads, 275 feet on level IV roads, and 375 feet on level V roads.
- Growth interferes with the use of a travel way
- Growth blocks the view of oncoming traffic to the degree that a driver could not determine the speed or existence of an oncoming vehicle thus affecting adequate stopping distance.
- Growth interferes with the steady flow of water in ditches or through drainage structures.

Roadside brushing on Level II roads will consist of cutting and disposing of vegetative growth to provide at lease twelve feet of continuous traveled way and eight feet of turnout width where they exist plus any additional width needed for maintenance. All vegetation shall be cut within two inches of the traveled way. Limbing may be done with a chainsaw or hand tools. Limbs are cut flush to the tree trunk. Debris from cutting operations shall be removed from the brushed area and scattered or chipped. Some slash from cutting operations will be used as sediment filters at outlets for cross road drainage. Some of the slash will be scattered or chipped and placed on cut or fill slopes or disturbed areas. The chipped material provides sediment control, holds in moisture improving sprouting of native seed, and is incorporated more rapidly into the duff layer.

Level III, IV, and V roadside brushing consists of cutting and disposing of vegetative growth including trees less than six inches in diameter. The area to be brushed includes cut slopes, fill slopes, ditches, roadbed, turnouts and vertical clearance. Additional area shall be brushed on the inside of curves as necessary to achieve adequate sight distance. Trees outside the roadbed or ditch, but within the brushing limits, which are over six inches in diameter will be limbed in lieu of cutting. Trimming or limbing may be done with a chainsaw or hand tools. Limbs are cut flush to the tree trunk. Debris from cutting operations shall be removed from the brushed area and scattered or chipped. Some slash from cutting operations will be used as sediment filters at outlets for cross road drainage. Some of the slash will be scattered or chipped and placed on cut or fill slopes or disturbed areas. The chipped material provides sediment control, holds in moisture improving sprouting of native seed, and is incorporated more rapidly into the duff layer.

Design Criteria

- In road segments that parallel stream courses, brushing operations will 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 will occur within RHCA's where safety is an issue. Options other than complete "removal" will 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 on sites where brush removal would cause sediment to be delivered to a stream.
- When brush cutting is necessary at stream crossings, it will be cut only to a minimum height of six inches above the ground to prevent sediment delivery to a live stream and will be left in ditches. Brush and other standing vegetation provide shade and filtering of dust delivery to streams and will 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 RHCA's will be reviewed by an MNF fish biologist or hydrologist and will require approval of the Level 1 Team.

Dust Abatement

During the summer months some roads will receive dust abatement treatment. Dust abatement is the application of a product, which either bonds dust particles and fines to larger matter or makes them heavier so they tend not to rise with the passage of vehicles. The purpose of dust abatement is to prevent loss of surface fines, enhance vehicle safety, and in some cases, prevent pollution and provide vehicle occupant comfort. Water is the only agent that will be used for dust abatement.

Water source development is not part of the proposed action of this BE. Where water can be drafted from designated water sources, it can occur only as long as supply is adequate to provide for both fish and withdrawal. Screens are attached to intake hoses to prevent pulling fish and other small matter. NOAA FISHERIES developed criteria for pump intake screens will be used on all water pump intakes as described in the attached "Appendix B, Juvenile Fish Screen Criteria For Pump Intakes" (NMFS, May 9, 1996). Screen mesh openings shall not exceed 3/32 inch for woven wire or perforated plate screens, or 0.0689 inch for profile wire screens, with a minimum 27% open area. Trucks will be maintained to prevent oil leaks. Loading is done in a manner to minimize overflowing and discharge of wash into stream.

Storage water will be pumped or gravity fed into a holding tank or pond, using less than ten percent of the stream volume. All systems will have screened intake pipes and return systems will be designed that prevents sediment from entering the stream. The maximum withdrawal from one site in an 8-hour period will be 18,000 gallons of water.

Water drafting guidelines prepared by NOAA Fisheries are included in Appendix A and will be implemented as needed under this BE.

Snow Removal

Removal of snow from roads is needed to facilitate logging operations and access for project work (e.g., reforestation). As snow plowing is done in connection or association with timber harvest and/or reforestation, it will be included as an activity with those projects for consultation.

Snow removal is also done to ensure safe and efficient transportation and to prevent unacceptable erosion damage to roads, streams, and adjacent lands. Removal includes the entire road width and turnouts. Snow slides, minor earth slides, fallen timber, and boulders that obstruct normal road surface width, including turnouts, are also removed. If culverts and ditches are restricted by snow or ice, they will be opened to allow proper drainage.

Design Criteria

Any type of equipment may be used to remove snow, providing:

- Type or use of equipment is not restricted in contract or permit clauses or Forest Road Rules document.
- Equipment is of the size and type commonly used to remove snow and will not cause damage to the road.
- The use of dozers to remove snow requires written Forest Service approval. All equipment shall be equipped with shoes or runners, unless agreed otherwise, that are designed to leave 4-6" of snow on roadway. Snow will not be completely removed.
- Berms shall be opened (surface trenches or drainage holes) to prevent the accumulation of runoff during melt off. Drainage holes will be spaced as required to obtain satisfactory surface drainage without discharge on erodible fills and will be placed above vegetation filters.
- Side casting of snow will be avoided in areas adjacent to streams where there is potential to cause snow or ice damming.
- Side cast material will not include dirt and gravel.
- Damage from, or as a result of snow removal, will be restored in a timely manner.

Road Closures

Road closure actions in this BE will include the installation of a physical device to restrict vehicle traffic. A closed road is an operating facility on which motorized traffic has been removed (year long or seasonally). These roads remain on the Forest Road Transportation System. Closed roads may not be drivable because they are usually not logged out or brushed out. They are closed to vehicles except for emergency or permitted use. One objective of road closures is to limit motorized vehicle traffic on native surface roads to reduce erosion. The roads are left in a stable condition and are maintained on an "as needed" basis. Inspections are made following a storm event or at least every five years.

Roads are most commonly closed with pole gates, steel gates, or closure signs, or earth berms as applicable for effective closure. These roads will be treated to provide self-maintenance prior to closure. Self-maintenance includes a variety of actions. Ditch relief culverts will be removed behind roads closed using earth-berms. Earth berms will not be used on roads with culverts at channel crossings still installed. Water bars will be installed with appropriate skew, outlet, and spacing. Sediment barriers of available woody material such as slash, brush, etc., will be placed at water bar outlets. Side ditches will be bladed where needed; culverts will be cleaned to drain; catch basins will be functional and free of debris. Drain dips, grade sags, and cross ditches will be reconstructed/rocked as necessary to assure proper functioning. All actions will be considered on a site-specific basis with each road or road segment actions suited to the needs and condition of the road and related resources.

Road closure actions, whether the initial closure or re-closing a breached road will occur only during sufficiently dry conditions to prevent damage and runoff. Road closure are also confined to time periods such that key fish or spawning areas are not impacted and soil movement is not likely to occur. All road closure activities will be reviewed by a fisheries biologist and who will inspect the site for adequate design criteria. The Forest will consult separately on road decommissioning projects of any type and on self-maintenance closures, which contribute sediment delivery to water. This would entail removing the road from the transportation system, contouring when needed, and rehabilitation of the area to as natural a condition as possible.

Material Sources

The Forest maintains an inventory of all active rock material (quarry) sources and many closed, inactive, and unopened sources. Over twenty-eight years ago, the Forest began locating centralized sources to provide rock material needs, especially for those projects that required large quantities of material. A primary goal of centralized sources is to limit the magnitude of surface disturbances while extracting quality materials to meet demand. Most roads which access developed sources have aggregate surfaces.

Some of the larger sites have been designed to impound water. These sites provide storage for rain and runoff, which may be used as water sources for road construction and maintenance activities, dust abatement, and fire suppression. An associated benefit of these ponds is use by wildlife and grazing animals.

Most sources are located in rocky terrain and are at a sufficient distance from any drainages or RHCA’s so as to have no impact on sediment contribution. A few sources have been developed in the past, which are located within RHCA buffers. The portions of sources within RHCA’s will not be expanded into the RHCA’s.

USFS engineers are responsible for following all Forest Plan Standards and Guidelines, PACFISH Standards and Guidelines, and PACFISH Riparian Management Objectives. Dust abatement will be used as needed, and safety guidelines will be used.

Appendix G – Wildlife Biological Evaluation

BIOLOGICAL EVALUATION/BIOLOGICAL ASSESSMENT OF PROPOSED, THREATENED, ENDANGERED, AND SENSITIVE WILDLIFE

Canyon Creek Wildland Interface Project

Prepared by: __/s/ Ken Schuetz__________________________ Date: __12/21/06_______
Ken Schuetz, Forest Wildlife Biologist

I. Summary of Effects

Threatened, endangered and sensitive (TES) species considered in the analysis of the **Canyon Creek Project** and the effects determination for the No Action alternative (Alternative 1) and the Proposed Action alternative (Alternative 2).

Species	Status	Occurrence	Alt. 1	Alt. 2
Terrestrial Species				
Gray Wolf *Canis lupus*	E	HD/N	NE	NE
Northern Bald Eagle *Hailaeetus leucocephalus*	T	HD/D	NE	NE
North American Lynx *Lynx canadensis*	T	HD/S	NE	NLAA
American Peregrine Falcon *Falco perigrinus anatum*	S	HD/S	NI	NI
California Wolverine *Gulo gulo luteus*	S	HD/S	NI	MIIH
Pygmy Rabbit *Brachylagus idahoensis*	S	HN/N	NI	NI
Pacific Fisher *Martes pennanti*	S	HD/N	NI	MIIH
Western Sage Grouse *Centrocercus urophasianus phaios*	S	HD/S	NI	NI
Gray Flycatcher *Empidonax wrightii*	S	HD/S	NI	NI
Bobolink *Dolichonyx oryzivorus*	S	HD/S	NI	NI
Upland Sandpiper *Bartramia longicauda*	S	HD/S	NI	NI
Tricolored Blackbird *Agelaius tricolor*	S	HD/S	NI	NI
Bufflehead *Bucephala albeola*	S	HN/N	NI	NI

Status

E	Federally Endangered
T	Federally Threatened
S	Sensitive species from Regional Forester's list
C	Candidate species under Endangered Species Act

Occurrence

HD	Habitat Documented or suspected within the project area or near enough to be impacted by project activities
HN	Habitat Not within the project area or affected by its activities
D	Species Documented in general vicinity of project activities
S	Species Suspected in general vicinity of project activities
N	Species Not documented and not suspected in general vicinity of project activities

Effects Determinations - Threatened and Endangered Species

NE	No Effect
NLAA	May Effect, Not Likely to Adversely Affect
LAA	May Effect, Likely to Adversely Affect
BE	Beneficial Effect

Effects Determinations - Sensitive Species

NI	No Impact
MIIH	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
WIFV	Will Impact Individuals or Habitat with a Consequence that the Action May Contribute to a Trend Towards Federal Listing or Cause a Loss of Viability to the Population or Species
BI	Beneficial Impact

BIOLOGICAL EVALUATION

II. INTRODUCTION

This Biological Evaluation (BE) satisfies requirements of Forest Service Manual 2672.4 requiring the Forest Service to review all its planned, funded, executed or permitted programs and activities for possible effects on proposed, endangered, threatened or sensitive species. The BE process is intended to review the Canyon Creek WUI Project in sufficient detail to determine effects of alternatives on species in this evaluation and ensure proposed management actions would not:

- Likely jeopardize the continued existence, or cause adverse modification of habitat, for a species that is proposed (P) or listed as endangered (E) or threatened (T) by the USDI Fish and Wildlife Service or NOAA National Marine Fisheries Service; or
- Contribute to the loss of viability for species listed as sensitive (S) by USDA Forest Service, Region 6, or any native or desired, non-native species; nor cause any species to move toward federal listing (FSM 2672.4).

The following sources were used during the pre-field review phase to determine the presence or absence of PETS species in the Canyon Creek WUI Project area:

- Malheur NF GIS database
- Regional Forester’s (R6) sensitive animal list (2004)
- Oregon Natural Heritage Information Center (ONHIC) database.
- Canyon Creek Watershed Analysis (2003)

- Canyon Creek Wildland Urban Interface. Existing Conditions Analysis Report. Prepared for the U.S. Forest Service, Malheur National Forest, Blue Mountain Ranger District, John Day, Oregon by PBS Engineering & Forestry, LLC (PBS 2004).

III. PROJECT DESCRIPTION

See Chapter 1 of the Canyon Creek WUI Fuels Reduction Project Environmental Assessment (EA) for a complete description of the project area and Chapter 2 for alternative descriptions, design criteria and mitigation. See Appendix C of the EA for the list of the past, ongoing and reasonably foreseeable future projects; all activities on the list have been considered in the cumulative effects analysis for each species in this Biological Evaluation.

Effects on wildlife species and habitat have been assessed within National Forest lands in the Canyon Creek ***"project area"*** - focusing on the effects of activities within proposed treatment units. For several wildlife species, the effects boundary has been expanded to the ***"subwatershed"*** level. Each wildlife section will identify the analysis boundary used in the effects analysis. The project area (22,700 acres) is located within portions of three subwatersheds; the analysis area encompasses the three subwatersheds in their entirety (57,761 acres). Subwatersheds are Vance Creek, East Fork Canyon and Upper Canyon Creek.

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

- Immediate – Approximately one growing season or several months or less
- Short-term – 0 to 5years
- Mid-term – 5 to 25 years
- Long-term – 25+ years

IV. POTENTIAL EFFECTS OF THE NO ACTION AND PROPOSED ACTION ON THREATENED AND ENDANGERED SPECIES

Gray Wolf *(Canis lupis)*

Status

Federal Status: Threatened [Western Distinct Population Segment (DPS)]

USDA-Forest Service (Region 6) Status: Threatened (USFS 2004)

Oregon State Status: Threatened (ODFW 2006)

Oregon Natural Heritage Program Status: List 2-extirpated (ONHIC 2004)

Major Threats

Wolves were exterminated from large areas through trapping, shooting, poisoning, and reduction in prey populations (ungulate herds) (NatureServe 2006).

Human-caused mortality is the major factor limiting the recovery of wolves with the majority of losses due to shooting, trapping and vehicle accidents. In addition, wolves, particularly juveniles, are susceptible to canine parvovirus and distemper.

Roads negatively affect this species by increasing human presence in wolf habitat and increasing the likelihood of negative contacts. A disproportionate number of human-caused mortalities occur near roads. These mortalities are mostly legal and illegal shooting resulting from human access provided by roads. Vehicle collisions account for additional mortalities.

Thurber and others (1994) cite three studies (Jensen and others 1986, Mech and others 1988, Thiel 1985) indicating wolf packs would not persist where road densities exceeded about 1.0 mi/mi2" (Wisdom et al. 2000).

Population Status and Trend

Currently there are populations of gray wolves established in Idaho, Montana and Wyoming. There are no known wolf packs in Oregon but dispersing wolves could establish in remote areas within the State.

Source Habitat Trend

Source habitats span a broad elevation range and include all terrestrial community groups except exotic herblands and agriculture (Wisdom et al. 2000).

Historically, source habitats for gray wolf likely occurred throughout the Great Basin. The current extent of habitat, albeit largely unoccupied, is similar to the historic distribution except for the Columbia Plateau, Lower Clark Fork, and Upper Clark Forks Ecological Reporting Units (ERUs), where habitat has a more patchy distribution than that it was historically available. The overall trend in source habitats across the basin was neutral.

Biology and Ecology

Gray wolves are the largest wild members of the Canidae, or dog family, with adults ranging from 40 to 175 pounds depending upon sex and subspecies (Mech 1974 as cited in Federal Register: July 13, 2000). Wolves are social animals, normally living in packs of two to ten members. They need a large, remote area relatively free from human disturbance (Snyder, S. A. 1991 [16]). Packs occupy, and defend from other packs and individual wolves, a territory of 50 to 550 km2 (20 to 214 mi2). In the northern U.S. Rocky Mountains territories tend to be larger, typically from 520 to 1040 km2 (200 to 400 mi2) (Federal Register: July 13, 2000).

The gray wolf once ranged across nearly all of North American continent. During colonization of North America wolves were persecuted by European settlers to the point of extirpation in many states. Effective government eradication programs continued the extermination of wolves in the West. By the 1930's wolves were extirpated from all of the lower 48 states except Minnesota. Most of the eradication was due to conflicts between the carnivores and livestock. Many programs were initiated to extirpate wolves, grizzly bears and mountain lions out of areas that were used for livestock grazing.

Normally, only the top-ranking male and female in each pack breed and produce pups. Litters, usually four to six pups, are born from early April into May (Michigan Department of Natural Resources (MI DNR) 1997, U.S. Fish and Wildlife Service 1992a, both as cited in Federal Register: July 13, 2000). Wolves excavate natal dens in well-drained soils in meadows near water, but occasionally they will den in hollow logs, under tree roots, rock outcrops, or even in beaver lodges (Snyder, S. A. 1991 [11, 16]). After 1 to 2 months natal dens are abandoned for an open area called a rendezvous site. Here a few adult pack members guard the pups, while the rest of the pack hunts (Snyder, S. A. 1991 [1]).

Yearling wolves frequently disperse from their natal packs, although some remain with their pack (Michigan Department of Natural Resources 1997, U.S. Fish and Wildlife Service 1992a, both as cited in Federal Register: July 13, 2000). Dispersers may become nomadic and cover large areas as lone animals, or they may locate suitable unoccupied habitat and a member of the opposite sex and begin their own territorial pack.

Wolves' habitat preferences appear to be more prey dependent than cover dependent. Forests, open meadows, rocky ridges, and lakes or rivers all comprise a pack's territory (Snyder, S. A. 1991 [16]). In the West wolves have been known to follow the seasonal elevational movements of ungulate herds. Wolves prey mainly on large ungulates, such as deer and elk. Beaver are a major supplement to wolves' diets (Snyder, S. A. 1991 [23]). Voigt and others (Snyder, S. A. 1991 [33]) reported that wolves' diets vary, depending on relative prey abundance. Other prey species include beavers, mountain goats, pronghorn, various rodents, upland game birds and waterfowl, snowshoe hare, and black bear (Snyder, S. A. 1991 [6, 10, 21, 23, 25, 33]). Occasionally wolves prey on domestic livestock.

Roads can negatively affect gray wolf by increasing human presence and increasing the likelihood of negative contacts. A disproportionate number of human-caused mortalities occur near roads. These mortalities are mostly legal and illegal shooting resulting from human access provided by roads. Vehicle collisions account for additional mortalities on highways. Thurber and others (1994) cite three studies (Jensen and others 1986, Mech 1988, Thiel 1985) indicating wolf packs would not persist where road densities exceeded about 1.0 mile per square mile (Wisdom et al. 2000).

Humans are the only significant predator of the wolf and have eradicated it from almost all of its former range worldwide (Snyder, S. A. 1991 [27, 34]). Fear of livestock depredation seems to be the biggest reason for opposition to wolf recovery. Also hunters worry that big game populations will decrease if wolves re-colonize their former range.

Existing Condition

Historically, wolves occupied all habitats of the Malheur National Forest (Wisdom et al. 2000), but are currently considered extirpated.

In the recent past, there were three confirmed occurrences of wolves in Oregon. In 1999, a collared female wolf (B-45-F) from the experimental, non-essential Idaho population traveled to the three Blue Mountain National Forests and stayed until it was captured near the middle fork of the John Day River and returned to Idaho. A second radio-collared wolf was struck and killed by a vehicle on I-84 south of Baker City in the spring of 2000. A third wolf, an uncollared male, was found shot in the Blue Mountains between Pendleton and Ukiah (ODFW 2002).

A recent flight occurred over northeastern Oregon searching for 15 radio-tagged wolves missing out of Idaho. The flight included the Blue Mountains as far south as the Middle Fork of the John Day River. No wolves were found (Miller 2006).

In recent years, the USFWS has received dozens of reports of wolf or wolf track sightings in eastern Oregon. Based on interviews conducted by USFWS of those who reported the sightings, it is believed that some observations could be of dispersing wolves from Idaho. There is no confirmed evidence that wolves occur in Oregon at the present time (Miller, 2006).

Wolves are habitat generalists and potentially could occupy the entire Malheur National Forest. Because of human persecution, seclusion is a very important factor in providing wolf habitat; therefore, open road density is one element that can be used to evaluate wolf habitat. Overall road densities in the Canyon Creek analysis area average 1.89 miles per square mile, above the density threshold of 1.0 mile per square mile that would be expected to support a wolf pack (Thurber 1994). However, areas of relative remoteness and freedom from disturbance do occur in the Strawberry Mountain Wilderness.

The presence of moderate to high populations of big game and relatively low road densities within portions of the Canyon Creek analysis area indicates the potential for at least season habitation by wolves. There is a potential for dispersing individuals from the Idaho experimental populations to come to this area and use these habitats.

Environmental Effects and Determination

Effects were analyzed at the analysis area level (51,761 acres) and analysis area level . Short-term, mid-term and long-term definitions are defined at the beginning of the report.

Alternative 1 – No Action

Direct, Indirect and Cumulative Effects

This alternative would maintain the existing condition of potential gray wolf habitat, big game populations and the road network. This alternative would do nothing to restore dry forest types or reduce road densities. This alternative would have no effect on grey wolf. Big game populations could provide the wolves' preferred prey species. Open road densities would remain in excess of the threshold that Thurber (1994) suggests would support wolf packs; however, the Strawberry Mountain Wilderness does provide areas of relative remoteness and low disturbance. Because there are no direct or indirect effects to gray wolf or their habitats, there would be no cumulative effects to gray wolf.

Determination

Due to the nature of the No Action Alternative, there would be **No Effect (NE)** to gray wolf or their habitat.

Alternative 2 – Proposed Action

Direct, Indirect and Cumulative Effects

Historically, wolves occupied a broad spectrum of habitats including grasslands, sagebrush steppe, coniferous and mixed forests, and alpine areas. Wolves are limited by prey availability and are threatened by negative interactions with humans. Generally, land management activities are compatible with wolf protection and recovery, especially actions that manage for healthy ungulate populations. Habitat and disturbance effects are of concern in denning and rendezvous areas; however, no such habitat is currently occupied in Oregon.

Because of human persecution, seclusion is a very important factor in providing wolf habitat; therefore, open road density is one element that can be used to evaluate wolf habitat. Open road densities would remain in excess of the threshold that Thurber (1994) suggests would support wolf packs; however, the Strawberry Mountain Wilderness does provide areas of relative remoteness and low disturbance. Construction of temporary road would increase road density during logging, but roads would be ripped and seeded when the project is completed. The construction of 200 feet of permanent road would not measurably increase average road densities at the landscape scale. On adjacent private land, human occupation likely reduces the potential for wolves occupying developed areas along Canyon Creek.

The Big Game Habitat section Chapter 3 of the Canyon Creek EA describes the effects of the Proposed Action on big game. The section concludes that reductions in thermal and hiding cover would likely affect big game distribution, but would not be expected to affect population numbers. Although satisfactory cover is reduced below standards, total cover remains near or in excess of standards. Retention of unthinned patches in units would help mitigate losses in cover. Open road densities would remain below Forest Plan standards in all areas except Vance Creek summer range, reducing the potential for disturbance. Seasonal restrictions on activities would minimize disturbance in winter range. The alternative snow mobile route is located outside winter range to the south; additional disturbance effects would be considered minimal. The project was designed to maintain connectivity corridors for deer and elk. Winter and summer range would continue to meet Forest Plan standards for the Habitat Effectiveness Index (HEI). Elk populations have remained stable during the last 10 years, meeting or exceeding ODFW Management Objectives. Implementation of the Proposed Action would not be expected to reduce populations.

Determination of Effects

At this time, the determination for almost all projects activities on the Malheur National Forest is **No Effect (NE)** for the following reasons:

- No populations currently occupy the Malheur National Forest.
- No denning or rendezvous sites have been identified on the Malheur National Forest.
- There is an abundance of prey on the Forest; therefore, prey availability is not a limiting factor.

Northern Bald Eagle *(Haliaeetus leucocephalus)*

Status

Federal Status: Threatened (list 1-7-00-SP-588).

USDA-Forest Service (Region 6) Status: Threatened (USFS 2004)

Oregon State Status: Threatened (ODFW 2006)

Oregon Natural Heritage Program Status: List 4 (ONHIC 2004)

Major Threats

Major threats to bald eagles include environmental contaminants and excessive disturbance by humans (NatureServe 2006), decreasing food supply and illegal shooting.

Bald eagles are fairly resilient to natural or human stresses or catastrophes, are generally susceptible to human intrusion, but show a high degree of adaptability and tolerance if human activity is not directed towards them. Chronic disturbance can result in disuse of areas by eagles (NatureServe 2006).

Population Status and Trend

The Pacific Recovery Region comprises 7 states (California, Idaho, Montana, Nevada, Oregon, Washington and Wyoming). The Pacific Bald Eagle Recovery Plan (USFWS 1986) specifies recovery goals for delisting: a minimum of 800 nesting pairs with an average annual productivity of 1.0 fledged young per occupied breeding area, and an average success rate for occupied breeding areas of not less than 65% over a 5-year period. Additionally, breeding population goals should be met on at least 80 percent of 30 management zones, and wintering populations should be stable or increasing.

The recovery goals have been met, with the numeric delisting objectives having been met since 1995 (USDI 2006). According to the Pacific Bald Eagle Recovery Plan, the number of nesting pairs for the entire recovery unit in 1985 was 527. However, between 1985 and 2001 the number of nesting pairs of eagles more than tripled, totaling 1, 627 pairs. The number of nesting pairs exceeded the recovery goal of 800 in 1990, and has continued to increase. Productivity has averaged about 1.0 young per nesting pair since 1990. In 1998, six of the seven Pacific Region States reported an average success rate of 75%. As off 1999, 30 of the 37 targeted management zones had met their goals, or 81% of the zones.

In Oregon in 2005, 95% of breeding areas surveyed (456 of 479) were occupied (Isaacs and Anthony 2006). Nesting success was 66%, resulting in a 5-ear nesting success of 65%. Productivity was 1.01 young per occupied breeding area, resulting in a 5-year productivity of 1.04 young per occupied breeding area.

Data for the Pacific Recovery Region (USDI 2006) indicate that the objective of stable to increasing trends in wintering populations of bald eagles have been attained on the average for the recovery region. Wintering populations have been tracked in the Pacific and many other States using the mid-winter bald eagle surveys. Wintering populations are difficult to assess because bald eagles concentrations depend upon weather and food supplies and consequently will vary from year to year. With these constraints, the information suggest that that Washington, Oregon, Idaho and California have experienced an increasing trend in wintering populations from 1.5 to 4.5 percent, while Nevada an Montana report a decline of about 2.5 percent for 1986-2000.

Biology and Ecology

Bald eagles prey largely on fish and, to a lesser extent, waterfowl and are usually associated with rivers or lakes. Habitat includes clean water with abundant fish and/or waterfowl populations, and many large, "wolfy" (having many dense branches) perch trees and roost sites nearby. In the Pacific Northwest, bald eagle nests are usually in multi-storied, predominantly coniferous stands with old growth components near water bodies that support adequate food supply. They usually nest in the same territories each year and often use the same nest repeatedly which can result in very large nest structures, 2-3 feet deep and up to 5 feet in diameter. They will use alternate nests. Nest trees have stout upper branches to support the nest structure and usually provide an unobstructed view of an associated water body. Most nests in Oregon have been within 1/2 mile of water.

In winter, bald eagles preferentially roost in conifers or other sheltered sites and typically select larger, accessible trees in second growth stands with large trees or old growth. Perching I deciduous and coniferous trees is equally common in some areas (Bowerman et al. 1993). Communal roost sites used by two or more eagles are common in Oregon, and some may be used by 100 or more eagles during periods of high use. At preferred communal roost sites, bald eagle use occurs in successive years.

Existing Condition

Local Summer Populations - There are three know bald eagle nest sites on the Malheur National Forest. The nearest nest site is located in the Silvies Valley (Silvies River Nest #597). It is located about 25 miles south of the project area. The other two nests are located near Delintment Lake (Nest #899), about 40 miles southwest, and near Mosquito Creek (Nest #1043), about 30 miles to the northeast. The Mosquito Creek nest site is a suspected site; use of the nest was reported in 1991 but failed and has not been used since.

Local Winter Populations – On the Malheur National Forest, bald eagles congregate at winter roost sites during the late fall, winter, and early spring. Eagles roost and feed in Bear Valley, and along the South Fork John Day River, Middle Fork John Day River, and the main stem John Day River. They scavenge in agricultural valleys and wetlands, feeding primarily on carrion normally found in areas of cattle concentration and birthing, or where ranchers dispose of dead animals. Eagles roost at night in mature forest stands that provide a microclimate that helps protect them from cold weather and wind. The closest winter roost sites are located around Bear Valley, and include 3 sites ranging from about 2 miles to 6 miles southwest of the project area. Monitoring indicates these roosts have been used yearly since 1991.

Although bald eagles have been sighted flying over the project area, there have been no nest or roost sites identified. The late and old structure stands located along Canyon Creek could provide nesting or roosting habitat; however forage is limited. There are no bald eagles or critical habitat necessary for their recovery within the project area.

Environmental Effects and Determination

Effects were analyzed at the project area level (22,700 acres). Short-term, mid-term and long-term definitions are defined at the beginning of the report.

Alternative 1 – No Action

Direct, Indirect and Cumulative Effects

Under the No Action Alternative, there would be no new management activities; therefore, there should be no direct, indirect or cumulative effects to bald eagles or their habitat.

Determination

Due to the nature of the No Action Alternative, there would be **No Effect (NE)** to bald eagles or their habitat.

Alternative 2 – Proposed Action

Direct, Indirect and Cumulative Effects

Bald eagle presence in the analysis area is transitory in nature. The project does not target large diameter trees or snags for removal; any losses would be considered incidental at the landscape scale. No nest sites or roost sites would be affected. It is unlikely eagles would be affected during project implementation.

Determination of Effects

There would be **NO EFFECT (NE)** to bald eagles or their habitat. No bald eagles nest or roost within the project area. No effects are anticipated on winter roost sites located outside the project area in Bear Valley.

Canada Lynx (Lynx canadensis)

Status

Federal Status: Threatened

USDA-Forest Service (Region 6) Status: Threatened (USFS 2004)

Oregon State Status: Not Listed (ODFW 2006)

Oregon Natural Heritage Program Status: List 2 (ONHIC 2004)

Major Threats

The Canada lynx has a large range in northern North America, particularly in Alaska and Canada. Declines have occurred in some populations, but are apparently still widespread and relatively abundant in most of the historic range, though population data are lacking for many areas. Lynx distribution at southern latitudes, including mountainous regions in Northeast Oregon, represent the occupation of marginally suitable habitat that decreases in quality and availability as one continues to move southward.

Habitat loss, fragmentation and susceptibility to over-harvest (trapping) are major concerns across the lynx's range (TNC 1999). Factors contributing to these concerns include; forest management activities, fire suppression, landscape level catastrophic wildfire, roads, developments that destroy habitat, grazing, predator control and trapping, competition with other predators, and human disturbances (winter recreation off-highway travel and highways) that displace lynx from their habitat (Wisdom et al. 2000, TNC 1999, and Witmer et al. 1998).

Population Status and Trend

Empirical data for distribution of lynx within the Interior Columbia Basin are scarce, and data on abundance of lynx populations are not available. McKelvey and others (1999) recently summarized all known lynx locations in the United States, which provides a framework for designing and conducting future surveys and demographic studies of lynx populations (Wisdom et al. 2000).

Source Habitat Trend

Basin-wide, source habitat was projected to have increased moderately or strongly in 47 percent of the watersheds. The Blue Mountains ERU has undergone a positive absolute (+26.93%) and relative (>100.00%) change in source habitat availability (moderate or strong increases in more than 50 percent of the watersheds). An increase in Blue Mountains source habitat was most influenced by an increase in mid- and late-seral montane forests and mid-seral subalpine forests (Wisdom et al. 2000).

Biology and Ecology

This species requires a mix of early successional habitats that contain high numbers of prey for foraging, and late-successional habitats that contain denning space and hiding cover for kittens (especially deadfalls) (Koehler 1990). Intermediate successional stages may serve as travel cover, but function primarily to provide connectivity within a forested landscape. Lynx avoid large openings (>330 feet from cover) that have the potential to disrupt movement between isolated populations (Ruggiero et al.1994).

Lynx are typically associated with large tracts of higher elevation boreal and mesic coniferous forests with abundant snowshoe hares *(Lepus americanus)*. Home range size varies considerably and is usually dependent upon prey availability. Typical home range territories are 45-155 mi2. Snow conditions and vegetation type are important factors to consider in defining lynx habitat (Ruediger et al. 2000).

Deep snow and cold temperatures are often associated with lynx habitat. While other predators may need to migrate to lower elevations under these conditions in order to follow their food source, lynx, remain and thrive because of their physical adaptations to low temperatures, deep snow and ability to successfully hunt the snowshoe hare.

In the northern portions of lynx range, snow depths are relatively uniform and only moderately deep (39-50 inches). Snow conditions are very cold, dry, and soft/powdery.

In contrast, in the southern portion of lynx range, snow depths are generally deeper. Snow in this area is subject to more freezing and crusting which may reduce the competitive advantage lynx have over other predators.

Lynx habitat landtype typically occur where low topographic relief creates continuous forest communities of varying ages (Ruggiero et al. 1994). In the western United States, most lynx occurrences (83%) are associated with Rocky Mountain conifer forest, and most (77%) were within approximately 5,000 to 6,500 feet elevation (Ruediger et al. 2000).

Primary vegetation that contributes to lynx habitat is lodgepole pine (Pinus contorta), subalpine fir (Abies lasiocarpa), and Engelmann spruce (Picea engelmannii). Secondary vegetation that, when interspersed within subalpine forests, may also contribute to lynx habitat. This includes cool, moist Douglas-fir, grand fir (Abies grandis), western larch (Larix occidentalis), and aspen (Populus tremuloides) forests. Dry forest types (e.g., ponderosa pine) do not provide lynx habitat.

Foraging Habitat

Lynx prefer early to mid-successional, densely stocked, mixed conifer forests created by natural or human-caused disturbances that support plentiful populations of snowshoe hare for hunting (Ruggiero et al. 1994). In general, these conditions are often preferred by hare for cover. In Washington, hares were 4-5 times more abundant in 20-25 year old lodgepole pine stands than older stands. In Montana, dense stand of early to mid-successional Douglas-fir were most commonly used and in Colorado and Utah, dense stands of early to mid-successional subalpine fir and Engelmann spruce were preferentially selected. Snowshoe hares also need large numbers of downed logs within these habitats for hiding cover and warren sites.

Snowshoe hare is a primary prey species (Quinn and Parker 1987). Other prey items used include small rodents, red squirrels (*Tamiasciurus hudsonicus*), grouse (*Bonasa umbellus* and *Dendrogapus spp.*) and ptarmigan (*Lagopus spp.*)

Denning habitat

Lynx denning habitat is characterized as having thermal cover, mature overstory canopies, and a high density of downfall logs in patches scattered over 5-10 acres (>40 logs per 40 yards [46 m] lying 1 to 4 feet [0.3-1.3 m] above the ground) (Koehler 1990) that provides security. These conditions combine to provide both vertical and horizontal structural diversity (Ruggiero et al. 1994). Habitat quality, as measured by the availability of alternate den sites, appears to be an important factor in kitten survival when disturbance occurs. Den sites occur primarily on north to northeast aspect slopes (Ruggiero et al. 1994). Primary denning sites are often in large hollow logs, beneath windfall or upturned roots, or in brush piles in dense thickets (Brittell et al. 1989).

Travel corridors

The third key component of lynx habitat is travel corridors that provide security during movement from denning areas to foraging areas and during dispersal. Travel corridors are characterized as having minimum stem density of at least 180 stems per acre that are over eight feet tall. Favored travel ways within and between habitat areas include riparian corridors, forested ridges, and saddles.

Distribution

The geographic range of lynx includes all of Alaska and Canada (except the northeastern parts of Northwest Territories) and the United States south to a line from southern Oregon to southern Colorado, southern Iowa, southern Indiana and southern Maryland (Verts and Carraway 1998). Lynx are considered to have historically resided in 16 of the contiguous United States (Maine, New Hampshire, Vermont, New York, Massachusetts, Pennsylvania, Michigan, Wisconsin, Minnesota, Washington, Oregon, Idaho, Montana, Wyoming, Utah, and Colorado) based on historical observations, trapping records, and other documented evidence. The occurrence of lynx in most of the contiguous United States is likely the result of transient dispersal during declines in population density of their primary prey, snowshoe hares (Quinn and Parks 1987).

Oregon Distribution

Oregon is considered to be at the southern fringe of the lynx's range, and animal density and habitat use are expected to differ from further north where habitat is considered more suitable. The lynx has always been rare in Oregon (Koehler and Aubry 1994).

In Oregon, there are twelve verified records of lynx documented from 1897-1993, six of which were taken from the Blue Mountains (Ruggiero et al. 1999, Verts and Carraway 1998). Of these 12 known specimens, one each was collected in 1897, 1964, 1974, and 1993, 2 in 1920, and 3 each in 1916 and 1927. Three of the six specimens taken in the Blue Mountains were collected near the town of Granite, approximately over 35 miles northeast of the project area. The remaining six specimens were taken from the Wallowa Mountains, the Cascade Mountains, the Willamette Valley, the Stinkingwater Mountains and the Steens Mountains.

Peaks in density of lynx populations in Alaska reportedly occurred in 1916-1918, 1926-1928, 1963-1966, and 1974-1975 (Quinn and Parks 1987). Peak periods somewhat correlate to collections made in Oregon. Verts and Carraway (1998) suggest that lynx occurrence in Oregon may be dispersers from occupied areas farther north that immigrate into the area and persist for a short time.

Local Surveys

Surveys using a hair sampling protocol that targets lynx were conducted on the Malheur National Forest in 1999, 2000 and 2001. The data did not determine lynx presence. In the early 1990's, winter track and camera station surveys were conducted on the Malheur National Forest to inventory forest carnivores, but no lynx were detected.

Recent unconfirmed lynx sightings have been reported along the Middle Fork of the John Day River, Blue Mountain Ranger District, and in the Reynolds Creek Subwatershed, Prairie City Ranger District.

Conclusion on Status and Distribution in Oregon

Based on the limited available information, the Fish and Wildlife Service cannot substantiate the historic or current presence of a resident lynx population in Oregon (Ruediger, et. al. 2000). Verts and Carraway (1998) conclude that there is no evidence of self-maintaining populations in Oregon and USDI (1997) considered lynx "extirpated" from Oregon. Additional surveys and research are warranted before lynx are considered as having self-maintaining populations in Oregon.

Local Habitat

Potential habitat on the Malheur National Forest is defined as stands above 5,000 feet that are subalpine fir, lodgepole pine, Engelmann spruce, or moist grand fir types. Biophysical environments are considered cold dry, cool moist or cool wet. Subalpine fir, Engelmann spruce and lodgepole pine plant associations are considered primary habitat. Grand fir types in the cool moist and cool wet biophysical environments provide habitat only in conjunction with the primary types and are considered secondary habitat.

Lynx Analysis Units (LAUs)

Lynx Analysis Units (LAUs) are areas delineated for management of habitat characteristics and implementation of Project Design Criteria (PDC's) necessary for the lynx to complete its life cycle. An LAU contains lands capable of producing the necessary lynx components: denning and foraging habitat. LAUs encompass both suitable lynx habitat and unsuitable areas. Habitat may or may not be currently in suitable conditions for denning or foraging.

LAUs are not designed to represent the actual home range of a lynx. Rather, LAUs are intended to provide the fundamental or smallest scale which to begin evaluation and monitoring of the effects of management actions on lynx habitat (Ruediger 2000).

Three LAU's have been designated on the Malheur National Forest. The Strawberry LAU is about 55,920 acres with 97% in the Strawberry Mountain Wilderness. The Canyon Creek project area contains 278 acres or less than .01% of the Strawberry LAU.

Lynx Denning, Foraging, and Unsuitable Habitat

Twenty-four percent (13,794 of 55,920 acres) of the Strawberry LAU is classified as lynx habitat. The remaining forest stands are grand fir stands below 6000 feet elevation or warm dry or hot dry biophysical environments dominated by Douglas fir and ponderosa pine. Lynx habitat was classified as denning, foraging, or unsuitable using remote sensing data and field reconnaissance.

Lynx habitat classification in Strawberry LAU - denning, foraging, unsuitable, and created unsuitable habitat by acres and percent of total lynx habitat.

Habitat Element	Existing Condition	
	Acres	% Habitat
Denning	9,979	72%
Forage	0	0%
Unsuitable[1]	3,815	28%
Created Unsuitable[2]	0[2]	0%[2]
Unclassified	3	0%
Total[3]	13,794[3]	100%[3]

[1]*Unsuitable* = habitat made unsuitable by management activities, such as timber harvest, within the last ***15*** years *or* habitat made unsuitable by natural disturbances such as wildfire or wind throw regardless of when the disturbance occurred.

[2]*Created Unsuitable* = a subset of "unsuitable" and refers to lynx habitat made unsuitable by management activities within the last ***10*** years.

Denning habitat comprises 72% of total lynx habitat, and typically occurs in stands where mature trees and multiple canopy layers are present. The number of down logs tends to be higher in these stands than in younger stands. Down logs of the density to provide good denning habitat occur infrequently, but are believed to occupy at least 10% of the total denning habitat. During past field reconnaissance, areas of sufficient downed logs have been identified, but not recorded or mapped.

There is no classified foraging habitat in the LAU although some of the denning habitat likely provides foraging habitat. The majority of stands are later successional stands dominated by mature trees and high canopy cover, which is likely to be optimal squirrel habitat. Stands in the mid- and late-successional structures that have openings dominated by thicket of dense young trees probably provide habitat for both prey squirrels and snowshoe hares. Foraging habitat is beginning to develop within the 1996 Wildcat Fire and 2000 Slide Fire boundaries as natural regeneration reestablishes forest and trees gains in height. In 15 to 20 years, more snowshoe forage habitat will exist when young trees in the wildfire areas provide dense stems and branches above average snow level.

Approximately 28% of total lynx habitat is currently classified as "unsuitable" mostly due to the Wildcat wildfire that occurred during the summer of 1996. These stands currently do not have the necessary vegetation and/or down logs to support lynx for either denning or foraging.

Open Road Density and Disturbance

The road system administered on US Forest Service lands provides access for a wide variety of users including recreation, livestock management, commercial activities, hunting, firewood cutting, and associated travel for administrative purposes.

Most of the Strawberry LAU is in the Strawberry Mountain Wilderness, designated through the Wilderness Act of 1964. As such, the wilderness portion of this LAU has been excluded from vehicular use since 1964. No major highways or roads access this LAU and only a few roads stretch further than a couple of miles into the LAU. Forest Service roads within the LAU are not plowed; with the only exceptions being for winter timber harvest activities occurring on Forest Service land or for access to private lands/residences if needed.

A total of 25.93 miles of open road exists within the LAU. An additional 1.97 miles of closed/decommissioned roads are also present within the LAU. Road use does not approach the traffic threshold (2000 vehicles per day) considered problematic to lynx. About 2.8 miles of the open roads receive moderate levels of traffic use yet the use is less than 100 trips per day (K. Shull, pers. comm. 2002). These roads are made up primarily of higher maintenance Forest roads (ML 3). The remaining 23.13 miles of open road usually have little to no traffic except during fall hunting season. Guidelines recommend that open road densities in lynx habitat be maintained at less than 2 miles per square mile (Ruediger et al. 2000). Total open road density in the LAU is .30 miles per square mile.

Canyon Creek Project Area

The project area does not include any primary or secondary habitat for lynx. Approximately 1,245 acres, of 5% or the project area are in grand fir plant associations that could provide secondary lynx habitat if contiguous with primary habitat. These stands are not contiguous with primary habitat and most are associated with drier plant association groups not conducive for suitable snowshoe hare habitat, and consequently would not be suitable for lynx.

About 278 acres or less than .01% of the Strawberry LAU is in the Canyon Creek project area; about 50% of these acres are in lynx plant associations that could provide secondary lynx habitat but they do not adjoin primary habitat.

Environmental Effects and Determination

This analysis focuses on the effects of alternatives on the Strawberry LAU. Effects to connectivity habitat are analyzed at the project area/analysis area level. Roads effects are discussed at both the LAU and analysis area scale. Short-term, mid-term and long-term definitions are defined at the beginning of the report.

Alternative 1 – No Action

Direct, Indirect and Cumulative Effects

Under Alternative 1, there would be no new management activities within the Strawberry LAU; therefore, there would be no effects to lynx habitat. The No Action Alternative would not change existing habitat conditions for lynx inside or adjacent to the Strawberry LAU. The risk of a stand replacement fire and insect and disease infestation would remain high. There would be no direct, indirect or cumulative effects to Canada lynx or their habitat.

Determination

Due to the nature of the No Action Alternative, there would be **No Effect (NE)** to Canada lynx or their habitat.

Alternative 2 – Proposed Action

Direct and Indirect Effects

Potential habitat on the Malheur National Forest is defined as stands above 5,000 feet that are subalpine fir, lodgepole pine, Engelmann spruce, or moist grand fir types. Biophysical environments are considered cold dry, cool moist or cool wet. Subalpine fir, Engelmann spruce and lodgepole pine plant associations are considered primary habitat. Grand fir types in the cool moist and cool wet biophysical environments provide habitat only in conjunction with the primary types and are considered secondary habitat. Primary and secondary lynx habitat does not occur within the Canyon Creek project area; consequently, there is no source habitat for lynx in the project area.

About 278 acres or less than .01% of the Strawberry LAU is in the Canyon Creek project area; about 50% of these acres are in lynx grand fir plant associations but they do not classify as secondary habitat due to their distance from primary habitat. The proposed action would treat 60 of the 278 acres. Units 708, 709 and 710 would be treated; only portions of these units are within the LAU. The following table displays unit number, plant association, proposed treatment and treatment acres within the LAU.

Non- Lynx Habitat in Strawberry LAU Proposed for Treatment in Canyon Creek Project Area

Unit Number	Habitat Type (Plant Association)	Proposed Treatment	Acres
708	Grand fir/elk sedge	Commercial thin by tractor; whole-tree yarding	11
709	Grand fir/elk sedge	Commercial thin by helicopter; hand pile slash and burn	3
710	Ponderosa pine/mountain mahogany/elk sedge	Precommercial thin; hand pile slash and burn	8
Total Acres Treated			60

Stands proposed for treatments are in the warm dry plant associations. The ponderosa pine plant association is not a lynx plant association. Grand fir/elk sedge does classify as a lynx plant association on the Malheur National Forest, but is considered marginal habitat given its classification as a warm dry site. These stands are not contiguous with primary lynx habitat and therefore, do not classify as secondary habitat. The stands are located on the edge of the LAU; the nearest lynx denning habitat is located over 1 mile east.

In units 708 and 709, commercial thinning would reduce basal area to 50 square feet. In unit 710, precommercial thinning would only remove small diameter trees less than 9 inches dbh. Thinning would reduce the amount of dense horizontal cover of conifers preferred by lynx and snowshoe hare. To mitigate losses in hiding cover and maintain stand diversity, un-thinned patches 2 to 5 acres in size would be retained on 5% to 15% of the treated acres. Snags and large down logs would b retained to meet Forest Plan standards. Thinning treatment would shifts stands back towards their historic condition. Treatments would likely increase understory shrubs and ground cover. No road construction would occur within the LAU.

The Strawberry LAU is considered the southern fringe of the lynx's range. Areas to the south and west of the Strawberry LAU, including the Canyon Creek project area, are primarily in the warm dry and hot dry biophysical environments and do not include any large, contiguous blocks of lynx habitat, so it is unlikely that lynx would use the project area as travel or dispersal habitat to other areas of the Forest. It is possible that a lynx could cross back and forth between the LAU and the project area, but lynx would be considered a rare visitor in the project area at best. Human disturbance due to project implementation could have short-term, indirect effects on lynx traveling through the area, but individual animals would likely react by using alternative travel routes. With no source habitat in the project area and a high degree of human impact and use, lynx presence would be expected to be low.

Connectivity corridors have been established for the project area (see Map 9 in Appendix B). Although corridors were created primarily to meet Forest Plan standards for movement of old growth species, they would also provide travel and dispersal habitat for wide-ranging carnivores such as lynx. Corridors generally meet or exceed the minimum requirements as described in Amendment #2 of the Forest Plan. In most cases, corridors were designated at the "stand level" with stand width often exceeding the minimum 400-foot width. In some cases, where suitable forest conditions do not exist, stands have been identified as connectivity habitat even though minimum canopy closure or corridor width requirements were not met. One example is where large blocks of non-forest bracket a narrow riparian area.

The Forest Plan requires that within corridors, canopy closure be maintained in the upper 1/3 of site capability. This standard does not necessarily meet lynx needs because it applies to overhead cover, measured above about 5 feet, rather than horizontal cover near the ground that is more important to lynx that is about 2 feet tall. Corridors, however, tend to have more trees and provide better lynx hiding cover than surrounding stands, even in the warm-dry and hot-dry biophysical environments.

Corridors, when located in riparian or ridge lines, offer the best options for lynx dispersal and movement. By maintaining corridors, the forest can be managed within HRV while maintaining options for lynx (Ruediger et. al. 2000).

Under the Proposed Action, thinning in 9 units would reduce cover on about 260 acres, or 7% of established connectivity corridors. Thinning prescriptions in units 121,194, 338, 340, 386, 392, 394, 538, and 712 would be adjusted to maintain canopy cover in the upper 1/3 of site potential as required by Regional Forester's Eastside Forest Plans Amendment #2. Only a portion of units 121, 392 and 538 lie in connectivity corridors; acres outside of corridors would receive standard treatments. Prescribed burning would affect 456 acres or 11% of the connectivity corridors with a portion of those acres overlapping with harvest units. Prescribed underburning and pre-commercial thinning would reduce understory stocking; however, design requirements would retain 5% to 15% of the treatment areas in un-thinned patches to help facilitate animal movement. Although travel habitat would remain, quality and quantity will be reduced where stem densities are thinned below 180 stems per acre.

Amendment #2 gives the Forest Service flexibility to modify or forgo connectivity direction for projects that address safety and health concerns (USDA 2006). There are 4 units within ¼ mile of the public/private boundary that are considered high priority for fuels reduction to protect private property. In units 62, 90, 95 and 536, harvest treatments would reduce canopy cover below the upper 1/3 of site potential. Connectivity standards would not be met on 104 acres, or 3% percent, of established connectivity corridors; this level of impact is considered incidental to lynx movement. In units 95 and 536, un-thinned patches would be maintained on about 5% of the acres to help mitigate cover reductions. Units 62 and 90 are proposed for shelterwood harvest; following treatment very little cover would be left. Harvest in these 4 units would reduce, but not eliminate all connectivity habitat to adjacent old growth areas.

Thinning, harvest, and burn prescriptions are designed to move conditions towards the Historic Range of Variability. Treatment areas are predominantly in the low elevation warm dry to hot dry biophysical environments. These sites tend towards an open forest condition with an herbaceous or shrub understory. The LCAS recommends restoring fire as an ecological process and to use fire to make landscape patterns consistent with historical succession and disturbance regimes. The Canyon Creek project emphasizes burning sites which naturally had a high fire return interval. Restoration of historic vegetation conditions, fire regimes and landscape patterns would make habitats more sustainable in the long-term.

In the short- to mid-term, connectivity corridors would continue to provide for the free movement of various wildlife species, including wide-ranging carnivores such as lynx. Harvest in units 62, 90, 95 and 536 would reduce, but not entirely eliminate, connectivity habitat to adjacent old growth areas. In the long-term, untreated corridors would remain at a higher risk to insects and fire that could degrade or eliminate habitat.

As an action connected to the timber sale, there would be some change to the existing road conditions. Maintenance and reconstruction would occur on roads used for log haul. Temporary road construction would reduce vegetative cover on approximately 7 acres. The temporary roads would be subsoiled and seeded as soon as harvest is completed and would not increase the overall open road density. The decommissioning of the temporary roads adheres to recommendations in the Lynx Conservation Assessment and Strategy (LCAS) (Ruediger 2000). About 200 feet of permanent road would be constructed. Loss of vegetation would be permanent; however, this amount of road is considered incidental and would not change average open road densities. No increase in vehicle traffic would be expected once the project is completed. Proposed road construction would not fragment connectivity corridors. Guidelines recommend that open road densities in lynx habitat be maintained at less than 2 miles per square mile (Ruediger et al. 2000). Total open road density in the LAU is .30 miles per square mile. Outside of the LAU, open road density generally exceeds this level, reducing the likelihood that animals will use these areas.

The Canyon Creek project area has established snow mobile trails outside the wilderness and LAU. Harvest treatments in some areas may temporarily preclude use of these designated routes; an alternative snow mobile route is located outside winter range to the south; additional disturbance effects would be considered minimal. Most units along the wilderness boundary are located in big game winter range. Seasonal restrictions prohibit management activities from December 1st through April 1st reducing the potential for snow compaction and increased competition from other predators near the LAU.

Cumulative Effects

This analysis focuses on the effects of alternatives on the Strawberry LAU. Effects to connectivity habitat are analyzed at the project area/analysis area level. Roads effects are discussed at both the LAU and analysis area scale. All of the activities in Appendix C have been considered for their cumulative effects on lynx.

The existing condition section summarizes the condition of habitat in the Strawberry LAU. The project area does not include any primary of secondary habitat for lynx, so the following discussion will focus on the cumulative effects of management activities on connectivity corridors and dispersal habitat. Past adverse effects to connectivity habitat have been primarily a result of timber harvest and road construction; in particular, the lower elevations of the project area have been highly managed.

Future thinning and burning projects would be conducted in warm dry and hot dry biophysical environments away form the Strawberry LAU. Proposed treatment areas do not provide primary or secondary habitat for lynx. Connectivity corridors have already been established or would be designated as part of these project analyses.

Guidelines recommend that open road densities in lynx habitat be maintained at less than 2 miles per square mile (Ruediger et al. 2000). Total open road density in the LAU is .30 miles per square mile. Outside of the LAU, open road density generally exceeds this level, reducing the likelihood that animals will use these areas for dispersal.

Large-scale wildfires have the potential to alter source habitat and connectivity habitat for lynx as well as habitat for its prey species. The precise effects of future wildfires would depend upon the magnitude, duration, and intensity of those fires. High intensity/low frequency fires are the historic fire regime for lynx source habitats; however, the same kinds of fires are outside the historic range of variability for the dry forest types in dispersal habitat..

Private lands are unlikely to support much lynx activity. Private development has increased in the area in recent years, and associated timber harvest and road construction have reduced the quality of connectivity habitat. The Little Canyon Mountain fuels reduction project reduced connectivity habitat.

Recreation use in the area is high, at least during the fall hunting seasons. This activity can directly disturb lynx. Hunting intensity tends to be greater at the lower elevations where open road densities are higher. Source habitat for lynx is in the Strawberry LAU; recreation use is far lower here and likely has little impact on lynx. One of the most significant recreation trends in recent years is the growth in use of motorized off-highway vehicles (OHVs). OHV users are increasingly attracted to parcels of public lands where access is readily available, this in turn concentrates the use of OHV and the potential disturbance associated with that use (Toweill & Thomas 2002). Snow mobile trails have been designated in the project area, and tend to focus use along designated routes. OHV and snow mobile use is prohibited in the wilderness.

The combined effects of the Canyon Creek project with the effects of past, present, and reasonably foreseeable future activities would not be expected to adversely affect populations or viability of lynx. Management activities have not altered nor are expected to alter source habitat in the Strawberry LAU. Connectivity habitat has been reduced, but proposed habitat levels likely better represent historic conditions. Although connectivity habitat would be treated, these corridors would continue to allow free movement of lynx and other carnivores.

Determination of Effects

The Proposed Action may affect individuals or habitat, but will **Not Likely Adversely Affect (NLAA) the continued existence of the Canada lynx**. This determination is based on the following rationale:

Based on local surveys and information by USDI (1997), Ruediger at al. (2000) and Verts and Carraway (1998), there is no evidence of self-maintaining populations in Oregon.

No primary or secondary lynx habitat is affected; therefore, no source or reproduction habitat is affected. Treatments within the Strawberry LAU would be minimal at 60 acres (< .01% of the LAU). Treatment units are not in primary or secondary habitat. Thinning in units 708, 709 and 710 would move the vegetation towards a natural and sustainable condition. Treatment units are over one mile from potential lynx denning habitat.

The Strawberry LAU is considered the southern fringe of the lynx's range. Areas to the south and west of the Strawberry LAU, including the Canyon Creek project area, are primarily in the warm dry and hot dry biophysical environments and do not include any large, contiguous blocks of lynx habitat, so it is unlikely that lynx would use the project area as travel or dispersal habitat to other areas of the Forest. It is possible that a lynx could cross back and forth between the LAU and the project area; however, lynx would be considered a rare visitor to the project area at best. Proposed treatments in connectivity corridors would reduce the effectiveness of dispersal habitat, but would not eliminate the ability of lynx to move across the landscape.

V. POTENTIAL EFFECTS OF THE NO ACTION AND PROPOSED ACTION ON SENSITIVE SPECIES

California Wolverine (Gulo gulo)

Status

Federal Status: Species of Concern (list 1-7-00-SP-588)

USDA-Forest Service (Region 6) Status: Sensitive

State Status: Threatened (ODFW 2000)

Oregon Natural Heritage Program Status: List 2 (ONHIC 2004)

Major Threats

Status is not well known in many portions of the range and extirpated from most of its historic range in the contiguous 48 states. Wolverines are showing promising signs of semi-recovery in selected western states (TNC 1999).

Wolverine populations are suspected to be small, especially sensitive to disturbance, and vulnerable to local extinction (Ruggerio et al. 1994). Past decline in population may have been due primarily from fur trapping, but habitat alteration (e.g. agriculture, oil exploration, cattle grazing, rural settlement, timber harvest, road construction, and ski area development) and general human disturbance are contributing factors (TNC 1999, Witmer et al. 1998).

Population Status and Trend

Hash (1987) describes a contraction in the North American range of the wolverine beginning around 1840 with the onset of extensive exploration, fur trade, and settlement. State records suggest very low wolverine numbers in Montana, Idaho, Oregon, and Washington from the 1920s through 1950s, with increases in wolverine sightings since the 1960s (Banci 1994, Wisdom et al. 2000).

Source Habitat Trend

Basin-wide, source habitat was projected to have increased moderately or strongly in 56 percent of the watersheds. The Blue Mountains ERU has undergone a positive absolute (+27.46%) and relative (>100.00%) change in source habitat availability (moderate or strong increases in more than 50 percent of the watersheds). An increase in Blue Mountains source habitat was most influenced by an increase in mid- and late-seral montane community types (Wisdom et al. 2000).

Biology and Ecology

The wolverine occurs in a broad range of wilderness habitats (Verts and Carraway 1998). Source habitats for wolverines include alpine tundra and all subalpine and montane forests. Within the forest type, all structural stages except the closed stem exclusion stage provide source habitat (Wisdom et al. 2000). The impression that wolverines require high elevation habitat may be a result of remaining wolverine populations retreating to inaccessible, undeveloped areas, which are often at high elevations (Witmer et al. 1998).

Wolverines are solitary predators that range over vast and remote territories; consequently, they are difficult to study and to survey (Rausch and Pearson 1972). Most available research indicated that wolverines were strictly associated with secluded wilderness areas and that distribution is probably limited to upper montane and sub-alpine forest types. Some recent work suggests that although wolverines may frequent upper montane and sub-alpine habitat during most of the year, they may follow migrating big game herds and scavenge on winter kills, which is considered a primary winter food source (Wisdom et al. 2000, Ruggiero 1994), to lower elevation winter range.

Wolverines are typically opportunistic predators and use a wide variety of foods including roots, berries, small and medium size rodents, birds, bird eggs, fish, and carrion (especially ungulate carcasses) (Wisdom et al. 2000, NatureServe 2001). They are known to attack wild ungulates hampered by deep snow. Carrion often makes up a large percentage of the diet (Wisdom et al. 2000, NatureServe 2001). Copeland (1996) found that carrion related food supplied 46 percent of wolverine diets in Idaho during both summer and winter. Banci (1994) suggests that diversity of habitats and foods is important to wolverines.

Several special habitat features have been identified for wolverines. Natal dens in the western United States is generally located in subalpine basins in isolated talus fields surrounded by trees (Copeland 1996). There is also evidence that wolverine use down logs and hollow trees for denning and cavities in live trees may be used (Wisdom et al. 2000). Both talus and areas associated with large, fallen trees were used as maternal dens sites in Idaho (Copeland 1996).

Regardless of habitat type used, the critical component to suitable source habitat seems to be the absence of human activity or development (Hash 1987). High elevation wilderness and undisturbed backcountry refugia are still considered critical to the current welfare and viability of existing wolverine populations (Hornocker and Hash 1981).

Denning Habitat

A denning habitat model developed primarily by Jeff Copeland, Idaho Department of Fish and Game, was used to identify potential wolverine denning habitat on the Malheur National Forest. Utilizing PMR (Pacific Meridian Resources Company) data and ArcInfo base coverage, key habitat components were queried to produce a forest level coverage of potential denning habitat. Key elements included topographic relief with flat to concave curvature, slopes with north to northeast aspects, areas above 5,000-foot elevation, and rock or snow cover types.

The analysis identified large areas of potential denning habitat in the Strawberry Mountain Wilderness, Monument Rock Wilderness, and in some northern portions of the Malheur National Forest, likely the areas around Vinegar Hill-Indian Rock Scenic Area, Jump Off Joe Wildlife Emphasis Area and Dixie Butte Wildlife Emphasis Area.

Distribution

Wolverines once occupied the boreal zone across the northern part of the continent and southward into the mountains of Colorado and California. Bailey (1936) states that wolverine were thought to be rare in the United States, but probably were not yet extinct in the Cascades and Sierra Nevada's.

Wolverines were always rare in Oregon, although recent sightings, tracks, and collected remains document their continued presence at low densities in the state (Csuti et al. 1997). Current distribution appears to be restricted to isolated wilderness areas. Verts and Carraway (1998) believe that while there is a possibility of self-maintaining population of wolverine in the state, most animals seen or collected are likely dispersers from Washington and Idaho populations.

Numerous animals have been collected or sighted around the northwest. A query of the Oregon Natural Heritage database reveals that there are about 150 observations of wolverines in Oregon, with most occurring in the mountainous northeast (Baker, Grant, Umatilla, Union and Wallowa Counties) region (Edelmann and Copeland 1997).

Local Surveys

Records of wolverine occurrence on the Malheur National Forest are very limited. Confirmed and high confidence observations on the Malhuer National Forest and adjacent areas include:

- A partial skeleton and tufts of fir found near Canyon Mountain, Grant County (1992)
- Tracks and a probable denning site found in the Strawberry Wilderness (1997)

- Tracks in Monument Rock Wilderness (1997)
- Collection of an animal from Steens Mountain, Harney County, (1973)
- Hair and track collection on Snow Mountain Ranger District, Ochoco National Forest (1992)

In the 1990's, surveys were conducted in the large, roadless or wilderness tracts associated with the Strawberry Mountain Wilderness, Dixie Butte Wildlife Emphasis Area, Dry Cabin Wildlife Emphasis Area, Vinegar Hill-Indian Rock Scenic Area and the Shaketable, McClellan Mountain, and Aldridge Mountain Roadless Areas. No wolverine tracks or individuals were found.

Additional sightings of animals and tracks have occurred on the District, but none have been confirmed.

Existing Condition

In the Blue Mountains, source habitat for wolverine occurs primarily in wilderness and large roadless areas. Areas of low human impacts, low human disturbance, and high deer and elk concentrations are preferred. The nearest source habitat is in the adjacent Strawberry Mountain Wilderness. Elsewhere on the District, the Vinegar Hill-Indian Rock Scenic Area, the Dry Cabin, Jump Off Joe and Dixie Butte Wildlife Emphasis Areas and the Shaketable, McClellan Mountain, and Aldrich Mountain Roadless Areas exhibit these characteristics.

The cold dry, cool moist, and cold dry biophysical environments represent the highest quality habitat, particularly where they remain relatively undeveloped and undisturbed (Wisdom et al. 2000). The Forest Vegetation section of the Canyon Creek EA indicates that these biophysical environments comprise about 6% of the analysis area, and most of this habitat is in the Strawberry Mountain Wilderness. In the project area, these biophysical environments are at low levels, highly fragmented and isolated. The majority of the project area is in warm dry and hot dry biophysical environments.

Given the proximity of the project area to the Strawberry Mountain Wilderness, it is possible that a wolverine could use the project area as winter foraging habitat when human access is impeded by snow. The project area also provides sufficient cover and security to meet landscape connectivity between core habitat areas in the Strawberry Mountain Wilderness and the McClellan Mountain and Aldrich Mountain Roadless Areas. Although much of the project area has been impacted by logging, road construction and other management activities, the area is still considered travel habitat. The highest potential for wolverine use in the project area occurs in the Dedicated and Replacement Old Growth areas located along the wilderness boundary.

Environmental Effects and Determination

Effects were analyzed at the analysis area level (51,761 acres). Short-term, mid-term and long-term definitions are defined at the beginning of the report.

Alternative 1 – No Action

Direct, Indirect and Cumulative Effects

There would be direct, indirect or cumulative effects to wolverine or potential home range or travel corridors within the project area. Big game populations would remain stable, providing potential winter forage habitat for wolverine. Connectivity habitat would remain as currently exists. The risk of a stand replacement fire and insect and disease infestation would remain high.

Determination

There would be **No Impact (NI)** to wolverine by implementing the No Action alternative.

Alternative 2 - Proposed Action

Direct and Indirect Effects

The project area provides little to no source or reproduction habitat for wolverine; the area has been highly managed. The adjacent Strawberry Mountain Wilderness does provide source habitat. The project area may provide winter foraging habitat and dispersal habitat.

The Canyon Creek project area is in big game winter range. Wolverines may follow migrating big game herds to lower elevation winter range and scavenge on winter kills (Wisdom et al. 2000, Ruggiero 1994). The Big Game Habitat section in Chapter 3 of the Canyon Creek EA describes the effects of the Proposed Action on big game. The section concludes that reductions in thermal and hiding cover would likely affect big game distribution, but would not be expected to affect population numbers. Although satisfactory cover is reduced below standards, total cover remains near or in excess of standards. Retention of unthinned patches in units would help mitigate losses in hiding cover. Open road densities would remain below Forest Plan standards in all areas except Vance Creek summer range, reducing the potential for disturbance. Seasonal restrictions on management activities in winter range would minimize disturbance to both big game and foraging wolverine. The alternative snow mobile route is located outside winter range to the south; additional disturbance effects would be considered minimal. The project was designed to maintain connectivity corridors for deer and elk. Proposed treatments would open up tree canopies and increase forage. Winter and summer range would continue to meet Forest Plan standards for the Habitat Effectiveness Index (HEI). Elk populations have remained stable during the last 10 years, meeting or exceeding ODFW Management Objectives. Implementation of the Proposed Action would not be expected to reduce big game populations. The project area would continue to provide winter foraging opportunities for wolverine.

Reductions in canopy cover would have variable effects on other smaller, prey species; some prey species adversely affected by the loss of tree cover while other prey benefiting from the increasing level of ground vegetation. Applying mitigation measures to protect downed logs and snags would reduce impacts to substrate for wolverine prey.

Connectivity corridors have been established for the project area (see Map 9 in Appendix B). Although corridors were created primarily to meet Forest Plan standards for movement of old growth species, they would also provide travel and dispersal habitat for wide-ranging carnivores such as wolverine. Corridors generally meet or exceed the minimum requirements as described in Amendment #2 of the Forest Plan. In most cases, corridors were designated at the "stand level" with stand width often exceeding the minimum 400-foot width. In some cases, where suitable forest conditions do not exist, stands have been identified as connectivity habitat even though minimum canopy closure or corridor width requirements were not met. One example is where large blocks of non-forest bracket a narrow riparian area.

Under the Proposed Action, thinning in 9 units would reduce cover on about 260 acres, or 7% of established connectivity corridors. Thinning prescriptions in units 121,194, 338, 340, 386, 392, 394, 538, and 712 would be adjusted to maintain canopy cover in the upper 1/3 of site potential as required by Regional Forester's Eastside Forest Plans Amendment #2. Only a portion of units 121, 392 and 538 lie in connectivity corridors; acres outside of corridors would receive standard treatments. Prescribed burning would affect 456 acres or 11% of the connectivity corridors with a portion of those acres overlapping with harvest units. Prescribed underburning and pre-commercial thinning would reduce understory stocking; however, design requirements would retain 5% to 15% of the treatment areas in un-thinned patches to help facilitate animal movement. Research by Hornocker and Hash (1981) found wolverines showed preference for scattered timber with pockets, compared to young dense stands; therefore, in some instances treatment in the corridors may actually facilitate movement.

Amendment #2 gives the Forest Service flexibility to modify or forgo connectivity direction for projects that address safety and health concerns (USDA 1996). There are 4 units within ¼ mile of the public/private boundary that are considered high priority for fuels reduction to protect private property. In units 62, 90, 95 and 536, harvest treatments would reduce canopy cover below the upper 1/3 of site potential. Connectivity standards would not be met on 104 acres, or 3% percent, of established connectivity corridors; this level of impact is considered incidental to wolverine movement. In units 95 and 536, un-thinned patches would be maintained on about 5% of the acres to help mitigate cover reductions. Units 62 and 90 are proposed for shelterwood harvest; following treatment very little cover would be left. Harvest in these 4 units would reduce, but not eliminate all connectivity habitat to adjacent old growth areas.

Thinning, harvest, and burn prescriptions are designed to move conditions towards the Historic Range of Variability. Treatment areas are predominantly in the low elevation warm dry to hot dry biophysical environments. These sites tend towards an open forest condition with an herbaceous or shrub understory. Restoration of historic vegetation conditions, fire regimes and landscape patterns would make habitats more sustainable in the long-term.

As an action connected to the timber sale, there would be some change to the existing road conditions. Maintenance and reconstruction would occur on roads used for log haul. Temporary road construction would reduce vegetative cover on approximately 7 acres. The temporary roads would be subsoiled and seeded as soon as harvest is completed and would not increase the overall open road density. Although these roads would be eliminated, the effects would remain until trees become established in the road prism. About 200 feet of permanent road would be constructed. Loss of vegetation would be permanent; however, this amount of road is considered incidental and would not change average open road densities. No increase in vehicle traffic would be expected once the project is completed. Proposed road construction would not fragment connectivity corridors.

During project operations (logging, noncommercial thinning, machine work, road work and use, burning, use of alternative snow mobile routes) degrees of disturbance and displacement of wildlife would be likely. Human disturbance could have short-term, indirect effects on wolverines traveling through the area, but individual animals would likely react by using alternative travel routes. With no source habitat in the project area and a high degree of human impact and use, wolverine presence would be expected to be low, even outside operating periods. Overall, disturbance from activities would be limited in time and place, and therefore, would not be expected to change populations of species at the landscape level.

Cumulative Effects

Cumulative effects were analyzed at the analysis area level (51,761 acres). All of the activities in Appendix C have been considered for their cumulative effects on wolverines. Past adverse effects have been primarily a result of timber harvest and road construction; in particular, the lower elevations of the project area have been highly managed. Past management combined with high human use preclude wolverine using the project area use as source habitat. The following discussion will focus on the cumulative effects of management activities on forage and dispersal habitat.

Activities that have cumulatively affected big game habitat and populations can also cumulatively affect wolverine (see EA, Chapter 3, Big Game Habitat, Cumulative Effects). The Big Game Habitat section describes the conditions of cover, forage and open road density, and their effects on habitat effectiveness for big game. Habitat values reflect the effects of past management activities as well as natural events such as wildfire, and include effects of management on both public and private lands. Habitat Effectiveness Index (HEI) values meet or exceed Forest Plan standards. Satisfactory cover does not always meet standards. Open road densities meet standards except in Vance Creek summer range. Elk populations have remained stable during the last 10 years, meeting or exceeding ODFW Management Objectives, despite management activities. The Big Game Habitat cumulative effects discussion concludes that the combined effects of the Canyon Creek project with the effects of past, present and reasonably foreseeable future activities would not be expected to adversely affect populations or viability of big game species within the analysis area.

Future thinning and burning projects would have effects similar to those described for the Canyon Creek project. Thinning along Highway 395 and around Dry Soda Lookout would have both positive and negative effects to wolverine and its prey. Positive effects include reducing canopy cover and increasing forage for deer and elk as well as ground cover for smaller, wolverine prey species. Although timber harvest can increase forage, it can also reduce the hiding cover provided by understory trees. New timber harvest and prescribed burning projects are being designed to retain a portion of the existing hiding cover. Connectivity corridors have been established. Neither area is considered ideal source habitat for wolverine because of vegetation type and the intensively managed condition of the area. Firewood cutting could also remove snags or down logs that could provide future denning habitat; however, firewood cutting occurs along roads which tends to discourage wolverine use.

Large-scale wildfires have the potential to alter source habitat and connectivity habitat for wolverines as well as habitat for its prey species. The precise effects of future wildfires would depend upon the magnitude, duration, and intensity of those fires. High intensity/low frequency fires are the historic fire regime for wolverine source habitats; however, the same kinds of fires are outside the historic range of variability for the dry forest types.

Private lands are unlikely to support much wolverine activity except for dispersing animals and possibly winter foraging habitat. Private development has increased in the area in recent years, and associated timber harvest and road construction have reduced the quality of habitat for wolverine. The Little Canyon Mountain fuels reduction project on BLM land also reduced wolverine habitat.

Recreation use in the area is high, at least during the fall hunting seasons. This activity can directly disturb wolverine or disturb deer and elk populations, a major prey source. Hunting intensity tends to be greater at the lower elevations where open road densities are higher. Source habitat for wolverine is in the Strawberry Mountain Wilderness; recreation use is far lower here and likely has little impact on wolverines. One of the most significant recreation trends in recent years is the growth in use of motorized off-highway vehicles (OHVs). OHV users are increasingly attracted to parcels of public lands where access is readily available, this in turn concentrates the use of OHV and the potential disturbance associated with that use (Toweill & Thomas 2002). Snow mobile trails have been designated in the project area, and tend to focus use along designated routes. OHV and snow mobile use is prohibited in the wilderness.

The combined effects of the Canyon Creek project with the effects of past, present, and reasonably foreseeable future activities would not be expected to adversely affect populations or viability of wolverine. Management activities have not altered nor are expected to alter source habitat in the Strawberry Mountain Wilderness. Big game populations, the wolverine's primary prey source, would be expected to remain stable. Connectivity habitat has been reduced, but proposed habitat levels likely better represent historic conditions. Cumulatively, management activities across the Forest are distributed sufficiently to minimize disturbance impacts at the population level. Seasonal restrictions are applied on a project by project basis as needed.

Determination of Effects

The Proposed Action **may impact individuals or habitat (MIIH) but will not likely cause a trend towards federal listing or loss of viability**. This determination is based on the following rationale:

The project area provides little to no source or reproduction habitat for wolverine; the area has been highly managed. Human disturbance could have short-term, indirect effects on wolverines foraging or traveling through the area, but individual animals would likely react by using alternative travel routes. With no source habitat in the project area and a high degree of human impact and use, wolverine presence would be expected to be low.

Wolverines may follow migrating big game herds to lower elevation winter range and scavenge on winter kills. Reductions in thermal and hiding cover would likely affect big game distribution, but would not be expected to affect population numbers. Seasonal restrictions on management activities in winter range would reduce the potential for disturbing big game and foraging wolverines.

Connectivity corridors would continue to provide for the free movement of various wildlife species, including wide-ranging carnivores such as wolverine. Harvest and prescribed burning would reduce, but not eliminate connectivity habitat. Design requirements would retain non-thinned patches to facilitate animal movement. Harvest in units 62, 90, 95 and 536 would reduce canopy cover below standards; however, Regional Forester's Amendment #2 permits this in situations where safety and health are an issue. Even in these units, there would be post-treatment vegetation that would provide some degree of cover for the movement of animals. Harvest in these units effects 3% of the connectivity corridors; level of impact is considered incidental to wolverine movement.

Pacific fisher *(Martes pennanti)*

Status

Federal Status: Candidate (NARA 2005)
USDA-Forest Service (Region 6) Status: Sensitive (USDA 2004)
State Status: Sensitive-Critical (ODFW 2006)
Oregon Natural Heritage Program Status: List 2 (ONHIC 2004)

Major Threats

Intensive trapping and predator control efforts, as well as loss and alteration of habitat has pushed the fisher to near extirpation in Washington and Oregon (NatureServe 2006).

Source Habitat Trend

Basin-wide, there were moderately or strongly declining habitat trends in nearly 70 percent of watersheds. The Blue Mountains ERU has undergone a positive absolute (+14.24%) and relative (>100.00%) change in source habitat availability (moderate or strong increases in more than 50 percent of the watersheds). An increase in Blue Mountains source habitat was most influenced by an increase in mid- and late-seral montane community types (Wisdom et al. 2000).

Biology and Ecology

Authorship and citation for the following baseline data, unless indicated otherwise, is taken from http://www.livingbasin.com./endangered/mammals/fisher.html

Fishers are medium sized carnivores that prey on a wide variety of foods including birds, rabbits, porcupines, and carrion. Distribution is likely governed by the availability of food but the presence of overhead cover may also be an important factor. Home range sizes of fishers vary up to 30 km2 (about 7,400 acres) for adult males. The range of one male will overlap those of more than one female, but home ranges within adult sexes are exclusive.

Fishers use primarily coniferous or mixed-hardwood habitats. Optimum fisher habitat consists of a diversity of forest types and, therefore, greater prey abundance. Studies have shown a preference for forests dominated by multi-layered conifer stands, and in Idaho, they prefer mesic forest habitats (Witmer et al. 1998), but some hardwoods may be desirable for maximum prey numbers and diversity. A 70 to 80 percent canopy closure is believed optimum, but a California study showed a preference for 40 to 70 percent canopy cover areas. Fishers are known to inhabit second growth and even clearcuts after cover is established (Marshall 1996). It is not known whether the second growth and sparse overhead canopy habitats are used transiently or the basis of stable home ranges (Ruggiero et al. 1994). Large diameter trees with cavities, especially riparian cottonwoods in British Columbia, are important as natal den sites. Fishers move to larger cavities as the young grow. Dense forest stands in the latter successional stages provide the best quality habitat, particularly in western North America. Ruggiero et al. (1994) noted that fisher use riparian areas disproportionately more than their occurrence and exhibit a strong preference for habitats that have overhead tree cover.

In Ruggiero (1994) it has been hypothesized that the physical structure of the forest and prey associated with the structure are the critical features that explain fisher habitat use, not specific forest types. Forest structure needs to provide three important functions for fisher usage: 1) lead to a high diversity of dense prey populations, 2) lead to high vulnerability of prey to fisher, and 3) provide natal and maternal dens and resting sites.

Fishers are vulnerable to habitat loss through forestry, trapping, and hydroelectric development. Loss of habitat through the cutting of forests for timber or conversion to other land uses, over-trapping, and the widespread use of poisons as a harvest and predator control method have also contributed to the reduction and extirpation of fisher populations. Forest harvesting elsewhere also increases access for trappers, which is a particular concern because fishers are taken in marten sets. Marshall (1996) states that timber harvesting is not considered compatible with maintenance of maximum fisher numbers in most areas, and if severe, it will eliminate fishers. Ruggerio et al. (1994) suggested that small patch cuts may not impact fisher populations and uneven aged management practices would have less impact to fisher than even aged management practices. Clear cut timber harvesting practices had the most severe impact to fisher habitat in North America. Degraded, destroyed, or fragmented habitat may result in isolated habitats that are too small to maintain viable fisher populations.

Distribution

The Pacific fisher may be extirpated from northern, northeastern, and western Oregon and in the central and northern Sierra Nevada or reduced to very low numbers. Based on extensive camera and track plate surveys, Lewis and Stinson (1998) concluded that the fisher is greatly reduced in Oregon. Based on extensive inquiry and review of records, Aubry and Lewis (2003) found that extant fisher populations in Oregon are restricted to two disjunct and genetically isolated populations in the southwestern portion of the State.

Existing Condition

Although habitat exists in the analysis area, fisher are not known or suspected to occur there. Fisher have been extirpated from much of their range due to trapping and loss of habitat due to logging *(http://imnh.isu.edu/digital atlas/splash_navigate/pcmain.htm).* They are considered extirpated from much of Oregon (Oregon Natural Heritage Program 2001).

Conifer stands that are in the cool dry, cool moist or cold dry biophysical environments and that have at least 40% canopy closure are considered fisher habitat. In the analysis area, i.e., the Vance Creek, Upper Canyon and East Fork Canyon Creek subwatersheds, about 3,500 acres comprise these biophysical environments with the majority located in the Strawberry Mountain wilderness. Estimated acres include stands with greater than and less than 40% canopy cover, so the estimate actual represents potential habitat. Existing quality fisher habitat would be at a lower level after subtracting out stands with less than 40% canopy closure. In the project area, only 184 acres are in these biophysical environments; habitat blocks are too small and isolated to support a fisher home range. No source or reproduction habitat exists. The Canyon Creek project area is predominantly in the warm dry and hot dry biophysical environments, and would not be expected to provide fisher habitat. Historically, stands would have been more open and even less conducive to fisher use.

Environmental Effects and Determination

Effects were analyzed at the project area level (22,700 acres) and analysis area level (51,761 acres). Short-term, mid-term and long-term definitions are defined at the beginning of the report.

Alternative 1 - No Action

Direct, Indirect and Cumulative Effects

In the Canyon Creek project area, there is insufficient habitat to support a fisher. In the analysis area, about 3,500 acres classify as fisher habitat. Canopy cover would continue to increase, improving habitat. As canopy closure increases above 40%, the risk of tree mortality due to insects and diseases also increases. Increasing snags and down wood would provide additional denning and resting sites, cover and prey substrate. Habitats would remain at high risk to stand-replacement fire, but this type of fire reflects the expected fire regime for these habitats. Since there are no direct or indirect impacts to fisher or fisher habitat in the project area, there would be no cumulative impacts to fisher.

Determination of Impacts

Since there would be no vegetation treatment with this alternative, there would be **No Impact (NI)** to fisher or fisher habitat.

Alternative 2 - Proposed Action

Direct and Indirect Effects

The Canyon Creek project area is predominantly in the warm dry and hot dry biophysical environments, and would not be expected to provide fisher habitat. In the project area, only 184 acres are in biophysical environments that are typically associated with fisher; habitat blocks are too small and isolated to support a fisher home range. Prescribed burning would occur on 15 of the 184 acres; no effects would be expected. On 3,500 acres in adjacent areas located outside the project area, habitat would continue to develop as described in the No Action alternative. There will be no road activity within potential fisher habitat.

Connectivity corridors have been established for the project area (see Map 9 in Appendix B). Although corridors were created primarily to meet Forest Plan standards for movement of old growth species, they would also provide travel and dispersal habitat for wide-ranging carnivores such as fisher. Corridors generally meet or exceed the minimum requirements as described in Amendment #2 of the Forest Plan. In most cases, corridors were designated at the “stand level” with stand width often exceeding the minimum 400-foot width. In some cases, where suitable forest conditions do not exist, stands have been identified as connectivity habitat even though minimum canopy closure or corridor width requirements were not met. One example is where large blocks of non-forest bracket a narrow riparian area. Fisher habitat is predominantly associated with moister habitats in the Strawberry Mountain Wilderness to the north and east; habitat is very limited in drier biophysical environments areas south and west of the project area.

The Forest Plan requires that within corridors, canopy closure be maintained in the upper 1/3 of site capability. This standard does not necessarily meet fisher needs because it applies to overhead cover rather than horizontal cover near the ground that is more important to fisher that is about 2 feet tall. Corridors, however, tend to have more trees and provide better hiding cover than surrounding stands, even in the warm-dry and hot-dry biophysical environments. Corridors, when located in riparian or ridge lines, offer the best options for fisher dispersal and movement. By maintaining corridors, the forest can be managed within HRV while maintaining options for fisher (Ruediger et. al. 2000).

Under the Proposed Action, thinning in 9 units would reduce cover on about 260 acres, or 7% of established connectivity corridors. Thinning prescriptions in units 121,194, 338, 340, 386, 392, 394, 538, and 712 would be adjusted to maintain canopy cover in the upper 1/3 of site potential as required by Regional Forester's Eastside Forest Plans Amendment #2. Only a portion of units 121, 392 and 538 lie in connectivity corridors; acres outside of corridors would receive standard treatments. Prescribed burning would affect 456 acres or 11% of the connectivity corridors with a portion of those acres overlapping with harvest units. Prescribed underburning and pre-commercial thinning would reduce understory stocking; however, design requirements would retain 5% to 15% of the treatment areas in un-thinned patches to help facilitate animal movement. Design measures would be incorporated in prescriptions to protect existing snags and down logs that could provide hiding cover for fisher and its prey.

Amendment #2 gives the Forest Service flexibility to modify or forgo connectivity direction for projects that address safety and health concerns (USDA 1996). There are 4 units within ¼ mile of the public/private boundary that are considered high priority for fuels reduction to protect private property. In units 62, 90, 95 and 536, harvest treatments would reduce canopy cover below the upper 1/3 of site potential. Connectivity standards would not be met on 104 acres, or 3% percent, of established connectivity corridors; this level of impact is considered incidental to wolverine movement. In units 95 and 536, un-thinned patches would be maintained on about 5% of the acres to help mitigate cover reductions. Units 62 and 90 are proposed for shelterwood harvest; following treatment very little cover would be left. Harvest in these 4 units would reduce, but not eliminate all connectivity habitat to adjacent old growth areas.

Thinning, harvest, and burn prescriptions are designed to move conditions towards the Historic Range of Variability. Treatment areas are predominantly in the low elevation warm dry to hot dry biophysical environments. These sites tend towards an open forest condition with an herbaceous or shrub understory. The Canyon Creek project emphasizes burning sites which naturally had a high fire return interval. Restoration of historic vegetation conditions, fire regimes and landscape patterns would make habitats more sustainable in the long-term.

In the short- to mid-term, connectivity corridors would continue to provide for the free movement of various wildlife species, including wide-ranging carnivores such as fisher. Harvest in units 62, 90, 95 and 536 would reduce, but not entirely eliminate, connectivity habitat to adjacent old growth areas. In the long-term, untreated corridors would remain at a higher risk to insects and fire that could degrade or eliminate habitat.

Fisher are also associated with cottonwood/willow habitats. Precommercial thinning, pile burning and prescribed burning would be conducted in riparian areas, i.e., Riparian Habitat Conservation Areas (RHCA's). Design features would retain untreated patches to maintain foraging and security cover. Precommercial thinning would have a greater impact than burning, but the number of acres being treated is considered incidental. Burning activities would mimic low intensity fires that are characteristic of natural burning patterns in riparian areas. Some mortality of understory trees would occur in burned patches, with only a few overstory trees being killed. Created small openings in the canopy may induce establishment of shrubs, grasses and forb species. Treatments in riparian areas would be limited and would likely promote hardwood establishment, rather than retard it.

As an action connected to the timber sale, there would be some change to the existing road conditions. Maintenance and reconstruction would occur on roads used for log haul. Temporary road construction would reduce vegetative cover on approximately 7 acres. The temporary roads would be subsoiled and seeded as soon as harvest is completed and would not increase the overall open road density. About 200 feet of permanent road would be constructed. Loss of vegetation would be permanent; however, this amount of road is considered incidental and would not change average open road densities. No increase in vehicle traffic would be expected once the project is completed. Proposed road construction would not fragment connectivity corridors.

During project operations (logging, noncommercial thinning, machine work, road work and use, burning, use of alternative snow mobile routes) degrees of disturbance and displacement of wildlife would be likely. Disturbance and displacement of wildlife away from forestry operations depends upon the season of the year and the tolerance of the species and individual. Overall, disturbance from activities would be limited in time and place, and therefore, would not be expected to change populations of species at the landscape level.

Cumulative Effects

The area considered for cumulative effects is the Vance Creek, East Fork Canyon and Upper Canyon Creek subwatersheds. All of the activities in Appendix C have been considered for their cumulative effects on fisher. The project area does not contain sufficient habitat to support fisher, so the following discussion will focus on the cumulative effects of management activities on connectivity corridors and dispersal habitat. Past adverse effects to connectivity habitat have been primarily a result of timber harvest and road construction; in particular, the lower elevations of the project area have been highly managed.

Future thinning and burning projects would be conducted in warm dry and hot dry biophysical; environments are not considered fisher habitat. Connectivity corridors have already been established or would be designated as part of these project analyses.

Large-scale wildfires have the potential to alter source habitat and connectivity habitat for fisher as well as habitat for its prey species. The precise effects of future wildfires would depend upon the magnitude, duration, and intensity of those fires. High intensity/low frequency fires are the historic fire regime for fisher source habitats; however, the same kinds of fires are outside the historic range of variability for the dry forest types in dispersal habitat.

Private lands are unlikely to support fisher activity. Private development has increased in the area in recent years, and associated timber harvest and road construction have reduced the quality of connectivity habitat. The Little Canyon Mountain fuels reduction project reduced connectivity habitat.

Recreation use in the area is high, at least during the fall hunting seasons. This activity can directly disturb fisher. Hunting intensity tends to be greater at the lower elevations where open road densities are higher. Source habitat for fisher is predominantly in the wilderness; recreation use is far lower here and likely has little impact on fisher. One of the most significant recreation trends in recent years is the growth in use of motorized off-highway vehicles (OHVs). OHV users are increasingly attracted to parcels of public lands where access is readily available, this in turn concentrates the use of OHV and the potential disturbance associated with that use (Toweill & Thomas 2002). Snow mobile trails have been designated in the project area, and tend to focus use along designated routes. OHV and snow mobile use is prohibited in the wilderness.

The combined effects of the Canyon Creek project with the effects of past, present, and reasonably foreseeable future activities would not be expected to adversely affect populations or viability of fisher. Management activities have not altered nor are expected to alter source habitat in the Strawberry Mountain Wilderness. Connectivity habitat has been reduced, but proposed habitat levels likely better represent historic conditions. Although connectivity habitat would be treated, these corridors would continue to allow free movement of fisher and other carnivores. Cumulatively, management activities across the Forest are distributed sufficiently to minimize disturbance impacts at the population level. Seasonal restrictions are applied on a project by project basis as needed.

Determination of Effects

The Proposed Action **may impact individuals or habitat (MIIH) but will not likely cause a trend towards federal listing or loss of viability**. This determination is based on the following rationale:

Fisher are not known or suspected to occur within the project area. Fisher have been extirpated from much of their range due to trapping and loss of habitat due to logging. They are considered extirpated from much of Oregon (Oregon Natural Heritage

Program 2001). The Canyon Creek project area is predominantly in the warm dry and hot dry biophysical environments, and would not be expected to provide source habitat for fisher. In the project area, only 184 acres are in biophysical environments that are typically associated with fisher; habitat blocks are too small and isolated to support a fisher home range. With the absence of reproductive habitat, the project area would most likely be dispersal habitat and fisher use would be transitory. Proposed treatments in connectivity corridors would reduce the effectiveness of dispersal habitat, but would not eliminate the ability of fisher to move across the landscape. Given there current status of fisher in Oregon, it is very unlikely fishers would be using connectivity habitat in the area.

American Peregrine Falcon *(Falco peregrinus anatum)*

Status

Federal Status: Species of Concern (list 1-7-00-SP-588)
USDA-Forest Service (Region 6) Status: Sensitive
State Status: Endangered (ODFW 2006)
Oregon Natural Heritage Program Status: List 2 (ONHIC 2004)

Major Threats

The peregrine falcon is currently recovering throughout much of its range (NARA 1999b). Primarily threats continue to be from environmental toxins, habitat loss, human disturbance, and illegal take. The decline of this species has long been linked to the use of persistent organochlorine pesticides, such as DDT. Since the banning of DDT in North America in the early 1970s, peregrines have made a significant recovery. However, organochlorine residues persist in the environment, and peregrines are still being affected in portions of their breeding range (NatureServe 2006). Illegal collecting of nestlings for use in falconry and incidental shooting are other threats (TNC 1999).

Biology and Ecology

Peregrine falcon habitat consists of nesting, perching, roosting and foraging areas. The most critical habitat component for peregrine falcons appears to be suitable nesting sites (Csuti et al 1997). Nesting occurs almost exclusively on sheer cliffs with small caves or overhangs large enough to contain three to four full-grown nestlings and is usually near water. Nesting on substitute human-made sites includes ledges on tall buildings, bridges, rock quarries, and raised platforms. Tree nesting is virtually unknown. The peregrine falcon nests along the seacoast, near marshes and even in cities, but are not well suited to life in forest interiors (Csuti et al 1997).

Associated with the nest territory is a foraging area. This generally includes open wooded areas, marshes, open grasslands and bodies of water within a short flying distance from the nesting area (Marshall 1992). When not breeding, peregrine falcons can occur in areas where preys concentrate. This includes farmlands, marshes, lakeshores, river mouths, tidal flats, dunes and beaches, broad river valleys, cities and airports (NatureServe 2006).

Distribution

The American peregrine falcon breeds across interior Alaska, south of the Brooks Range, eastward across Canada, south-central United States and the Atlantic coast. Its southern range extent includes Baja, California and Mexico. Now absent from large areas of its historic range, particularly in the eastern United States. Successful introduction of non-native peregrine falcons have occurred in much of this subspecies' historic eastern United States range (TNC 1999). The Pacific Coast population has increased since its near extirpation in the early 1970's (Pagel 1992).

Henny and Nelson (1981) reported that there are at least 42 historic peregrine nest sites in Oregon. Other sources indicate that there were as many as 70 historic nest sites within the state. Of these reports, one referred to a location in the Strawberry Mountain Wilderness (unverified). Sighting of peregrine falcons are uncommon. They are often noted in the fall and spring when migrating through the forest (Pagel 1992).

There are no records of resident peregrines occupying habitat or nesting on the Blue Mountain District, but migrating birds have been seen (rare sightings). While a transient peregrine falcon could fly over or migrate through the project area, the potential of the activity having a measurable effect on this species is very low to negligible.

Existing Condition

In 1992, surveys to identify probable nest sites were conducted on the Malheur National Forest (Pagel 1992). The potential for nests at various locations were identified and rated from low to high potential of use according to specific habitat criteria. The closest potential nest site rated in this effort was the Canyon Mountain site located about 2 miles north of the project area. This site was determined to have a medium potential for use by peregrine falcon, although there have been no documented records of use. Medium potential is defined as: cliffs with an acceptable level of potential occupancy, or were otherwise low potential cliffs with a possibility of a nesting ledge that was not visible or may be suspected. Certain rock types (conglomerate, granite, sandstone, limestone) have distinct possibilities of having ledges that are not normally visible, and were usually categorized as medium, if they had the "proper" or acceptable height (Pagel 1992).

Additional sites are located near Aldrich Mountain, Fields Peak, McClellen Creek, Moon Mountain, and Riley Creek, ranging from 7 to 17 miles west of the project area. Locations rated low to medium potential for use.

Environmental Effects and Determination

Effects were analyzed at the project area level (22,700 acres). Short-term, mid-term and long-term definitions are defined at the beginning of the report.

Alternative 1 – No Action

Direct, Indirect and Cumulative Effects

Peregrine falcon presence in the area appears to be transitory in nature; therefore, falcons would not likely be affected by the project. There would be no direct, indirect or cumulative effects to peregrine falcons.

Determination

There would be **No Impact (NI)** to peregrine falcon by implementing the No Action alternative.

Alternative 2 - Proposed Action

Direct, Indirect and Cumulative Effects

Peregrine falcon presence in the area appears to be transitory in nature; therefore, falcons would not likely be affected by the project. There would be no direct, indirect or cumulative effects to peregrine falcons.

Determination

There would be **No Impact (NI)** to peregrine falcon by implementing the No Action alternative.

Western Sage Grouse *(Centrocercus urophasianus phaios)*

Status

Federal Status: Species of Concern (list 1-7-00-SP-588)

USDA-Forest Service (Region 6) Status: Sensitive (USFS 2000)

State Status: N/A

Major Threats

Conversion of sagebrush cover types to agricultural lands and conversion of shrub-steppe vegetation to exotic forbs and annual grasses (Wisdom et al. 2000) have drastically reduced or altered the availability of this species' habitat. In southeastern Oregon over 2,760 square miles of federally administered lands have been modified to the detriment of sage grouse (Willis et al. 1993). Predation and livestock grazing contribute to the decline of sage grouse numbers.

Population Status and Trend

Prior to the 1950s, estimates of abundance were anecdotal, and historical population levels are unknown (NatureServe Exlorer 2002). Early accounts, however, suggest that this species was once widespread and abundant in many areas of the West. There are reports of sage grouse at times blackening the sky and being shot by the wagon-load (NatureServe Explorer 2002). Declines began with livestock overgrazing of western rangelands aggravated by over harvesting and periods of drought. By the 1920s and 1930s sage grouse were thought to be declining throughout their range (NatureServe Explorer 2002). Population declines have continued to present day with accumulating loss and degradation of sagebrush habitats.

Wisdom et al. (2000) reports that sage grouse populations have shown significant, steep declines since the 1940s in Idaho, Oregon and Washington. The rates of decline in Idaho, Oregon, and Washington are not significantly different, suggesting common, widespread factors affecting these populations. In Oregon, long-term population declines have averaged 30 percent since 1950 (Interagency Interdisciplinary Sage Grouse Planning Team 2000). Braun (1998 in NatureServe Explorer 2002) estimates a current total of fewer than 142,000 grouse rangewide, and population levels fewer than 20,000 in Montana, Oregon and Wyoming.

A complicating factor is that sage grouse in this geographic area may exhibit population cycles with a periodicity of around 10 years. Apparent trends over short periods should be regarded with caution. Nonetheless, trends for populations in Colorado, for example, reveal that each population peak has been lower than the last. There have been no sustained population increases in any part of the range (NatureServe Explorer 2002).

Source Habitat Trend

The current extent of habitat is similar to the historic distribution, although the abundance of habitat has changed in some areas. Basin-wide, nearly 48 percent of the watersheds showed a moderate or strongly declining trend in habitat, and declines exceeded increases in every ERU. The Blue Mountains ERU has undergone a negative absolute (-11.73% and -12.70%) and relative (-30.14% and -32.78%) change in winter and summer source habitat availability (Wisdom et al. 2000).

Habitat

Sage grouse are obligate residents of sagebrush habitat, usually inhabiting sagebrush-grassland or juniper-sagebrush-grassland communities. Throughout their range habitats used includes a wide variety of sagebrush mosaic habitats (Schroeder et al. 1999), including:

- tall sagebrush types such as big sagebrush, three-tip sagebrush (A. tripartita), and silver sagebrush (A. cana);
- low sagebrush types, such as low sagebrush (Artemesia arbuscula) and black sagebrush (A. nova);
- mixes of low and tall sagebrush with abundant forbs;
- riparian and wet meadows;
- steppe dominated by native forbs and bunchgrasses;

- scrub-willow (Salix spp.)
- sagebrush/woodland mixes with juniper (Juniperus spp.), ponderosa pine (Pinus ponderosa),or quaking aspen (Populus tremuloides).

In southeastern Oregon, the most widely used vegetation type throughout the year is forb-rich sagebrush types with low stature sagebrush, and mosaics of low and high stature sagebrush (Willis et al. 1993). Vegetation types of low stature primarily include low sagebrush (A. longiloba), although black sagebrush, stiff sagebrush (A. rigida), and three-tipped sagebrush may be used. Wyoming big sagebrush (A. t. var wyomingensis) and mountain big sagebrush (A. t. var vaseyana) are the primary species of high stature used in mosaic form with low sagebrush in Oregon. Neither expansive dense sagebrush nor expansive open areas constitute optimal sage grouse habitat.

Sage grouse use sagebrush of different age classes and stand structures for lek (courtship display), nesting, brood rearing, and wintering. During the mating season (March-May), leks may be on bare areas, such as swales, irrigated fields, meadows, burns, and roadsides or areas of low cover and stature of sagebrush and are more often within vegetation types of low sagebrush or low/big sagebrush mosaics. When not on the lek, sage grouse disperse to the surrounding areas (Interagency Interdisciplinary Sage Grouse Planning Team 2000).

After mating, hens usually nest near lek grounds, but some fly as far as 12 to 20 miles (19-32 km) to favorable nesting sites (Interagency Interdisciplinary Sage Grouse Planning Team 2000). They prefer sagebrush 14 to 25 inches (36-63.5 cm) tall with an open canopy, 10-50%, for nesting. During the nesting season, cocks and hens without nests use relatively open areas for feeding, and roost in dense sagebrush patches.

Early brood rearing occurs near the nest site depending on the availability of forbs and insects, which are the main food source for the chicks. Young broods use areas of low plant height (9 to 15 inches) and density, while older broods and adults use areas with taller plants (7 to 25 inches) (Interagency Interdisciplinary Sage Grouse Planning Team 2000). Sage grouse apparently do not require open water for day-to-day survival if succulent vegetation is available, but they utilize free water if it is available.

Habitat used by summering groups generally takes three forms: mid-elevation playas and waterholes, high mountain areas, and alfalfa developments. After early brood rearing, hens with broods leave early brooding areas when forbs have desiccated and move to areas that still have green vegetation, such as meadows/ephemeral wet riparian areas. There they spend the mid- and late summer period with other hens and brood groups. Hens without broods group up with other unsuccessful hens in meadow habitats. By August, most birds cluster near permanent watering sites. In Oregon, sage grouse movements in mid-elevational summering areas are more random.

The Interagency Sage Grouse Planning Team (2000) identify important late brood rearing habitats as sagebrush, meadows and riparian areas, dry lake beds, and agricultural lands. The optimum habitat contains a mosaic of these lands types that include at least:

- 40 percent of the area in sagebrush stands that are 16 to 32 inches tall with a canopy cover of 10 to 25 percent and
- An herbaceous understory of 15 percent grass canopy cover and
- 10 percent forb canopy cover

Habitat loss, predation, drought, and poor weather conditions during hatching and brooding have been cited as factors leading to poor recruitment. Sage grouse hunting is closely regulated in states where it is allowed, and is not generally cited as a factor in sage grouse decline (NatureServe 2002).

Sagebrush is used for hiding cover year-round and provides thermal cover during summer and winter. Vegetation types used for wintering include primarily low sagebrush, big sagebrush, and mosaics of low and big sagebrush, where the often prefer wind swept areas free of snow.

Sagebrush, used year-round, is the most important component in the diet of adult sage grouse. Sagebrush constituted less than 60 percent of the diet only between June and September. Other forage consists largely of herbaceous leaves of dandelion (Taraxacum spp.), legumes (Fabaceae), yarrow (Achillea spp.) and wild lettuce (Lactuca spp.), which is used primarily in late spring and summer. Insects are a minor diet item for adult sage grouse. Chicks consume primarily insects, especially ants and beetles, in their first week of life (Interagency Interdisciplinary Sage Grouse Planning Team 2000). Their diet then switches to forbs, with sagebrush gradually assuming primary importance.

Distribution

Sage grouse occur from central Washington, southern Idaho, Montana, southeastern Alberta, southwestern Saskatchewan, southwestern North Dakota, and western South Dakota south to eastern California, south-central Nevada, southern Utah, western Colorado; formerly north to southern British Columbia, south to northern New Mexico and southeast to western Oklahoma (AOU 1998).

Western sage grouse (B. u. phaios), if indeed phaios is a taxonomically valid subspecies, occur from central and eastern Washington (Ellensburg, and Columbia County) south to southeastern Oregon; formerly to southern British Columbia (Osoyoos Lake) (NatureServe 2001). Taxonomic validity is questionable due to introduction of nominate subspecies into range of phaios. Validity may be impossible to determine (NatureServe 2002).

Existing Conditions

Sage grouse were reported scarce through Oregon at the turn of the century. Oral histories reported by one local resident claimed that sage grouse were plentiful in Bear Valley (several miles to the south of the Canyon Creek project area) before the town of Seneca was established, but were very difficult to find afterwards. In 1993, Oregon Department of Fish and Wildlife (ODFW) biologists estimated that Bear Valley had about 60 birds and a stable population. ODFW monitored a known active lek on private land in Bear Valley. In 2003, ODFW biologists (K. Rutherford, ODFW wildlife biologist, personal communication May 8, 2003) revised the 1993 estimates; they believe grouse populations in Bear Valley may have declined, primarily due to predation (coyotes), but also because of livestock grazing and agricultural conversion. Rutherford (2003) reported that the previously known active lek is no longer active. Little monitoring has been done in recent years to validate declines, but numbers are believed to be reduced.

In the Canyon Creek analysis area, shrub-steppe habitats are comprised primarily of dry woodlands, shrublands and grasslands. Dry woodlands/shrublands/grasslands comprise approximately 6% of the analysis area. Size ranges from 1 acre to 312 acres. Small openings are also scattered throughout the forested areas, and can include both grasslands and shrublands. Shrub species include sagebrush as well as mountain mahogany and bitterbrush. Livestock grazing, fire and road construction have impacted habitat quality. Conifer encroachment along the edge of openings may have reduced the extent of these habitats.

Habitat in the project area is considered marginal. There is no documented occurrence of sage grouse within the Canyon Creek project area; there are no known leks or suspected leks. It is possible that adult sage grouse with young may use non-forested areas, but use would be only occasional and random. Potential late season brood rearing habitat exists within meadow/ephemeral wet riparian areas; hens with broods or hen groups may use these lower elevation habitat as sagebrush types dry up and herbaceous plants mature in June and July, but again, use is expected to be occasional or random.

Environmental Effects and Determination

Effects were analyzed at the project area level (22,700 acres). Short-term, mid-term and long-term definitions are defined at the beginning of the report.

Alternative 1 - No Action

Direct, Indirect or Cumulative Effects

Under the No Action Alternative, there would be no new management activities; therefore, there should be no direct, indirect or cumulative effects to sage grouse or their habitat. Habitat conditions would be as described in the existing condition section.

Determination

Due to the nature of a No Action alternative, there would be **No Impact (NI)** to sage grouse or their habitat.

Alternative 2 - Proposed Action

Direct and Indirect Effects

Timber harvest, precommercial thinning and prescribed fire are not proposed for any large expanses of shrublands or woodlands. A small amount of light burning may occur along the fringes of these habitats and in small inclusions scattered throughout the forested areas. In fringe areas, any shrubland areas burned would do so in a mosaic of burned and unburned patches. Unburned islands of sagebrush can retain habitat features vital to associated species, such as sage grouse. In studies in Idaho, (Smith 2000), prescribed burns killed about 50% of the shrubs; total bird abundance declined significantly in the first year after fire, and then rebounded in years two and three to levels similar to those in unburned areas. Scattered loss of shrubs is not expected to have significant impacts on shrub-steppe habitats or the species that use them. No temporary or permanent roads would be constructed through these habitats. Disturbance from activities (burning, adjacent timber harvest and precommercial thinning, increased traffic, existing and alternative snowmobile access) would be limited in time and place, and therefore, would not be expected to change populations of species at the landscape level.

Cumulative Effects

Cumulative effects were analyzed at the project area level (22,700 acres). All of the activities in Appendix C have been considered for their cumulative effects on western sage grouse. The following discussion focuses on those past, ongoing and reasonable foreseeable future activities that may contribute adverse effects to the species or its habitat.

Juniper woodlands, sagebrush shrublands and dry grasslands have probably changed due to 100 years of fire suppression. Other conifer species have encroached on these habitats, reducing their size. On residual acres, juniper density probably has increased. Livestock grazing, primarily early in the century, may have caused changes in shrub, grass and forbs composition or abundance. Juniper woodland and shrubland habitats are very limited in the project area. Few management activities are proposed. As stated in the existing condition section, sage grouse populations on private lands in Bear Valley have declined primarily as a result of predation, livestock grazing and agricultural conversion. Livestock grazing is ongoing. At moderate grazing levels, livestock grazing can be compatible with sage grouse management.

Sagebrush habitats are very limited in the project area; the Proposed Action would conduct little to no activities in these habitats. Cumulatively, management activities across the Forest are distributed sufficiently to minimize disturbance impacts at the population levels. Even with all cumulative effects considered, the Proposed Action would not lead to any adverse effects to sage grouse populations nor would they contribute to a trend toward federal listing or loss of viability to the population or species.

Determination

Activities proposed under these alternatives are not expected to measurably change sagebrush habitats or potential late brood-rearing habitat. Given that there would be no direct, indirect or cumulative effects, there would be **No Impact (NI)** to this species.

Gray flycatcher *(Empidonax wrightii)*

Status

Federal Status: N/A

USDA-Forest Service (Region 6) Status: Sensitive (USFS 2000)

State Status: N/A

Major Threats

This species is vulnerable to land clearing, but it is generally found in very arid environments not usually converted to agriculture (USDA Forest Service 1994). Clearing of juniper in favor of grasslands for livestock grazing or widespread harvesting of juniper could be detrimental.

Population Status and Trend

North American BBS (Breeding Bird Survey) shows a survey-wide significantly increasing trend of 10.2 percent average per year (n = 89) during the 1966-1996 sample period; a non-significant decline of -1.0 percent average per year (n = 22) during 1966-1979; and a significant increase from 1980 to 1996 of 10.0 percent average per year (n = 84) (Sauer et al. 1997).

Data for Oregon reflects a strong long-term increase of 7.9 percent average per year (n = 29) during the 1966-1996 period (Sauer et al. 1997).

Habitat

The gray flycatcher prefers relatively treeless areas with tall sagebrush, bitterbrush, or mountain mahogany communities, but is also associated with pinyon-juniper woodland with understory sagebrush, and open ponderosa pine forests (Csuti et al. 1997). This species is most abundant in extensive tracts of big sagebrush, often selecting areas along washes where the sagebrush is especially tall. In the western Great Basin, this species nests in tall big sagebrush shrublands (Ryser 1985). During the nonbreeding season, this species commonly inhabits arid scrub, riparian woodland, and mesquite (NatureServe 2002).

Distribution

Breeding range covers extreme southern British Columbia and south-central Idaho south to southern California, southern Nevada, central Arizona, south-central New Mexico, and locally western Texas (NatureServe 2002). In Oregon, this species is typically found east of the Cascade Mountains (Csuti et al. 1997). Birds winter in southern California, central Arizona, south to Baja California and south-central mainland of Mexico (NatureServe 2001).

Existing Condition

The Malheur National Forest considers this species as a rare (not seen every year) summer resident.

The majority of the shrub-steppe habitats are associated with the larger expanses of habitat in Bear Valley several miles south of the project area. There is very little gray flycatcher habitat on Forest Service managed lands. In the Canyon Creek analysis area, shrub-steppe habitats are comprised primarily of dry woodlands, shrublands and grasslands. These habitats comprise approximately 6% of the analysis area. Size ranges from 1 acre to 312 acres. Small openings are also scattered throughout the forested areas, and can include both grasslands and shrublands. Shrub species include sagebrush as well as mountain mahogany and bitterbrush. Livestock grazing, fire and road construction have impacted habitat quality. Conifer encroachment along the edge of openings may have reduced the extent of these habitats.

Environmental Effects and Determination

Effects were analyzed at the project area level (22,700 acres). Short-term, mid-term and long-term definitions are defined at the beginning of the report.

<u>Alternative 1 - No Action</u>

Direct, Indirect or Cumulative Effects

Under the No Action Alternative, there would be no new management activities; therefore, there should be no direct, indirect or cumulative effects to sage grouse or their habitat. Habitat conditions would be as described in the existing condition section.

Determination

Due to the nature of a No Action alternative, there would be NO IMPACT (NI) to gray flycatcher or their habitat.

Alternative 2 - Proposed Action

Direct and Indirect Effects

Timber harvest, precommercial thinning and prescribed fire are not proposed for any large expanses of shrublands or woodlands. A small amount of light burning may occur along the fringes of these habitats and in small inclusions scattered throughout the forested areas. In fringe areas, any shrubland areas burned would do so in a mosaic of burned and unburned patches. Unburned islands of sagebrush can retain habitat features vital to associated species, such as gray flycatcher. In studies in Idaho, (Smith 2000), prescribed burns killed bout 50% of the shrubs; total bird abundance declined significantly in the first year after fire, and then rebounded in years two and three to levels similar to those in unburned areas. Scattered loss of shrubs is not expected to have significant impacts on shrub-steppe habitats or the species that use them. No temporary or permanent roads would be constructed through these habitats. Disturbance from activities (burning, adjacent timber harvest and precommercial thinning, increased traffic, existing and alternative snowmobile access) would be limited in time and place, and therefore, would not be expected to change populations of species at the landscape level.

Cumulative Effects

The area considered for cumulative effects is the project area (22,700 acres). All of the activities in Appendix C have been considered for their cumulative effects on gray flycatcher. The following discussion focuses on those past, ongoing and reasonable foreseeable future activities that may contribute adverse effects to the species or its habitat.

Juniper woodlands, sagebrush shrublands and dry grasslands have probably changed due to 100 years of fire suppression. Other conifer species have encroached on these habitats, reducing their size. On residual acres, juniper density probably has increased. Livestock grazing, primarily early in the century, may have caused changes in shrub, grass and forbs composition or abundance. Juniper woodland and shrubland habitats are very limited in the project area. Few management activities are proposed. Many of the non-forested areas on private lands are managed as pasturelands. Livestock grazing is ongoing. At moderate grazing levels, livestock grazing can be compatible with gray flycatcher management.

Shrub-steppe habitats are very limited in the project area; the Proposed Action conducted little to no activities in these habitats. Cumulatively, management activities across the Forest are distributed sufficiently to minimize disturbance impacts at the population levels. Even with all cumulative effects considered, the Proposed Action does not lead to any adverse effects to gray flycatcher populations nor will they contribute to a trend toward federal listing or loss of viability to the population or species.

Determination

Activities proposed under the Proposed Action would not be expected to measurably change bitterbrush, mountain mahogany, or sagebrush shrub habitats. Given that there would be minimal direct, indirect or cumulative effects from this project, there would be **No Impact (NI)** to this species.

Upland Sandpiper *(Bartramia longicauda)*

Status

Federal Status: none

USDA-Forest Service (Region 6) Status: Sensitive (USFS 2004)

State Status: sensitive species, critical category

Major Threats

Conversion of grassland cover types to agricultural lands (Kirsch and Higgins 1976) have drastically reduced or altered the availability of this species' habitat. Predation, forest succession and livestock grazing contribute to the decline of upland sandpiper numbers (NatureServe 2003).

Population Status and Trend

Populations of upland sandpipers in Oregon and Washington are disjunct from the rest of the species' range in the Midwest. It is unknown if the Oregon population is genetically different than the larger Midwest population. Breeding Bird Survey information is not available due to insufficient sample size for population trend analysis (Altman 2000).

In the 1980's through 1991, numbers in Oregon were the largest population of nesting sandpipers west of the Rockies. Seven locations make up the Oregon population, and two of those areas are in Bear Valley and Logan Valley on the Malheur National Forest. Numbers of nesting upland sandpipers have been declining since the mid-1980's, especially in Logan Valley where they have not nested in recent years (Scoville 1991, Tom Hunt pers. commun.). Bear Valley numbers are higher, but also have been declining (Scoville 1991). The reasons for the decline are unknown. Grazing system changes prior to 1992 in Logan Valley may explain some differences in habitat condition; however, a similar drop in numbers occurred in Bear Valley where no grazing changes were made. Changes in grazing does not totally account for the decline in numbers. Decreased survey effort may partly explain the decrease in the number of birds found, but it appears the population shows a steady decreasing trend since 1984 regardless of survey effort.

Bear Valley and Logan Valley locations accounted for over half of the sandpipers in the state in 1984 (Marshall 1988), when 23 pair (7 nests) and 3 singles were found in Bear Valley, and 12 pair (2 nests) and 6 singles were found in Logan Valley. Nests have been found along ditches or near moist areas, often adjacent to sagebrush. Bear Valley is located south of the Canyon Creek project area and Logan Valley is 8 miles east.

Bear Valley Survey Results:

	1977	1979	1980	1984	1987	1991	1992	1993	1994	1995	1996	1997	1998
#pair	0	0	8	23	19	15	0	no survey	no survey	0	0	0	4
#single	8	0	1	3	0	8	1			3	6	4	0

Logan Valley Survey Results:

	1977	1979	1980	1984	1987	1991	1992	1993	1994	1995	1996	1997	1998
#pair	no survey	0	11	12	8	4	0	0	0	0	0	0	0
#single		2	0	6	0	2	0	3	0	0	0	1	0

Habitat Trend

Both Bear Valley and Logan Valley have areas of short grasses mixed with forbs and scattered sagebrush patches. The removal of sagebrush and the seeding of non-native grasses have altered the habitat in Bear Valley east of Highway 395, where upland sandpipers nested in the early 1980's. Management has not changed in the rest of Bear Valley where the majority of the habitat is, but bird numbers have declined. Herman et al. (1985) speculated that the Bear Valley habitat was not fully occupied, thus the valley could support more nesting birds. Logan Valley management has apparently changed which might have contributed to the decline of upland sandpipers. Lodgepole pine has encroached in the valley and water regimes and drainage patterns have also changed which has affected the character of the habitat. Projects, including lodgepole pine removal in 2005, are underway to reverse this trend. Productivity declined at the same time that the population was declining. We also do not know why the productivity declined. Habitat factors might have contributed to the declining of the population and productivity, or it could be due to other factors, such as habitat or other conditions on their winter range in South America. In 1992, Swainson's hawks died by the thousands due to pesticide use on their wintering grounds in Argentina. Upland sandpipers from Oregon also winter in Argentina and may have been affected by the pesticides used to kill grasshoppers.

Habitat

In the Blue Mountains, upland sandpiper habitat is large flat or gently rolling expanses of grassland in mountain valleys and open uplands ranging in elevation from 3,400 to 5,200 feet with small creek drainages and wet to dry meadows (Akenson and Schommer 1992). Use areas have a wide diversity of plants, and forb abundance is particularly important. They often use stringer meadows, which generally are at least 125 acres. They selectively nest where the vegetation is between 6 and 13 inches tall and avoid fields containing relatively uniform stands of grass, tall undisturbed stands of grass, or those seeded to smooth brome (Buhnerkempe and Westemeier unpubl., Kirsch and Higgins 1976). Upland sandpipers have strong site fidelity, returning to the same area about the same time each year. Other key habitat features near nest sites are loafing and feeding areas that have shorter, sparser vegetation than nesting areas and the proximity of a small shrub or tree. Fence posts are often used as perches, possibly to survey the area for predators. Sandpipers are very secretive and easily disturbed by humans (Altman 2000). Early research on upland sandpipers suggests that a subtle change, sometimes unable to be detected by humans, causes nesting areas to become unacceptable (Buss and Hawkins 1939).

Distribution

Primary breeding habitat is in Canada and the north central United States. Upland sandpipers breed in North America and winter in South America (Akenson and Schommer 1992). They arrive on breeding grounds in the Blue Mountains of Oregon in early May. Clutches are initiated in mid May; renesting clutches were initiated as late as June 14. Hatching occurs in mid-June and fledge at about 30 days. Hatching is synchronous among neighboring nests. Chicks are precocial and begin feeding themselves soon after hatching.

Nests are built in cover that is 6-16 inches (15-40 cm) tall, and they avoid areas where vegetation in less than 2 inches (5 cm) or greater than 24 inches (60 cm). Upland sandpipers select areas with mixed grasses and forbs. Nests are constructed in a scratch in the ground and are lined with grass. In moist areas, they are on a slightly elevated rise or clump of vegetation and are concealed by grassy vegetation.

Upland sandpipers feed primarily on insects. They prefer to feed in vegetation that is less than 4 inches (10 cm) tall and prefer upland sites that have higher soil moisture than adjacent areas. Foraging sites might have had surface water during spring.

Brooding habitat is usually in vegetation that is less than 8 inches (20 cm) tall and has a variety of vegetation. Grazed areas are suitable brooding habitat.

Existing Condition

There are no known sightings of sandpipers within the project area. Surveys have not been conducted specifically for this species on either federal or private lands. The closest nest sites are located on private lands in Bear Valley about 6 miles southeast. On public lands, montane meadows comprise less than 1% of the analysis area. Wet meadows are particularly rare due to the geography of the area; when they are found they are usually relatively small riparian meadows scattered throughout the area. Meadow habitats on federal lands are smaller than the recommended 125 acres. Meadows along Canyon Creek are primarily on private ground, and most are managed as pastureland. Compared to the extensive habitat in Bear and Logan Valley, there is limited suitable upland sandpiper habitat. Therefore, use is expected to be occasional and random within the Canyon Creek project area.

Environmental Effects and Determination

Effects were analyzed at the project area level (22,700 acres). Short-term, mid-term and long-term definitions are defined at the beginning of the report.

Alternative 1 - No Action

Direct, Indirect and Cumulative Effects

Under the No Action Alternative, there would be no new management activities; therefore, there should be no direct, indirect or cumulative effects to upland sandpipers or their habitat.

Determination

Due to the nature of a No Action alternative, there would be **No Impact (NI)** to upland sandpipers or their habitat.

Alternative 2 – Proposed Action

Direct and Indirect Effects

The proposed activities would not enter meadow habitats; therefore, no impacts to upland sandpipers or their habitat would be expected. Disturbance from nearby activities (burning, timber harvest and precommercial thinning, road construction increased traffic, existing and alternative snowmobile access) would be limited in time and place, and therefore, would not be expected to change populations of species at the landscape level.

Cumulative Effects

Major threats to breeding habitat are from predation, forest succession and livestock grazing (NatureServe 2003). Cumulative effects were analyzed at the project area level (22,700 acres). All of the activities in Appendix C have been considered for their cumulative effects on sandpipers.

Riparian vegetation within and adjacent to the project area has been altered by a variety of management activities, including timber harvest, road construction and livestock grazing. Many years of livestock grazing, primarily earlier in this century, concentrated use in riparian areas including meadows. Livestock grazing also negatively affected grasslands by reducing native species' abundance and diversity. Fire suppression allowed encroachment of conifers. The condition of some riparian areas and grasslands has been improved by new management practices and restoration activities in more recent years, but many are still not fully restored to conditions that are most suitable for associated native wildlife species. Few management activities would affect sandpiper habitat. Livestock grazing and agricultural activities can influence sandpiper habitat; however, activities can be compatible with sandpiper management. Grazing, mowing and prescribed burning can be used to provide essential nesting conditions, but these activities can be detrimental if conducted inappropriately. Cumulatively, management activities across the Forest are distributed sufficiently to minimize disturbance impacts at the population level.

Because there are no direct or indirect effects from the project to meadow habitats, there would be no cumulative effects.

Determination

The Proposed Action would not be expected to change potential habitat; therefore, there would be **No Impact (NI)** to this species.

Bobolink (*Dolichonyx oryzivorus*)

Status

Federal - None

State - Sensitive

Region 6 - Sensitive

Habitat

Unless otherwise mentioned, the following information on bobolinks was derived from Dechant et al. (2001).

Bobolinks are found in native and tame grasslands, haylands, lightly to moderately grazed pastures, no-till cropland, small-grain fields, old fields, wet meadows, and planted cover. Bobolinks prefer habitat with moderate to tall vegetation, moderate to dense vegetation, and moderately deep litter, and without the presence of woody vegetation. They are found in areas with high percent grass cover and moderate percent forb cover, and avoid haylands with high legume-to-grass ratios; however, a forb component is beneficial for nesting cover.

If habitat is not maintained, use by bobolinks declines significantly, possibly due to the accumulation of litter and encroachment of woody vegetation. Bobolinks respond positively to properly timed burning or mowing treatments. In 2 years, a Wisconsin field that was burned in April each year was occupied by bobolinks in early June; the year it was not burned, the field was occupied by mid-May. Bobolink abundance declined in the burn year, but peaked 1-2 years postburn. In South Dakota, bobolinks preferred lightly grazed (grazed by American bison [Bos bison]) areas to spring-burned areas.

In the Great Plains, bobolinks responded positively to moderate grazing in tallgrass, but negatively to heavy grazing in shortgrass. In southeastern North Dakota, bobolinks occurred in grazed areas that had few shrubs and moderate to deep litter. Higher densities of bobolinks were found in areas under a short-duration grazing treatment (involved a system of pastures rotated through a grazing schedule of about 1 week grazed and 1 month ungrazed) than in idle areas.

Bobolink territories include both foraging and nesting areas. Average territory size ranged from 0.45 to 2.5 ha, depending on habitat variables. Bobolinks appear to prefer large grassland areas to small, having a minimum size of approximately 10-45 ha. Studies suggest bobolink abundance in tallgrass prairie fragments was positively related to area and/or fragment size.

Bobolinks generally are considered an uncommon or rare host of the brown-headed cowbird (Molothrus ater), but their nests may be multiply-parasitized as well. Nest depredation and brown-headed cowbird brood parasitism generally decreased farther from woody edges, and nest depredation rates were lower on large (130-486 ha) than on small (16-32 ha) grasslands. Nest productivity is usually highest in habitats far (>45 m) from a forest edge.

Keys to management are providing large areas of suitable habitat (native and tame grasslands of moderate height and density, with adequate litter), controlling succession, and protecting nesting habitat from disturbance during the breeding season. Avoid disturbing (e.g., haying, burning, moderately or heavily grazing) nesting habitat during the breeding season, approximately early May to mid-July. Treatments can be done in early spring (several weeks prior to the arrival of adults on the breeding grounds) or in the fall after the breeding season.

Distribution

Bobolinks breed from southern British Columbia across southern Canada to Nova Scotia, and south to eastern Oregon, central Colorado, central Illinois, western Virginia, and western North Carolina (Marshall 1996).

Existing Condition

Bobolinks are very local and scattered in the eastern one-third of Oregon and are known to breed on the Malheur National Wildlife Refuge, south end of Blitzen Valley, Harney County, Union County, and Wallowa County (Marshall 1996). Locally, sporadic nesting occurs in the Prairie City, Mt. Vernon, Silvies Valley, and Bear Valley areas (Sweeney, 2001; Winters 2001).

Bobolinks appear to prefer large grassland areas to small, requiring approximately 25-110 acres depending on habitat quality. On public lands, montane meadows comprise less than 1% of the analysis area. Meadow habitats on federal lands are smaller than the recommended 25-110 acres. Most of these acres are grazed and may not be providing tall enough grass for bobolinks. Meadows exist in the forest, but they tend to be small or habitat is naturally dry and low in productivity. Because of the low quality and the natural fragmentation, bobolinks would likely use only the largest areas. Meadows along Canyon Creek are primarily on private ground, and most are managed as pastureland, and potentially could provide habitat. Bobolinks have not been reported in the project area. Therefore, use is expected to be occasional and random within the Canyon Creek project area.

Environmental Effects and Determination

Effects were analyzed at the project area level (22,700 acres). Short-term, mid-term and long-term definitions are defined at the beginning of the report.

Alternative 1 - No Action

Direct, Indirect and Cumulative Effects

Under the No Action Alternative, there would be no new management activities; therefore, there should be no direct or indirect effects to bobolinks or their habitat.

Determination

Due to the nature of a No Action alternative, there would be **No Impact (NI)** to bobolink or its habitat.

Alternative 2 – Proposed Action

Direct and Indirect Effects

The proposed activities would not enter montane meadow habitats; therefore, no impacts to bobolinks would be expected. Disturbance from nearby activities (burning, timber harvest and precommercial thinning, road construction, increased traffic, existing and alternative snowmobile access) would be limited in time and place, and therefore, would not be expected to change populations of species at the landscape level.

Cumulative Effects

Cumulative effects were analyzed at the project area level (22,700 acres). All of the activities in Appendix C have been considered for their cumulative effects on bobolinks.

Riparian vegetation within and adjacent to the project area has been altered by a variety of management activities, including timber harvest, road construction and livestock grazing. Many years of livestock grazing, primarily earlier in this century, concentrated use in riparian areas including meadows. Livestock grazing also negatively affected grasslands by reducing native species' abundance and diversity. Fire suppression allowed encroachment of conifers. The condition of some riparian areas and grasslands has been improved by new management practices and restoration activities in more recent years, but many are still not fully restored to conditions that are most suitable for associated native wildlife species. Few management activities would affect bobolink habitat. Livestock grazing and agricultural activities can influence bobolink habitat; however, activities can be compatible with bobolink management. Cumulatively, management activities across the Forest are distributed sufficiently to minimize disturbance impacts at the population level.

Because there are no direct or indirect effects from the project to montane meadow habitats, there would be no cumulative effects.

Determination

Proposed activities are not expected to change potential habitat; therefore, there would be **No Impact (NI)** to this species.

Tricolored blackbird (Agelaius tricolor)

Status

Federal - None

State - Undetermined

Region 6 – Sensitive

Habitat

The average tricolor colony size has decreased dramatically (from 300,000 to 10,000 birds) since the 1930's. Overall population has decreased 89 percent during the approximate 50 year span from the 1930's to the 1980's. Despite the reductions in colony size and numbers, the distribution of tricolored blackbirds has not changed significantly since the 1930's.

Tricolored blackbirds breed from southern Oregon east of the coast range south through interior California along the Pacific Coast from central California to northwest Baja California. They are resident from northern California south throughout breeding range and adjacent agricultural areas. Some northern birds are migratory.

Tricolored population declines are primarily due to the elimination of wetland habitat, which has decreased from 4 million acres in the 1850's to less than 245,000 acres today. The conversion of wetlands to agricultural and urban uses coupled with the control of formerly abundant insects by pesticides has reduced the reproductive success of tricolor colonies. In one older study conducted in the 1930s, over 90 percent of 250 plus observed breeding colonies were in freshwater marshes dominated by tules and cattails. By contrast, a little over 50 percent of reported colonies were in tules and cattails during the 70's and 80's. A higher percentage of observed colonies existed in marginal habitats with blackberry brambles, thistles, nettles, and other vegetation.

Historically, tricolored blackbirds have been reported in dense, wet or dry tule marshes or patches of tules, cattails, or other emergent vegetation. More recently, the trend has been for more colonies to occur in blackberry thickets, and certain spiny grain crops such as wheat and barley (SJMSCP 2000). Nests are built of cattails, sedges, grasses, or other aquatic vegetation collected from the surface or in shallow water, and attached to cattails or twigs in shrubs and blackberry thickets, usually near water. They prefer live emergent vegetation for nesting. Feeding and roosting occurs in dense flocks, ranging from a few to 20,000 in a colony, throughout the year (USGS 1998). In winter, they move through marshes, open cultivated lands, and pastures. Food is gleaned from the ground and low vegetation, consisting of insects, spiders, and occasionally small tadpoles and snails (USGS 1998). Foraging areas have to be within a few miles of the nesting site (SJMSCP 2000).

Because of their proximity to open water, marshes serve as a protective barrier for tricolor nesting colonies. As these optimal nesting sites decline in size and numbers, predation becomes more repetitive, resulting in increased loss and abandonment of colonies. In smaller marshes, many nests must be situated near edges that offer easy access for ground predators and humans. Increased competition with other species of marsh nesting birds also results from the decrease in habitat size. Enormous breeding colonies that once typified tricolor populations have been replaced by smaller, fragmented colonies, where higher rates of nesting failures and lower rates of reproductive success occur.

Existing Condition

In the Canyon Creek project area, habitat is considered limited at best. Habitat may be associated with Canyon Creek, primarily on private lands, but has not been confirmed. There are no known sightings on the Malheur National Forest (Sweeney, Hunt 2001, pers. comm.).

Environmental Effects and Determination

Effects were analyzed at the project area level (22,700 acres). Short-term, mid-term and long-term definitions are defined at the beginning of the report.

Alternative 1 - No Action

Direct, Indirect and Cumulative Effects

No new management activities would occur with this alternative. There would be no direct, indirect or cumulative effects to tricolored blackbird or their habitat.

Determination

This alternative would have **No Impact (NI)** on tricolored blackbirds or their habitat.

Alternative 2 – Proposed Action

Direct and Indirect Effects

The proposed activities will not enter meadow/marsh habitats; therefore, no impacts to tricolored blackbirds would be expected. Habitat is very limited, what exists would be primarily on private lands, and habitat quality and size likely precludes use. Disturbance from nearby activities (burning, timber harvest and precommercial thinning, road construction increased traffic, existing and alternative snowmobile access) would be limited in time and place, and therefore, would not be expected to change populations of species at the landscape level.

Cumulative Effects

Cumulative effects were analyzed at the project area level (22,700 acres). All of the activities in Appendix C have been considered for their cumulative effects on bobolinks.

Riparian vegetation within and adjacent to the project area has been altered by a variety of management activities, including timber harvest, road construction and livestock grazing. Many years of livestock grazing, primarily earlier in this century, concentrated use in riparian areas including meadows. Livestock grazing also negatively affected grasslands by reducing native species' abundance and diversity. Fire suppression allowed encroachment of conifers. The condition of some riparian areas and grasslands has been improved by new management practices and restoration activities in more recent years, but many are still not fully restored to conditions that are most suitable for associated native wildlife species. Cumulatively, management activities across the Forest are distributed sufficiently to minimize disturbance impacts at the population level.

Because there are no direct or indirect effects from the project to meadow/marsh habitats, there would be no cumulative effects.

Determination

There will be **No Impacts (NI)** to tricolored blackbirds with the implementation of the Proposed Action. Habitat is very limited, and what exists would be on private on private land. All proposed activities would occur outside suspected habitat in the area.

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Appendix H – Botany Biological Evaluation

Biological Evaluation

for

Proposed, Threatened, Endangered, and Sensitive Plants

Canyon Creek Wildland-Urban Interface Project

Prepared by *Nancy L. Hafer* Date: July 26, 2006
Nancy L. Hafer
Botanist, Blue Mountain Ranger District

Executive Summary

Purpose and Project Area

This biological evaluation describes and displays effects to proposed, endangered, threatened, and sensitive floral species associated with the Canyon Creek Wildland-Urban Interface Project within the Blue Mountain Ranger District of the Malheur National Forest. The analysis and project area for this biological evaluation is the portion of the project area where treatments are planned. A map of the project area is included in the beginning of the environmental assessment.

Surveys and Analysis

Potential sensitive species habitat was surveyed during the 2003 field season (May through July). No sensitive plants were documented within this project area. One population of Thelypodium eucosmum is present in the northeast portion of the watershed, in the Byram Gulch area of the Lower Canyon Creek subwatershed.

Since alternatives that propose activities will treat fewer acres or propose activities that may be less impacting to sensitive plants than the Proposed Action, the effects are considered to be addressed under the Proposed Action assessment.

Proposed Action

The Proposed Action activities including tree planting, thinning commercial and non-commercial size trees within proposed harvest units, prescribed burning, and closing and decommissioning roads. Connected actions include using and improving the existing transportation system, constructing temporary roads, and treating fuels associated with cutting commercial size trees.

Status of Species, Habitat, and Effects Summary

The following table displays the status of species and habitat within the project area, and effect findings for species suspected or documented on the Blue Mountain Ranger District and are contingent upon implementation of mitigation measures, identified below.

Mitigation

- To protect Achnatherum species habitat, vehicles and off-road equipment should avoid scabland areas.

- To protect Phacelia minutissima habitat, areas supporting false hellebore (Veratrum californicum), should be avoided with vehicles and heavy equipment even if they dry out late in the season.

- To protect Carex idahoa habitat, prescribed burning should only produce only low to moderate fire severity so rhizomes of any existing plants will survive and sprout after the burn.

Table 1 - Effect Determinations

Sensitive Species	Occurrence in Project Area	Habitat Status Within Project Area	Alt 1 (No Action)	Alt 2 (Proposed Action)
*Achnatherum hendersonii*1 Henderson's ricegrass	Not Found	Present	MIIH2	MIIH
Achnatherum wallowensis Wallowa ricegrass	Not Found	Present	MIIH	MIIH
Astragalus diaphanus var. diurnus South Fork John Day milkvetch	Suspected	Present	MIIH	MIIH
Astragalus tegetarioides Deschutes milkvetch	Not Found	Present	MIIH	MIIH
Botrychium ascendens upswept moonwort	Not Found	Present	MIIH	MIIH
Botrychium crenulatum crenulate moonwort	Not Found	Present	MIIH	MIIH
Botrychium lanceolatum lance-leaf moonwort	Not Found	Present	MIIH	MIIH
Botrychium minganense Mingan moonwort	Not Found	Present	MIIH	MIIH
Botrychium montanum mountain moonwort	Not Found	Present	MIIH	MIIH
Botrychium pinnatum pinnate moonwort	Not Found	Present	MIIH	MIIH
Calochortus longebarbatus var. peckii long-bearded sego lily	Not Found	Not Present	NI	NI
Camissonia pygmaea dwarf evening primrose	Not Found	Not Present	NI	NI
Carex backii	Not Found	Suspected	MIIH	MIIH
Carex idahoa Idaho sedge (formerly C. parryana)	Not Found	Present	NI	NI
Carex interior inland sedge	Suspected	Present	MIIH	MIIH
Cypripedium fasciculatum clustered lady slipper	Not Found	Not Present	NI	NI
Dermatocarpon luridum silverskin lichen	Not Found	Not Present	NI	NI
Leptogium burnetiae var. hirsutum hairy skin lichen	Not Found	Not Present	NI	NI

1 *Achnatherum hendersonii* & *A. wallowensis* are similar species considered under the same common name - Henderson's ricegrass.
2 MIIH – May impact individuals or habitat but not expected to affect viability.
NI – No impact

Sensitive Species	Occurrence in Project Area	Habitat Status Within Project Area	Alt 1 (No Action)	Alt 2 (Proposed Action)
Listera borealis northern twayblade	Not Found	Not Present	NI	NI
Lomatium erythrocarpum redfruit desert parsley	Not Found	Not Present	NI	NI
Lomatium ravenii Raven's lomatium	Suspected	Not Present	NI	NI
Luina serpentina colonial luina	Not Found	Not Present	NI	NI
Mimulus evanescens vanishing monkeyflower	Not Found	Not Present	NI	NI
Pellaea bridgesii Bridge's cliff-brake	Not Found	Not Present	NI	NI
Phacelia minutissima least phacelia	Not Found	Suspected	MIIH	MIIH
Pleuropogon oreganus Oregon semaphore grass	Not Found	Not Present	NI	NI
Thelypodium eucosmum arrow-leaved thelypody	Not Found	Suspected	MIIH	MIIH

Introduction

This Biological Evaluation analyzes the potential effects for the Canyon Creek Wildland-Urban Interface Project. This biological evaluation satisfies the requirements of Forest Service Manual 2672.4 that requires the Forest Service to review all planned, funded, executed or permitted programs and activities for possible effects on proposed, endangered, threatened or sensitive species.

The objective of this evaluation is to understand how actions or lack of action will impact habitat and viability of these plant populations and how to reduce or avoid adverse impacts. The type of actions, scope of present, future, and past activities, and duration of activities, influence the size of impacts to these uncommon plants.

Project Area Baseline Conditions

Elevations within the project area range from 3,050 feet near its confluence with the main stem of the John Day River, at the north end of Canyon Creek, to approximately 8,000 feet along the eastern edge of the watershed. Much of the watershed lies on slopes ranging from 30 - 70%. Drainages are generally narrow and steep and are aligned in a slightly northeast/southwest direction. In general, the terrain to the east of Canyon Creek slopes westward; in contrast, the terrain in the western portion of Canyon Creek slopes eastward.

Proposed Action

Approximately 8,000 acres would receive treatment, including 5,140 acres of commercial timber harvest fuel reduction, 1,900 acres of non-commercial fuel reduction, 7,040 acres of surface fuel treatment by piling and burning, and 3,000 acres of fuel treatment by underburning (2,050 acres in harvest and thinning units and 950 outside of treatment units).

Crown or canopy fuels would be reduced primarily by commercial thinning (when too dense) and shelterwood treatments (where tree species are not suitable or sustainable). The trees to be cut are often large enough to be utilized for commercial products.

Ladder fuels would be reduced by commercial and non-commercial thinning treatments and understory removal. The trees cut would vary in size from medium to smaller diameters and some of the smaller sizes may be difficult to economically utilize for products, utilization will be pursued if the opportunity exists.

Surface fuels would be reduced by one or more of the following methods:

- Yarding tops to landings for utilization or disposal by burning
- Hand piling of natural and project generated fuels and burning the piles
- Grapple piling of natural and project generated fuels and burning the piles
- Underburning with hand fireline construction as needed.

Location

The proposed project is located in Grant County, Oregon, approximately 10 miles south of Canyon City. See the Vicinity Map for the location and extent of the project area. The legal description is: T.16S., R.32E., Sections 10, 11; T.15S., R.31E., Sections 1-17, 21-27, 36; and T.15S. R.32E. Sections 5-9, 15-18, 20-22, 25-35.

The project area is part of the Canyon Creek drainage which is a tributary to the John Day River system.

Scope of Actions and Duration

Proposed activities include timber harvest; precommercial thinning; prescribed burning; fuel treatment; tree planting; temporary and new road construction; road maintenance, closures and decommissioning; and monitoring are expected to occur within the next 5 years, from 2006 through 2010. Road construction would occur before timber management activities, while road maintenance would occur during timber harvest - 2007 through 2008. Road closures and decommissioning; prescribed burning; and monitoring would occur anytime after timber harvest activities. Tree planting would occur the last two years.

Alternative 1 (No Action) would not implement any activities associated with this project, but would allow other projects within the planning area to continue. For detailed descriptions of the project proposal, see Chapter 2 of the Canyon Creek Wildland-Urban Interface Project EA.

Potential Plant Habitats

The potential for occurrence of any given plant species is based on combinations of habitat, elevation, aspect, and micro sites known to occur within or adjacent to the analysis area. The following table presents the Regional Forester's listing of plants designated as sensitive (USDA, July 2004) that are considered as potentially having habitat on the Blue Mountain Ranger District.

Table *Sensitive Plant Species List for the Blue Mountain Ranger District

Scientific Name	Common Name
Achnatherum hendersonii	Henderson's ricegrass
Achnatherum wallowaensis	Wallowa ricegrass
Astragalus diaphanus var. diurnus	South Fork John Day milkvetch
Astragalus tegetarioides	Deschutes milkvetch
Botrychium ascendens	upswept moonwort
Botrychium crenulatum	dainty moonwort
Botrychium lanceolatum	triangle moonwort
Botrychium minganense	mingan moonwort
Botrychium montanum	mountain moonwort
Botrychium pinnatum	northwestern moonwort
Calochortus longebarbatus var. peckii	long-bearded sego lily
Camissonia pygmaea	dwarf evening-primrose
Carex backii	Cordilleran sedge
Carex idahoa	Idaho sedge
Carex interior	inland Sedge
Cypripedium fasciculatum	clustered lady slipper
Dermatocarpon luridum	silverskin lichen
Leptogium burnetiae var. hirsutum	hairy skin lichen
Listera borealis	northern twayblade
Lomatium erythrocarpum	red-fruited lomatium
Lomatium ravenii	Raven's lomatium
Luina serpentina	colonial luina
Mimulus evanescens	fleeting monkeyflower
Pellaea bridgesii	Bridge's cliff-brake
Phacelia minutissima	least phacelia
Pleuropogon oregonus	Oregon semaphore grass
Thelypodium eucosmum	arrow-leaved thelypody

To determine which sensitive plant species may be affected by the proposed action, two steps are taken. First, the Forest GIS and sensitive plant database is searched to locate known sensitive plant populations that occur in or near the area of the proposed action. Second, to identify habitats that may harbor sensitive plants, the physical and biological features in the project area are correlated with those in which sensitive plants are known or suspected to occur (Nelson 1985). Specific habitat features for Forest some sensitive plants are described in Sensitive Plants of the Malheur, Ochoco, Umatilla, and Wallowa-Whitman National Forests, (Brooks, et al. 1991), and in site reports of documented species.

Areas of suspected habitat for sensitive plants are identified in pre-field analysis based on aspect, elevation, and ecoclass. A large proportion of potential habitats were surveyed by the controlled intuitive meander method, a survey of the most likely areas and the travel routes walked between high priority sites. All surveys were completed during periods when individual plants could be identified.

Surveys were completed during June and July, 2003 by Nancy Hafer, District Botanist; Frazier Nichol; Margaret Carey; and Cynthia Kranich, Biological Science Technicians. Surveys were performed within areas considered to have potential habitat. No sensitive plants were documented within this project area. Since alternatives that propose activities will treat fewer acres or propose activities that may be less impacting to sensitive plants than the Proposed Action, the effects are considered to be addressed under the Proposed Action assessment.

Fifteen sensitive plant species have potential habitat within the analysis area: Achnatherum hendersonii, Achnatherum wallowensis, Astragalus diaphanus var. diurnis; Astragalus tegetarioides; Botrychium ascendens; Botrychium crenulatum; Botrychium lanceolatum; Botrychium minganense; Botrychium montanum; Botrychium pinnatum; Carex backii; Carex idahoa; Carex interior; Phacelia minutissima; and Thelypodium eucosmum.

Description of Affected Species and Effects Analysis

In this section, the effects determination is given for the Proposed Action or the No Action alternative for species with similar habitats. Individual species descriptions and effects discussions follow.

Plant Species Associated with Dry Habitat

These species are found in rock outcrops, talus slopes, rocky scabs in ponderosa pine stands, or grass steppe habitats.

Achnatherum hendersonii
(Henderson's ricegrass)

Status	Federal:	none
	State:	Candidate
	Region 6:	Sensitive

Achnatherum wallowensis
(Henderson's ricegrass)

Status	Federal:	none
	State:	none
	Region 6:	Sensitive

Astragalus diaphanus var. diurnis
(South Fork John Day milkvetch)

Status	Federal:	Species of Concern
	State:	Threatened
	Region 6:	Sensitive

Astragalus tegetarioides
(Deschutes milkvetch)
Status Federal: Species of Concern
State: Candidate
Region 6: Sensitive

Carex backii (Back's sedge)
Status Federal: none
State: Candidate
Region 6: Sensitive

Effects Determination for Plant Species Associated with Harsh Site Habitats

Proposed Action

Project use of this habitat group is low or limited since these plants inhabit non-forested or sparsely forested habitat. The Proposed Action would not likely impact individuals or habitat, and would not contribute to a trend towards federal listing or cause a loss of viability to the species.

Achnatherum Hendersonii, A. wallowensis (Henderson's ricegrass)

Environmental Baseline

Since both species occupy similar habitat, they are treated together in this document under the common epithet of Henderson's ricegrass. Potential ponderosa pine and grass-steppe habitat is common throughout the project area, however, no plants of either Achnatherum hendersonii or A. wallowensis were located, so it is assumed that no populations of either exist within the analysis area.

Henderson's ricegrass is a strongly tufted perennial that has been found on the Ochoco NF at elevations from 4100 to 5400 ft. It reproduces from seed, and known populations contain few plants. Its range is east of the Cascades from central Washington to the Wallowa Mountains of northeast Oregon.

This grass is found in dry, rocky, shallow soil, in association with sagebrush or ponderosa pine, although some sites have been found in scablands with no overstory. It has been found in Artemisia rigida - Poa secunda plant associations, as well as Eriogonum strictum - Poa secunda plant communities. Other associated plants include species of Lomatium spp., Elymus elymoides, Trifolium spp., and Zigadenus spp.

Direct Effects and Indirect Effects

It is unlikely that potential habitat will be affected by burning as scablands support too little vegetation to carry a fire.

Use of scabland areas by vehicles and heavy equipment during management activities could damage potential habitat by soil compaction and ground surface disturbance.

Cumulative Effects

Historic use of scablands for yarding and log landings has removed and reduced native vegetation, compacted soils, and altered runoff and moisture retention patterns on some potential habitat. Grazing, which is likely to remove the seed crop as well as impact individual clumps, is the greatest threat to these species' survival. There is ample evidence that another ricegrass Achnatherum hymenoides, a native American food source, was far more abundant in the Blue Mountain/Great Basin ecosystems before the introduction of European cattle (Murphey, 1959). It seems likely that the same may have been true for these two local endemic species, since their preferred habitat has historically seen heavy grazing.

Astragalus diaphanus var. diurnis (South Fork John Day milkvetch)

Environmental Baseline:

Astragalus diaphanus var. diurnis is a small, perennial legume with a prostrate growth habit which is endemic to Grant County, Oregon. It occurs on barren hillsides, dry washes, and openings in juniper scrubland at elevations from 2600 to 3700 feet. Growing sites are thin soiled, usually steep and south facing, and are often actively eroding.

Massey (1991) reports that many plants are found in rills or just down-slope from groups of rocks, either of which could indicate more water availability than on surrounding soils. In the dry environment in which this plant grows, any small advantage towards gathering and retaining moisture could be significant in allowing successful seed set, and Massey (1991) suggests this may be a determining factor for individual plant location.

Pollination mechanisms and requirements are unknown for this species.

Direct and Indirect Effects

No populations of the South Fork John Day milkvetch have been found within the analysis area, but potential habitat exists

Because South Fork John Day milkvetch inhabits such barren sites, with minimal accompanying ground vegetation, fire is not likely to carry through its habitat. How fire in surrounding areas might affect potential pollinators is unknown.

Ground disturbing activities, such as use of logging equipment or fireline construction, would be detrimental to the species and habitat, however, such activities are not likely to occur on the steep ground and nearly bare soils that harbor this species.

Cumulative Effects

Past road building, yarding and log landing use may have affected habitat by reducing sensitive plant habitat.

Astragalus tegetarioides (Deschutes milkvetch)

Environmental Baseline

Preferred habitat of this species is openings in big sagebrush and ponderosa pine forest. The species has been found in central Oregon (Grant and Harney Counties) and northern California.

The reproductive period is from late June to August.

Direct Effects and Indirect Effects

It is unlikely that potential habitat will be affected by burning as sagebrush openings should not burn hot enough to adversely affect habitat. Proposed thinning activities are a lower priority in ponderosa pine forests and habitat in sparsely forested areas should not be affected by activities.

Use of scabland areas by vehicles and heavy equipment during management activities could damage potential habitat by soil compaction and ground surface disturbance.

Cumulative Effects

Past road building, yarding and log landing use may have affected habitat by reducing sensitive plant habitat.

Carex backii (Back's sedge)

Environmental Baseline

There is scant information on this species on the Malheur National Forest. The only documented report of Back's sedge on the Malheur is on a very different habitat from other documented populations on the Wallowa-Whitman NF. On the Emmigrant Ranger District (Malheur NF) this species has been found on a terrace above a stream in association with ponderosa pine (Pinus ponderosa) and common snowberry (Symphoricarpos albus), and scattered Douglas-fir (Pseudotsuga menziesii), but generally in less shrubby areas of this plant association. At higher latitudes the preferred habitat of this sedge species is lowland to mid-montane sites that show substrate movement on steep slopes or are closely associated with rock outcrops. On the Wallow-Whitman NF it has been found in dappled to deep shade and includes a shrub component or are within ponderosa pine forests on rocky ridge tops, or growing in proximity to basaltic rock outcrops. Associated species include red alder (Alnus rubra), red osier dogwood (Coses sericea s. sericea), mountain alder (Alnus incana), other dry land sedges, and old man's whiskers (Geum triflorum).

The flowering period is July to August.

Direct Effects and Indirect Effects

No populations of the Back's sedge have been found within the analysis area, but potential habitat may exist.

Ground disturbing activities, such as use of logging equipment or fireline construction, would be detrimental to the species and habitat, however, such activities are not likely to occur within close proximity to riparian habitat.

Cumulative Effects

Past road building, yarding and log landing use may have reduced habitat by changing water availability. Invasive species such as red top (Agrostis stolonifera) and Kentucky blue grass (Poa praetensis) have invaded from riparian areas and may be the most serious threat this species.

Plant Species Associated with Seasonally Moist Habitat

These species are found in isolated areas where localized moisture is only available in the spring and are found within forested stands, veratrum meadows, or grass - steppe habitats.

Carex idahoa (Idaho sedge)
(formerly Carex parryana)

Status	Federal:	none
	State:	none
	Region 6:	Sensitive

Phacelia minutissima (least phacelia)

Status	Federal:	Species of Concern
	State:	Candidate
	Region 6:	Sensitive

Thelypodium eucosmum
(arrow-leaved thelypody)

Status	Federal:	Species of Concern
	State:	Threatened
	Region 6:	Sensitive

Effects Determination for Plant Species Associated with Seasonally Moist Habitat

Proposed Action

The proposed activities could impact individuals or habitat of least Phacelia, but not Idaho sedge. Activities would not contribute to a trend towards federal listing or cause a loss of viability to either species.

Carex idahoa (Idaho sedge)

Environmental Baseline:

No populations of Carex idahoa have been found within the analysis area, although there are several areas of potential habitat.

This sedge is loosely tufted that grows from lowlands to moderate elevation. Its range is chiefly east of the continental divide but it extends onto the Pacific slope in central and east Idaho and northern Utah; it is also known from northeast Oregon and central Nevada.

Carex idahoa grows in the driest communities of moist meadows, swales, and moist, low ground around streams and lakes, and on prairies and high plains as well. Associated plants found on a wetland classification plot on the Emmigrant Creek Ranger District were Poa pratensis, Agrostis stolonifera, Juncus balticus, and Carex praegracilis. Carex idahoa can reproduce via creeping rhizomes, and by seed production. Because it is wind-pollinated, it requires no pollinator insects.

Direct, Indirect, and Cumulative Effects

Because of its habitat, Carex idahoa is not likely to be affected by logging or thinning activities, as long as vehicles and machinery avoid meadows.

There is no information about the effects of fire on Carex idahoa, but because it grows in the driest associations of meadows, its habitat could be affected. If a fire is low to moderate in severity, the creeping rhizomes will probably survive and sprout after the burn. This sedge's habitat would probably not be negatively affected by prescribed burning.

Noxious weeds, knapweeds in particular, can spread rapidly in this species' preferred habitat.

Cumulative Effects

Historic heavy grazing, including late season use that removed the seed crop may have reduced occurrences of this sedge in NE Oregon.

Lowered water tables associated with stream channel degradation, and the loss of beaver created wetlands may have reduced potential habitat.

Phacelia minutissima (least phacelia)

Environmental Baseline

No populations of Phacelia minutissima have been found within the analysis area, although habitat is present.

Phacelia minutissima is a regional endemic of the Pacific Northwest, found in Oregon, Washington, Idaho, and Nevada. It grows at moderate elevations (5000 to 7000 feet) in the mountains, in micro-habitats that are at least vernally moist. It is known from the Wallowas, from the Aldrich Mountains, and from one upland site, near upper Camp Creek, a tributary to the Middle Fork John Day River.

According to Atwood (1996), least phacelia grows along streambanks in sagebrush communities and in aspen stands. In the Blue Mountains it occurs in association with Veratrum californicum (false hellebore) and Wyethia helianthoides (white mules ears) in vernally moist meadows and small scablands that are common throughout the forest. In currently known sites, it exists in relatively disturbed habitat where its greatest threat may be invasion by exotic plant species such as Lotus corniculatus (birdsfoot trefoil).

Populations of least phacelia are most abundant and easily located in wet years, though its diminutive size, along with its annual life cycle, makes this plant difficult to locate. For this reason it is possible that it is more widespread than current records indicate. The first population to be found in the Middle Fork John Day watershed was documented in summer, 2001.

Direct and Indirect Effects

Timber harvest activities have little effect on least phacelia as long as they avoid wet meadows and riparian habitat. Meadows supporting Veratrum californicum (California false hellebore) should be avoided with vehicles and heavy equipment, even if they dry out late in the season.

Prescribed fire is not likely to adversely impact favored habitat. While individual aspen stands might be temporarily altered by fire, the continued presence of spring moisture and the related growth of forbs, shrubs, and hardwoods that can provide the required shade will ensure continuity of habitat.

Because the population documented in the upper Camp Creek area has continued to produce new plants after various disturbances, proposed activities would not likely contribute to a trend towards federal listing or cause a loss of viability to the population or species because adaptive management should continue the improved trend in riparian habitat. This may even be a beneficial impact.

Cumulative Effects

Historic heavy grazing and overuse of riparian zones and meadows may have reduced the extent and abundance of least phacelia throughout its range, and may have degraded potential habitat as well. While it can exist in areas of moderate disturbance, its survival on severely impacted soils is in question.

Thelypodium eucosmum (arrow-leaved thelypody)

Environmental Baseline

No populations of this species have been found within the project area.

Thelypodium eucosmum is a locally endemic, short-lived perennial mustard found only in Baker, Grant, and Wheeler counties, Oregon. Known populations range in elevation from 1800 to 5000 feet. On the Blue Mtn. Ranger District habitats range from ephemeral draws shaded by Douglas-fir to small sidehills, shallow soil openings uphill of vernal draws within Ponderosa sites.

Arrow-leaved thelypody inhabits slopes with vernal moisture sources on otherwise dry sites, and is often found in the shade of junipers or ponderosa pine. It also occurs in mountain mahogany, sagebrush, and grass steppe communities, frequently in association with many introduced weedy species such as Bromus tectorum and Lepidium perfoliatum. It can grow on a variety of substrates including light clays, and occasionally moist, possibly alkaline soils near rivers. It is probably not tolerant of very dry sites.

Thelypodiums propagate by seed or creeping rootstocks. Each plant requires a minimum of one year of adequate moisture to flower and set fruit. Plants may be able to hold for several years in the rosette stage until conditions are optimum for seed production; however, Thelypodiums are known to be highly palatable to cattle, so increasing time to seed set increases vulnerability to predation as well. Since this species often grows in heavily grazed habitat that has lost much of its palatable forage, presence of cattle is probably its primary threat.

Several populations documented by historic collections have proved impossible to re-locate, and the species was considered extinct until a new site was documented in 1981. About 20 extant populations have since been found. Because this species is so limited in distribution and in number of known populations, any documented sites should be protected.

No information is available on pollinators of this species.

Direct and Indirect Effects

The plants ability to seed disturbed ground enables it to tolerate some disruption of its habitat. Increasing competition from exotic plant species may be reducing potential habitat and limiting its abundance.

Cumulative Effects

Cattle grazing is the primary threat to Thelypodium eucosmum because of its lengthy seed set requirement.

Historic overgrazing has probably reduced this species to its current limited occurrences because the plant is so highly palatable. Continued grazing may prevent it from rebounding.

Increasing loss of habitat to invading weeds is occurring across the range of this species.

Plant Species Associated with Riparian Habitat

These seven species are found in perennially moist ground at the edges of riparian areas, including swamps and wet meadows, seeps, springs, or streams.

Botrychium ascenden
(ascending moonwort)
Status Federal: Species of Concern
State: Candidate
Region 6: Sensitive

Botrychium crenulatum
(crenulate moonwort)
Status Federal: Species of Concern
State: Candidate
Region 6: Sensitive

Botrychium lanceolatum
(lance-leaf moonwort)
Status Federal: None
State: None
Region 6: Sensitive

Botrychium minganense
(Mingan moonwort)
Status Federal: None
State: None
Region 6: Sensitive

Botrychium montanum
(mountain moonwort)
Status Federal: None
State: None
Region 6: Sensitive

Botrychium pinnatum
(pinnate moonwort)
Status Federal: None
State: None
Region 6: Sensitive

Carex interior
(inland sedge)
Status Federal: None

State: None
Region 6: Sensitive

Effects Determination for Plant Species Associated with Riparian Habitat

No action

Because the no action alternative increases vegetation susceptibility to high intensity fire, it may adversely impact Botrychium species by affecting habitat: by removing shade, damaging rhizomes, or reducing or temporarily eliminating necessary mycorrhizal associations. However, no action will not likely contribute to a trend towards federal listing or cause a loss of viability to the population or species.

Alternative 2

Since no plants have been found within the analysis area, the proposed activities will not impact individuals, may beneficially impact habitat, and will not likely contribute to a trend towards federal listing or cause a loss of viability to the species.

Botrychium Species

None of the six Botrychium species have been documented within the project area. In this evaluation, all Botrychium species with occurrence potential on the district are treated under a single analysis because they have common habitat requirements and are frequently found growing together.

Environmental Baseline:

Botrychiums, also known as moonworts are small, primitive plants closely related to ferns. They reproduce by spores, and are known to be mycorrhizal, though many details of their life history and growth requirements are still unknown. Although green and apparently photosynthetic, the species considered here are all capable of surviving for years with only sporadic above-ground growth, apparently drawing reserves from the host plants with which they have mycorrhizal connections. As a result, populations of these moonworts appear to fluctuate from year to year, depending on how many plants produce visible leaves and/or fruiting bodies. The factors determining yearly growth are not yet understood.

These six Botrychium species are found sporadically throughout the mountains of the Pacific Northwest and the Rockies, and B. minganense is known across Canada to the eastern part of the continent. In the Blue Mountains they have primarily been found between 5000 and 7500 feet elevation.

Preferred habitat of these species is perennially moist ground at the edges of small streams, wet meadows, springs, and small seeps within forest openings. It should be emphasized that even the smallest spring or seep provides good potential habitat, especially above 4500 feet elevation.

Plants often favor shade from an overstory of conifers and/or riparian shrubs such as alder and red-osier dogwood, but also occur in openings or meadows with only grasses and forbs providing shade. Wet meadow edges with encroaching lodgepole pine are prime habitat sites, as are the mossy openings around springs in mixed conifer forest that includes sub-alpine fir and Engelmann spruce. On the Umatilla NF several botrychium species are found under young spruce in moist tree plantations that are 20 to 40 years old. Plants frequently associated with botrychiums in the Blue Mountains include strawberries and violets, Pinus contorta, Picea engelmannii, Alnus incana, Vaccinium scoparium, Carex aurea, Geum macrophyllum, Hypericum anagalloides, Mimulus moschatus, Orthilia secunda, Platanthera dilatata, Ranunculus uncinatus, and other botrychium species.

In many instances, moonworts appear to be "seral" species favored by one-time ground disturbance, tending to appear 10 years or more after such disturbance occurs. It is possible that they die out eventually, as forest succession shades out understory plants. A mosaic of forest habitats that shift over time, providing new openings as old ones fill in, may best ensure the long-term survival of botrychiums. However, until this is definitively known and the needs of these moonworts are better understood, it is important to preserve existing populations. Since most of the plants are quite small and are difficult to find, they may be easily overlooked except in intensive surveys. Their habitat, on the other hand, is readily identified and protected or avoided during management activities.

Reproduction of these plants is accomplished by the dispersal of spores by wind and water, and pollinators are not required.

Direct and Indirect Effects

Ground disturbance, such as soil disruption by logging and yarding activities, would reduce the quality of habitat, and could disrupt needed mycorrhizal connections, and cause direct mechanical damage to above-ground plants during the growing season. Loss of individual above-ground stems, by herbivores, unseasonable frost, or mechanical damage, may not harm plants in the long run, considering that they do not appear above ground every year, and probably rely on nutrients obtained from the mycorrhizal connections to persist.

Along with ground disturbance, changes in moisture availability -such as loss of ground water sources or hydrological changes, are probably the most potentially damaging to moonwort populations. While existing plants may have the capacity to survive droughty periods u their mycorrhizal connections, germination and establishment of new plants require ample moisture.

The effects of fire are not known. Because moonworts are limited to very wet microhabitats in the Blue Mountains, they are unlikely to be directly affected by fire, unless it is severe. However, the death of overstory trees due to burning may remove a necessary mycorrhizal host and impact an entire population, as in those that grow at the edges of meadows around small lodgepole pine. Loss of the shade that many populations favor could also affect long term survival of these species. It is not known what consequences such fire effects might have, or whether an existing population could persist under these circumstances.

Because sites capable of supporting botrychiums are usually classified as riparian, and management activities they should not be affected by harvest activities. For the same reason, prescribed fire is unlikely to damage potential habitat or any plants that may be present. Because the six sensitive species considered here have a broad distribution on the continent, and because more of them are being found each year as intensive surveys are conducted in appropriate habitats, any possible impacts to individuals from this project would not jeopardize the survival of the species as a whole.

Cumulative Effects

Loss of undisturbed wet sites capable of supporting botrychiums, whether due to water "developments" for livestock, water uses, or to upstream, upslope hydrologic disturbance can most effectively eliminate potential habitat. The Forest Plan, as amended by PACFISH, should adequately protect potential habitat.

Carex interior (interior sedge)

Environmental Baseline:

Interior sedge has not been documented within the project area but potential habitat probably exists as very small seeps in forested areas that are not always mapped.

Carex interior is a densely tufted sedge that grows in lowland to mid-montane elevations. It is a widespread North American species found throughout the range of the Pacific Northwest, as defined by Hitchcock and Cronquist; however, it is apparently uncommon in Oregon. It is known to inhabit saturated riparian areas with year-round surface water, such as swamps and wet meadows associated with seeps, springs, or streams. It thrives in full sun, but can survive with small amounts of shade. Associated species include Alnus incana, Carex cusickii, Carex utriculata, Cicuta douglasii, Deschampsia cespitosa, Juncus spp., and Menyanthes trifoliata.

Carex interior is not rhizomatous and reproduces only by seed.

Direct and Indirect Effects

Inland sedge grows in very wet habitats that are unlikely to be affected by prescribed fire. If fire did creep into an area where this sedge grows, it would likely only affect the above ground portions of the plant. The rhizomes embedded in wet mud can probably survive all but the most severe fires, allowing the plants to sprout rapidly after a burn.

The use of heavy equipment associated with logging and road construction can harm fragile, wet soils on which Carex interior grows. Because of its location in wet areas, its habitat is often protected from mechanical disturbance by Forest Plan standards.

Cumulative Effects

Canopy closure and dense shade from conifers resulting from years of fire suppression may well have reduced potential habitat, and may have caused existing populations to shrink.

Heavy domestic livestock grazing and wild ungulate use may have decreased the abundance of this sedge across the landscape. Like other sedges, Carex interior remains palatable fairly late in the summer and may become preferred forage when other plants are drying and late season grazing can remove the seed crop, negatively impacting this species' reproduction. Excessive use by ungulates can also harm the fragile, wet soils this sedge inhabits.

Water developments such as cattle troughs and ditches for irrigation have decreased wet meadow habitat. Lowered water tables associated with stream channel degradation and loss of beaver wetlands has also reduced wetland habitat that has the potential to support Carex interior

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APPENDIX I – SOILS

This Appendix has several parts:

- Expected Effects on Detrimental Soil Conditions
- Quantitative effects of logging on soil
- Soil Hazard Ratings
- Soil Types
- Assessment Procedure

Expected Effects on Detrimental Soil Conditions

These units are the tractor units, which are expected to have the most detrimental impacts. The number in the table is the expected percent of the unit with detrimental impacts.

Stand	Alt 1 % of unit	Alt 2 % of unit	Design Element
012	9	11	Winter
016	4	18	
018	7	19	
036	6	16	
046	4	14	
048	4	16	
050	5	15	
052	7	17	
058	10	12	Winter
060	7	17	
082	6	18	
084	4	17	
089	7	17	
095	8	19	
112	10	12	Winter
115	16	18	Winter
157	8	18	
176	7	17	
192	8	19	
194	6	17	
196	5	16	
198	7	19	

Stand	Alt 1 % of unit	Alt 2 % of unit	Design Element
209	5	17	
210	1	10	
211	4	15	
213	5	17	
230	11	17	Subsoil
240	2	14	
301	5	17	
302	8	19	Dry
304	5	14	
308	1	12	
310	6	17	
312	3	12	
317	6	16	
318	4	14	
320	0	11	
323	0	9	
324	2	13	
336	2	12	
338	3	12	
340	3	12	
342	6	15	
344	6	16	
346	0	8	
348	6	14	
349	9	17	
367	4	16	
369 371 373	9	18	Dry
382	1	12	
386	6	14	
388	3	13	
394	4	15	
404	8	16	
504	11	17	Subsoil
510	11	17	Subsoil
514	13	15	Winter

Stand	Alt 1 % of unit	Alt 2 % of unit	Design Element
518	8	17	
520	4	14	
521	3	13	
545	4	13	
576	1	13	
583	4	14	
584	1	14	
586	2	14	
604	6	16	
618	2	12	
642	0	12	
644	3	13	
646	2	16	
648	4	12	
654	6	17	
662	19	19	helicopter
708	4	13	

Quantitative logging effects on detrimental soil conditions

Hersh McNeil
10-7-05

Three Studies

Three monitoring studies on the Malheur estimated effects of a feller-buncher/skidder operation on soil detrimental conditions. These were Calamity (McNeil 1996), Misty (Gamble 2002), and Flagtail (McNeil 2005). The reported effects are:

Study	Detrimental Impacts (% of land*)
Misty 1&2	13
Misty 6	17
Calamity	8
Flagtail	16

* Land not included in roads or landings. In addition, the Calamity and Flagtail percentages have been adjusted upward, to the impact that would be expected on land that had no existing impacts. (Flagtail - (14.4-1.3[rilling])*1.09[roads & landings]*(1+.08*1.6)[existing impacts]) Impact on land that has existing impacts would be somewhat lower.

These data indicate the Calamity study probably is an anomaly. Reasons for this anomaly may include the following:

- In the Calamity study, skidtrail spacing was wider (120 feet), and width perhaps was less, than in the other two studies. Most of the following reasons explain why this is so.

- The Calamity study was generally well away from landings, so convergence of skidtrails near landings was not a factor.

- At Calamity, road locations, topography, and unit shape were such that skidtrails could be laid out more-or-less parallel to each other. Parallel skidtrails take up less area than branching or converging skidtrails.

- The topography at Calamity was fairly even, unlike Flagtail (at least) where topography was corrugated. In the Misty study, slopes ranged from 5 to 15%. Even topography, without draws or steep slopes, gives loggers more freedom to space skidtrails.

- In the Calamity study, loggers knew a soil study was taking place, and probably took this fact into consideration.

- The soil was drier in the Calamity study than in the Flagtail study. Soil was probably dry in the Misty study, because logging was during the summer.

Extenuating circumstances existed at Flagtail that did not exist at Misty because Flagtail was a post-fire salvage. For instance at Flagtail there was a rush to log deteriorating timber and a lack of forest floor and live tree roots. In addition at Flagtail, the volume removed probably was greater, the soil was more moist, and the topography was steeper and perhaps more uneven. On the other hand at Misty, Gamble (2002) thought the wide skidtrails were due in part to difficulties in utilizing jack-strawed lodgepole. In addition, the Misty soil was ash, whereas the Flagtail soils were partly ash and partly rocky non-ash. But, the results probably indicate less impacts at Flagtail than at Misty, if everything were equal. The following discussion is based on the Flagtail results, rather than the Misty results, because the Flagtail results are more recent, and probably more similar to current practices.

Calculations

The following calculations describe a model for skidding, in which the effect is estimated by taking a "starting point", and decreasing or increasing the effect by multiplying (mostly) the starting point by a series of factors, depending on values of variables, such as volume removed, existing impacts, etc. In some cases, other calculations beside multiplication are used.

I assume the extenuating circumstances related to fire salvage increased impacts by 3%. So my "starting point" estimate is 13%, for expected detrimental impacts in units similar to the Flagtail unit. "Similar" means units with 10 mbf/ac removed, moist soil, uneven topography with draws, no existing impacts, and a mixture of ash and rocky non-ash soil. In the following examples, I use a "starting point" of 14%.

Volume Factor. At the Flagtail study, the volume removed was perhaps 10 mbf/ac. If lesser volumes are removed, probably lower impacts would result. Impacts for lower volumes are reduced by the factor shown in the following table:

Volume (mbf/ac)	Factor*
0	0.00
1	0.46
2	0.62
3	0.71
4	0.78
5	0.83
6	0.88
10	1.00
25	1.23

*Factor= 0.25*ln(vol+0.19)+0.42, where vol is the volume (mbf/ac), and ln is the natural logarithm function.

Thus in a stand from which 2 mbf/ac would be removed, detrimental impacts could be 9% (=14%*0.62).

Soil Factor. The Flagtail study had both ash and rocky, non-ash soil, and I noted the ash soil seemed to compact more than the rocky, non-ash soil. So for ash soils a factor of 1.1 would be applied, and for rocky non-ash soils a factor of 0.9 would be applied. For non-rocky, non-ash soil the soil factor would be 1.

Steep Slope Factor. Slopes steeper than 35% tend to be have more displacement than gentler slopes. The factor for steep slopes is 1+0.4*ss where ss is the proportion of the unit that is steeper than 35% slope.

Skidtrail Spacing Factor. Impacts would be lower in units with even slopes, with a road along the bottom of the slope, like in the Calamity study. In units where landing locations, unit size and shape, and topography permit skidtrail spacing at 120 feet for 70% or more of the skidtrails, a factor of 0.8 could be applied.

Dry Soil Mitigation Factor. If dry soil only is prescribed, a factor of 0.85 would be used.

Existing Impact Calculation. On soil with existing impacts, impacts would not increase as much as on soil without existing impacts, because if operations compact soil that is already compacted, no increase in impacts results. This would be the case where existing skid trails are re-used. The calculation is a subtraction, instead of a multiplication. The calculation is new_ie = old_ie - 0.9*r*e where new_ie is the newly calculated increase, old_ie is the impact predicted from all the above factors, 0.9 is the assumed proportion of the existing detrimental impacts in skidtrails that would be impacted again (that is, 10% of the existing detrimental impacts in skidtrails would not have been detrimentally impacted in the new operation), r is the proportion of existing impacts that would be in skidtrails in the new operation, and e is existing impacts. (If new_ie is less than zero, zero would be used instead.) Data from the Flagtail study indicates "r" was about 1.6*old_ie/100. The "r" variable could be adjusted upward or downward, if reason exists to believe more or fewer existing skidtrails would be re-used than in the Flagtail study. As an instance where r = 1.6*old_ie, if 8% the land is already impacted, and old_ie is 14%, the amount of new impacts would be 12% (=14%-1.6*0.9*0.14*8%).

Subsoiling Mitigation Calculation. If subsoiling is prescribed, effects would be calculated as new_is = new_ie - 0.5 * old_ie where new_is is the newly calculated effect, 0.5 is the assumed effectiveness of subsoiling, and new_ie and old_ie are defined under the "Existing Impact Calculation" section. Negative numbers are acceptable. For instance, if new_ie is 12% and old_ie is 14%, the amount of new impacts would be 5% (= 12-0.5*14).

Winter Mitigation Effect. If winter logging is prescribed, the effects would be estimated as 2%, and the "factors" would not be used. The landing and fuel treatment effects would remain the same.

Roads Factor. Because these percentages apply to the area off of roads and landings, the percentages should be lowered by the amount of area in roads. For instance, if 5% of the land is in roads and landings, the impacts off roads and landings would be 13% (=14%/1.05).

Other Factors. Other variables may influence effects. For instance, tractor winching may have different impacts. As another instance, if a unit is so small that skidtrails are short and would be traveled only two or three times, effects could be reduced. As another example, uphill skidding probably would increase impacts. These factors would be estimated on an as-needed basis.

Landings and Fuel Treatment. These activities are exceptions to the multiplicative model for skidding. After effects from skidding are calculated, 3% additional detrimental impacts should be added for landings, (unless they're subsoiled), using the results from the Misty study. If the landings are subsoiled, 1% additional impacts would be expected. Perhaps landing impacts would depend on whether whole tree harvesting is planned. Grapple piling would increase impacts by 1%.

References

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Soil Hazard Ratings

Mapping Unit	Surface Erosion Hazard	Compaction Hazard	Displacement Hazard	Puddling Hazard	Stability
3	L-M	M-H	L	L-H	VS
7	L-H	M-H	M	L-H	S-MS
8	L-H	M-H	M	L-M	S-US
9	L-M	M	H	L	S-US
10	L-M	M	H	L	S-US
31	L-M	M	M	L	VS
32	M	M	H	L	VS
33	H	M	M	L	VS
34	VH	L-M	M	L	VS
35	VH	L-M	L	L	VS
36	M	M	H	L	VS
41	L-M	M-H	L-M	L	VS
42	M	M	H	L	VS
43	M-H	M-H	L-M	L	S
44	VH	L-M	L-M	L	S-VS
45	VH	L-M	M	L	S-VS
46	M-H	L-M	L-M	L	VS
47	H	L	L-M	L	VS
48	M	M	H	L	S
81	M-H	H	L	M-H	MS-S
82	L	M	H	L	MS-S
95	L	M	H	L	VS
96	M-H	M-H	L-M	L	VS

Soil Types

Following is a general characterization of the soil. The descriptions are based on their occurrence within broad vegetation types and geomorphic position. Landtypes marked with an asterisk are the most abundant within the project area.

Additional information, including surface erosion hazard, is given in Chapter 3, Soils, Existing Condition section

Soils with Mixed Conifer Plant Communities Dominant

These soils typically have a 6 to 15 inch thick surface layer of volcanic ash over a very gravelly loam or gravelly clay loam subsoil and are moderately deep or deep. Some have gravelly clay subsoils. The surface layers have low bulk density and relatively high infiltration rates. The soils are mostly on relatively steep slopes (45 to 70 %), with some benches and shoulder slopes of 20 to 50 percent. These soils are mostly on northerly and easterly exposures. These soils are underlain by graywacke, shale, mudstone, siltstone, basalt, and andesite. These soils have the highest water holding capacities in the watershed, and they retain significant amounts of moisture throughout most of the summer. Plant available water holding capacity is about 3 to 6 inches in these soils, and maximum water holding capacity is generally between 10 and 20 inches. The soils have a relatively thick litter layer (1 to 4 inches), but are susceptible to displacement and dustiness when disturbed. The volcanic ash soils are susceptible to hydrophobicity (water repellency) when burn intensities are moderate to severe. These are the most productive soils in the watershed. (Landtypes 9*, 10*, 32*, 36*, 42, 48*, 82, 95)

Soils with Ponderosa Pine Communities Dominant

This group of soils is the most extensive on the north and northeast side of Canyon Creek. On the south and southwest side they often are mapped in complex with mixed conifer stands. They are shallow and moderately deep, with loam and clay loam surface layers and clay loam and clay subsoils. They are mostly very gravelly, cobbly, and stony, and usually have less than 20 percent stones on the surface. Most of the soils are well drained, but a few areas are moderately well drained. The bedrock is mostly basalt, andesite, breccia, shale, mudstone and siltstone. There is an area in the upper part of Vance Creek that is underlain by peridotite and serpentine. These soils are mostly on gentle slopes (0 to 30 %) with a southerly exposure but a few of these soils are on slopes of 30 to 70 percent. When runoff does occur, the potential for downstream turbidity is relatively high. Compaction hazard is quite variable in this extensive group. There are significant areas that have a low to moderate compaction hazard, but significant areas of high hazard also are present. Soil puddling (loss of structure by shearing forces) is a hazard when these soils are wet. These soils generally have high strength when dry. Displacement hazard is mostly low to moderate. Plant available water holding capacity is mostly 2 to 4 inches. Maximum water holding capacity for most of these soils about 6 to 10 inches. Productivity potential is relatively low. Some of the soils have moderate productivity potential. (Landtypes 8*, 12, 31, 33*, 41*, 43, 81*, 96)

Soils with Juniper, Mahogany, and Sagebrush Plant Communities Dominant

Soils in this group are mostly shallow and very shallow, are very to extremely gravelly loams and some clay loams, with more than 30 percent surface stones. They are well to excessively drained on ridges and southerly slopes of 15 to more than 70 percent. Basalt, andesite, shale, mudstone and siltstone are the dominant bedrock from which the soils are forming. These soils support mostly juniper plant communities with significant components of mountain mahogany, big sagebrush, low sagebrush, rabbitbrush, and a few scattered ponderosa pine. Grasses are mostly bluebunch wheatgrass, Idaho fescue and Sandberg bluegrass. Compaction hazard is mostly low, but with some areas of moderate hazard. Soil displacement hazard is mostly moderate or low. Plant available water holding capacity is generally less than 1.5 inches. (Landtypes 7, 34*, 44*, 46*)

Soils with Grass and Sagebrush Plant Communities Dominant

Soils in this group are mostly very shallow and shallow and are very to extremely gravelly and cobbly loams. These soils usually have more than 40 to 50 percent surface stones and are excessively drained. Plant available water holding capacity is less than one inch. These soils are on mostly south facing slopes of 30 to 70 percent, but a few are on less than 30 percent slopes. These soils are dominantly forming from sedimentary rock or basalt and andesite bedrock. These soils are extensive on the southeast facing slopes southwest of Canyon Creek. They are less extensive on the north and eastside of Canyon Creek. They support a cover of bluebunch wheatgrass, Idaho fescue and Sandberg bluegrass, low sage, and stiff sage. Soil compaction and displacement hazard is mostly low, but some are rated moderate hazards. (Landtypes 35*, 45, 47)

Valley Floor and Meadow Soils

The soils in this group are mostly deep and moderately deep, silty to clayey, moderately well to somewhat poorly drained and are on gentle slopes, less than 15 percent. They are forming in valley fill materials. Water holding capacity is about 20 to 24 inches. These soils have a high hazard for compaction and are highly susceptible to gully and streambank erosion. These soils are not extensive, but can support a dense cover of grasses, sedges, and rushes. They also support shrubs such as willows, alders, currants and red osier dogwood. They are highly productive. Most of these soils are on private lands along Canyon Creek (Landtype 3).

Assessment Procedure

The sampling protocols require an investigator to establish transects and to evaluate the soils at 200 or more evenly spaced points along these transects. At each point, the soil condition was evaluated by probing or digging with a tile spade and by using visual cues. Each point was assigned a class designation as follows:

- Class 0—Undisturbed natural state
- Class 1—Low soil disturbance
- Class 2—Moderate disturbance
- Class 3—High disturbance

A more complete description of the disturbance class definitions is in Table 1. Classes 2 and 3 are considered to be detrimental conditions that count against the 20% maximum. The detrimental conditions are soil compaction, displacement, puddling, erosion, and detrimental burning. Standards for these conditions are described in FSM 2520, R-6 Supplement No. 2500.98-1.

Prior to beginning a transect, the investigators dug or probed in undisturbed areas of the stand to establish a reference for that soil type. They observed soil structural conditions, penetration resistance, depth of the surface soil, and the amount of volcanic ash at the reference sites and at points on the transect.

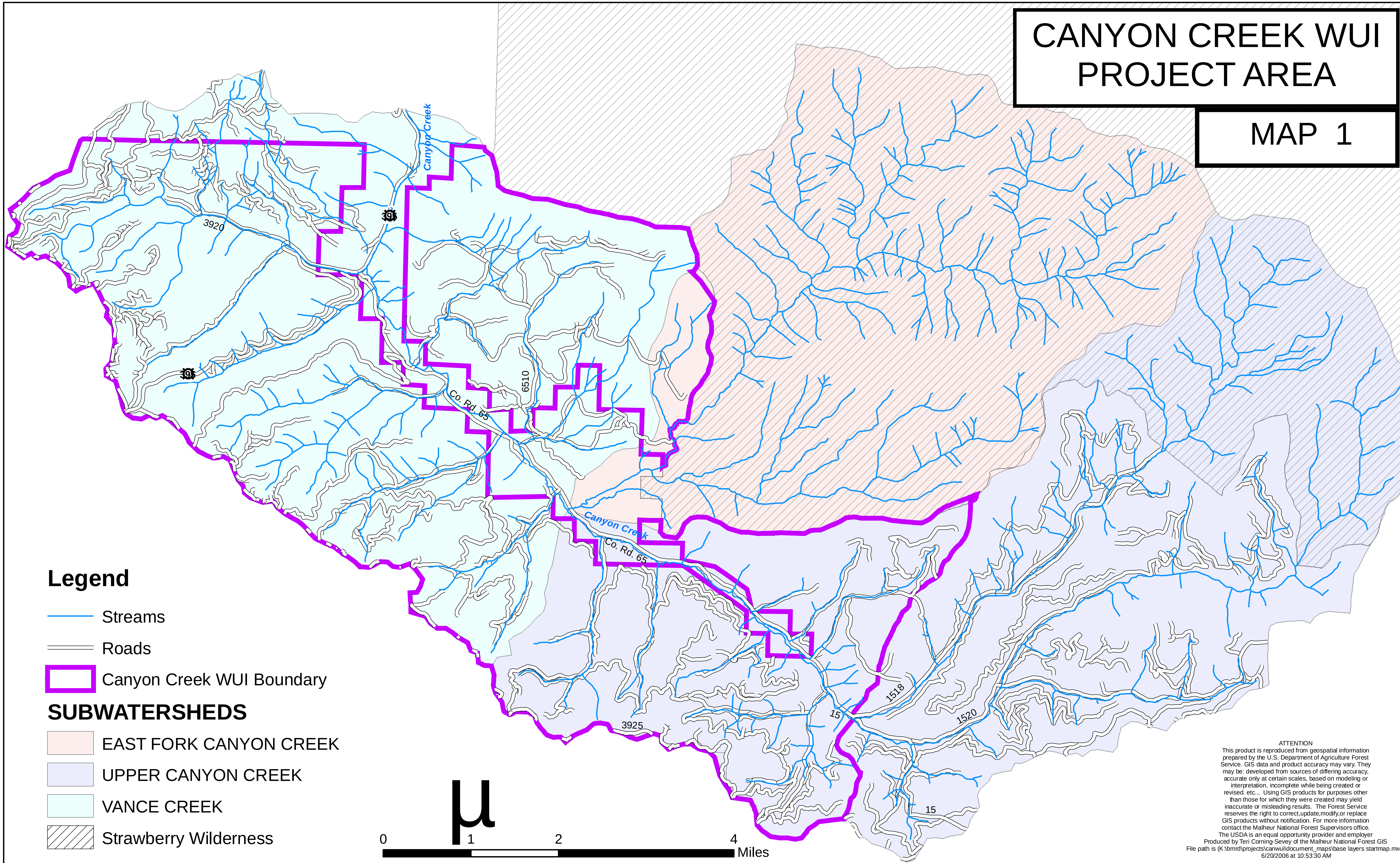
In the 2003 assessments, stands were evaluated using one of two levels of intensity. Type I sampling required one transect per stand. An azimuth was selected that would take the investigator across the stand. These transects had at least 200 data points and were 800 to 1,000 feet long. If the shape of the stand precluded following a single straight line, the investigator traveled as far as possible, then selected a new azimuth to complete the transect. The 2005 assessments only used Type I. Type II sampling was more intense. It required five randomly oriented transects for every 10 acres in the stand. These 100 foot transects each had 20 data points, resulting in an average of 10 data points per acre. In the 2003 assessments roads and landing were counted if they were on the transects. In the 2005 assessments roads and landings were skipped, and added in from map information.

The investigators carried a form, upon which a class designation for each data point was recorded. In the 2003 assessments, the investigators also recorded observations about the stand, including vegetation type and density. Soil information included texture, percentage of coarse fragments, surface rock, slope, and depth of ash layer. Characteristics of the soil were compared with how the area was mapped in the SRI. In both the 2003 and 2005 assessments, evidence of previous entries was noted, including skidtrail patterns, off-trail skidding, slash burning, and machine piling. Notes were made on the suitability for subsoiling, the potential for reusing existing skid trails, and conditions that may call for special mitigation measures. The investigators made judgments on whether the sampling was representative of the unit by studying aerial photos and reviewing what they had seen while driving or walking through the stand.

It is the opinion of the three soil scientists that the transect method gave a reasonably good field estimate of the area impacted by prior activities.

Table 1. Soil Disturbance Class Definitions

Class 0: Undisturbed Natural State. **Soil surface:** dence of past equipment operation. pressions or wheel tracks evident. nd duff layers present and intact. l displacement evident.	**Class 1: Low Soil Disturbance** **il surface:** aint wheel tracks or slight depressions evident (e.g. <2" deep). itter and duff layers usually present and intact. urface soil has not been displaced. ome evidence of burning impacts including a mosaic of charred and intact duff layer to partially consumed duff layer with blackened surface soil. **il resistance to penetration with tile spade or probe:** Resistance of surface soils may be slightly greater than observed under natural conditions. Concentrated in top 0-4 inch depth. **bservations of soil physical conditions:** Change in soil structure from crumb or granular structure to massive or platy structure, restricted to the surface 0-4
Class 2: Moderate Disturbance **il surface:** Vheel tracks or depressions evident (e.g. 2-6" deep. urface soil partially intact with minimal displacement (area must meet the size requirement). **il resistance to penetration with tile spade or probe:** ncreased resistance is present throughout top 4-12 inches of soil. **bservations of soil physical conditions:** hange in soil structure from crumb or granular structure to massive or platy structure, restricted to the surface 4-12 inches. laty structure is generally continuous and holds together when shaken. arge roots may penetrate the platy structure, but fine and medium roots may not.	**Class 3: High Disturbance** **face:** tracks or depressions highly evident (e.g. >6" deep) ce of topsoil removal, gouging and piling. splacement has removed the majority of the surface soil. Subsoil partially or totally exposed. g consumed duff layer, root crowns and surface roots of grasses. Evidence of severely burned soils (mineral surface soil red in color) in an area that meets the size requirement. **istance to penetration with tile spade or probe:** sed resistance is deep into the soil profile (>12 inches). **ations of soil physical conditions:** e in soil structure from granular structure to massive or platy structure extends beyond the top 12 inches of soil. tructure is continuous. do not penetrate the platy structure.



CANYON CREEK WUI PROJECT AREA
MAP 1
Canyon Creek
3920
6510
Co. Rd. 65
Canyon Creek
Co. Rd. 65
3925
15
1518
1520
15
Legend
Streams
Roads
Canyon Creek WUI Boundary
SUBWATERSHEDS
EAST FORK CANYON CREEK
UPPER CANYON CREEK
VANCE CREEK
Strawberry Wilderness
0
1
2
4
Miles
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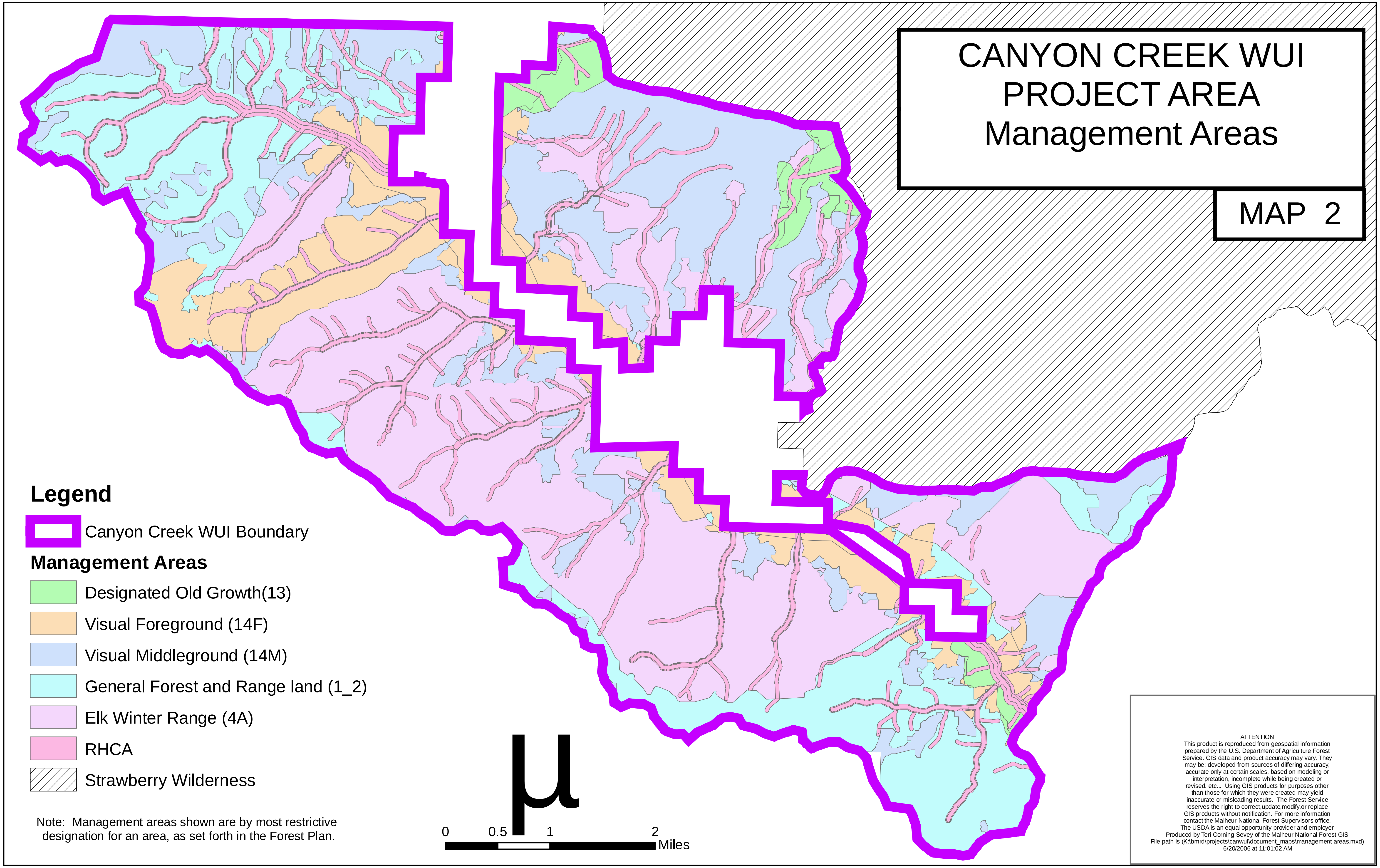
CANYON CREEK WUI
PROJECT AREA
Management Areas
MAP 2
Legend
Canyon Creek WUI Boundary
Management Areas
Designated Old Growth(13)
Visual Foreground (14F)
Visual Middleground (14M)
General Forest and Range land (1_2)
Elk Winter Range (4A)
RHCA
Strawberry Wilderness
Note: Management areas shown are by most restrictive
designation for an area, as set forth in the Forest Plan.
0
0.5
1
2
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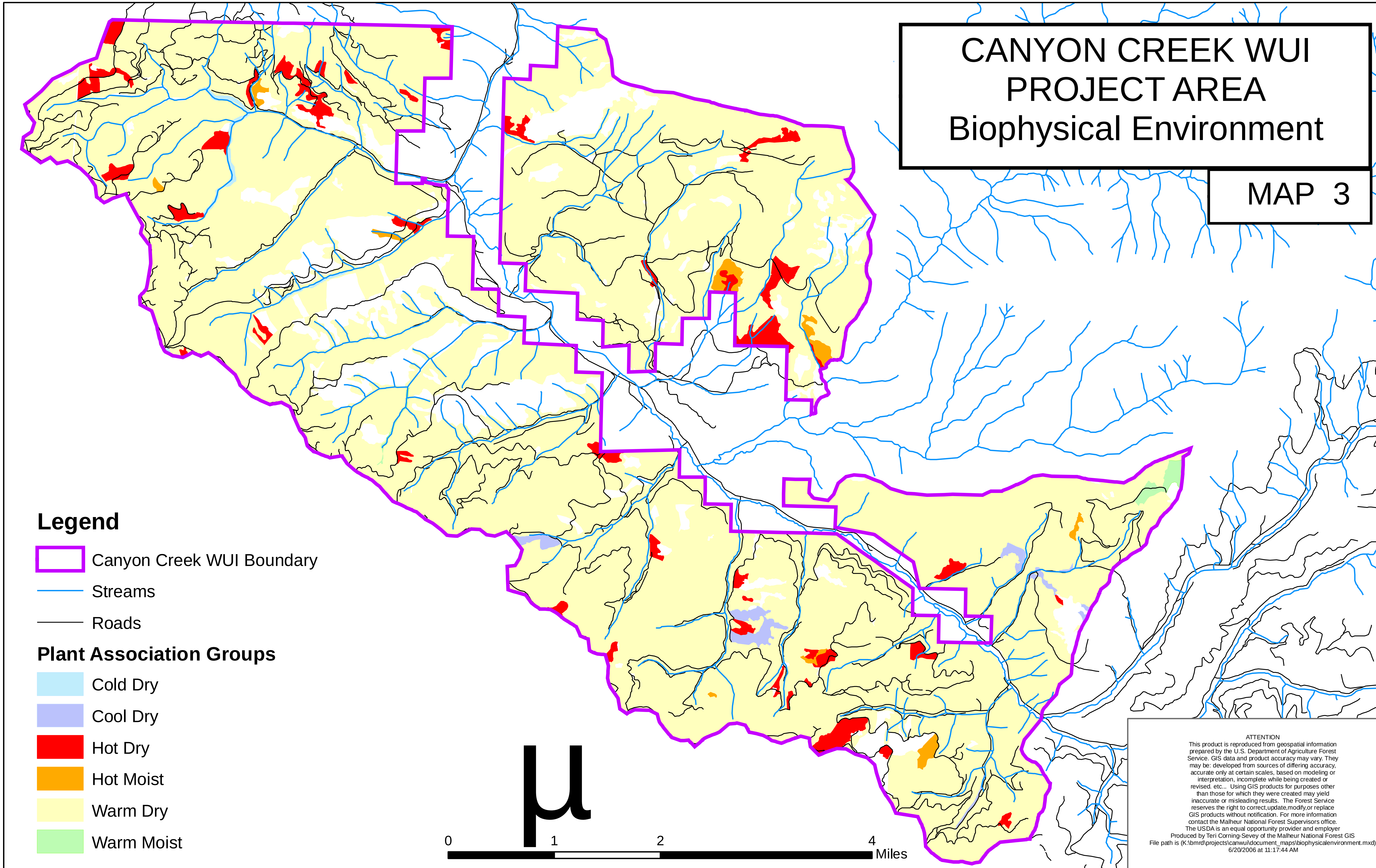

CANYON CREEK WUI
PROJECT AREA
Biophysical Environment
MAP 3
Legend
Canyon Creek WUI Boundary
Streams
Roads
Plant Association Groups
Cold Dry
Cool Dry
Hot Dry
Hot Moist
Warm Dry
Warm Moist
0
1
2
4
Miles
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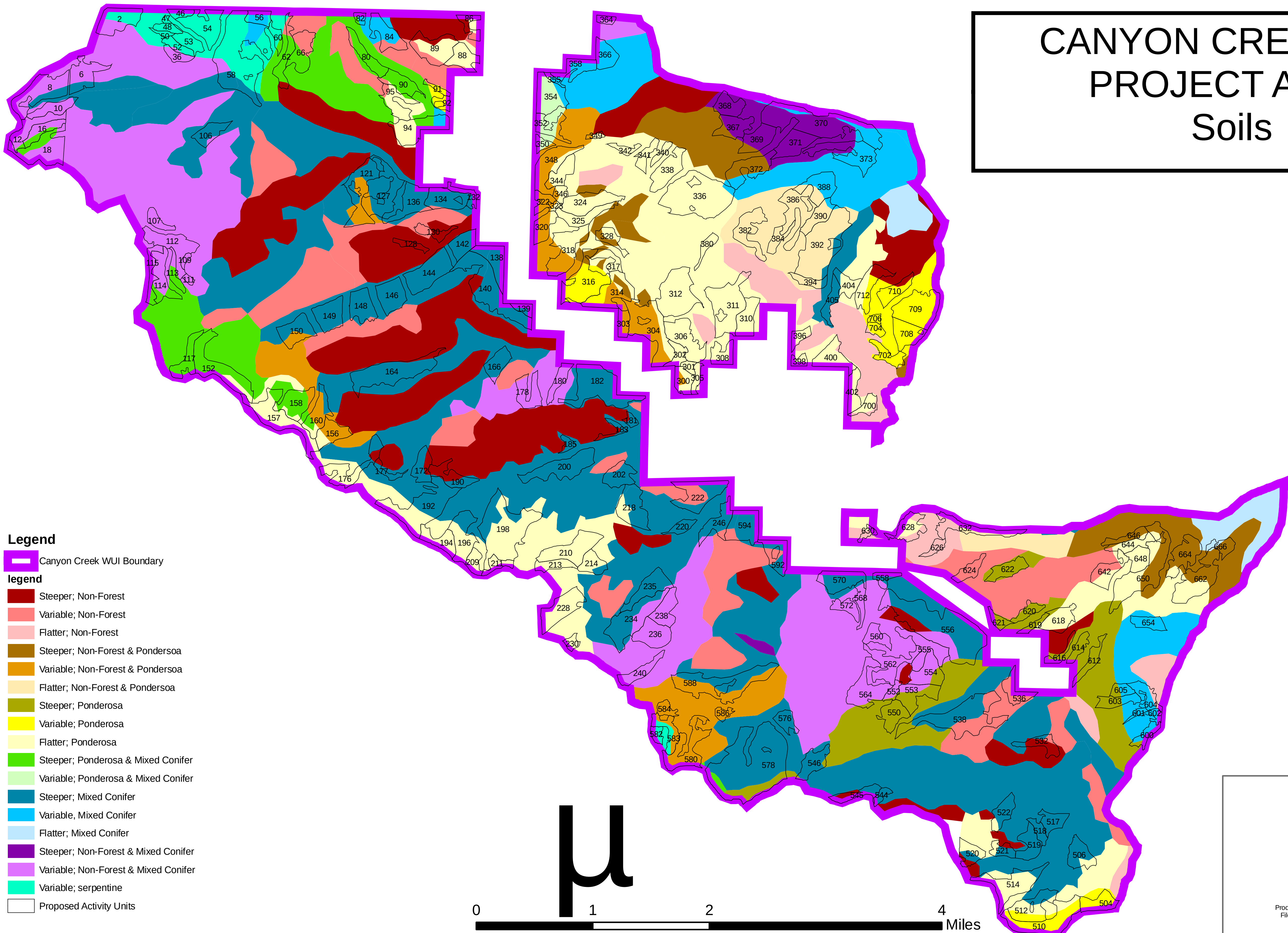
CANYON CREEK WUI PROJECT AREA
Soils

MAP 4



Legend

Canyon Creek WUI Boundary

legend

- Steeper; Non-Forest
- Variable; Non-Forest
- Flatter; Non-Forest
- Steeper; Non-Forest & Pondersoa
- Variable; Non-Forest & Pondersoa
- Flatter; Non-Forest & Pondersoa
- Steeper; Ponderosa
- Variable; Ponderosa
- Flatter; Ponderosa
- Steeper; Ponderosa & Mixed Conifer
- Variable; Ponderosa & Mixed Conifer
- Steeper; Mixed Conifer
- Variable, Mixed Conifer
- Flatter; Mixed Conifer
- Steeper; Non-Forest & Mixed Conifer
- Variable; Non-Forest & Mixed Conifer
- Variable; serpentine
- Proposed Activity Units

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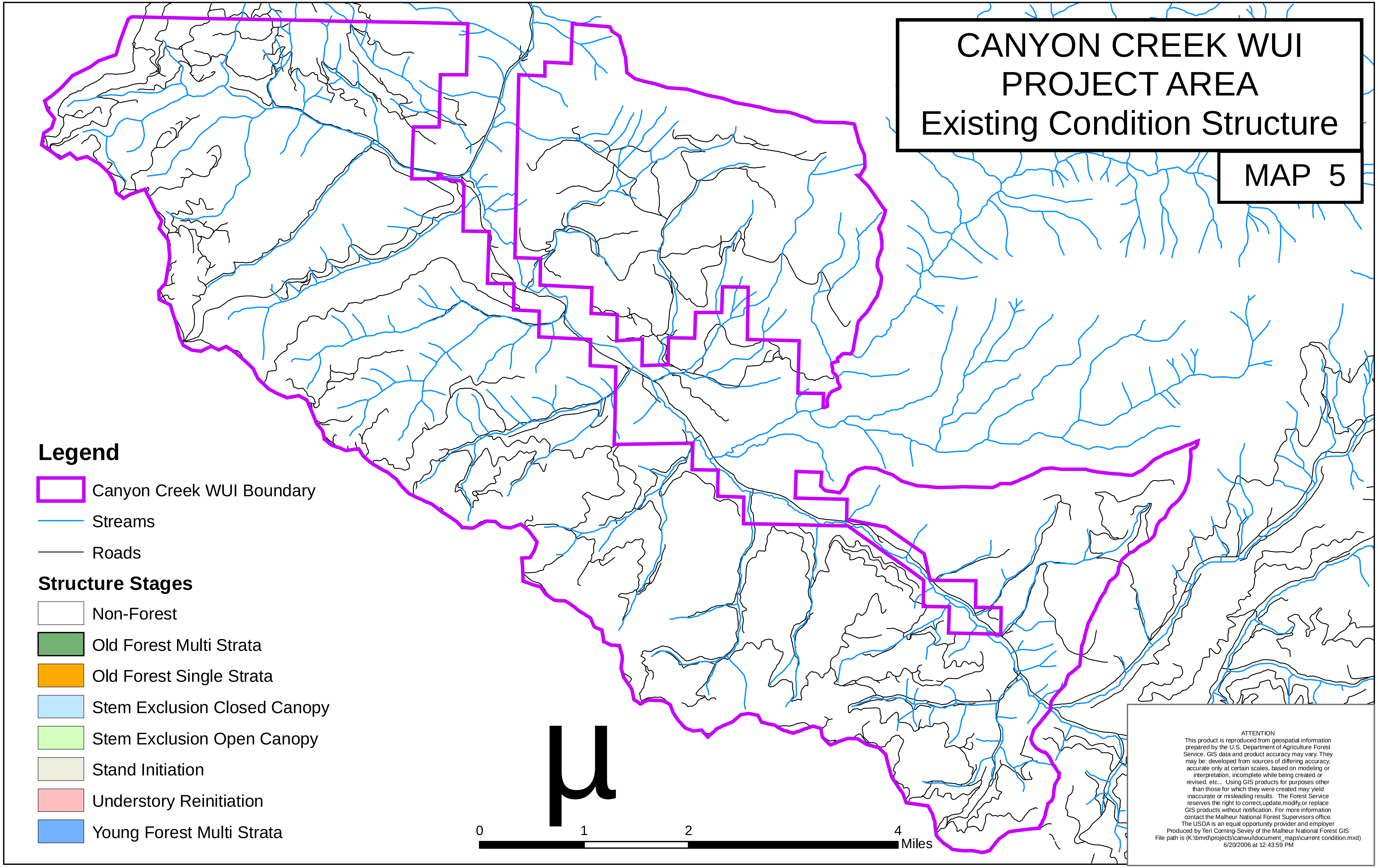

CANYON CREEK WUI
PROJECT AREA
Existing Condition Structure
MAP 5
Legend
Canyon Creek WUI Boundary
Streams
Roads
Structure Stages
Non-Forest
Old Forest Multi Strata
Old Forest Single Strata
Stem Exclusion Closed Canopy
Stem Exclusion Open Canopy
Stand Initiation
Understory Reinitiation
Young Forest Multi Strata
0
1
2
4
Miles
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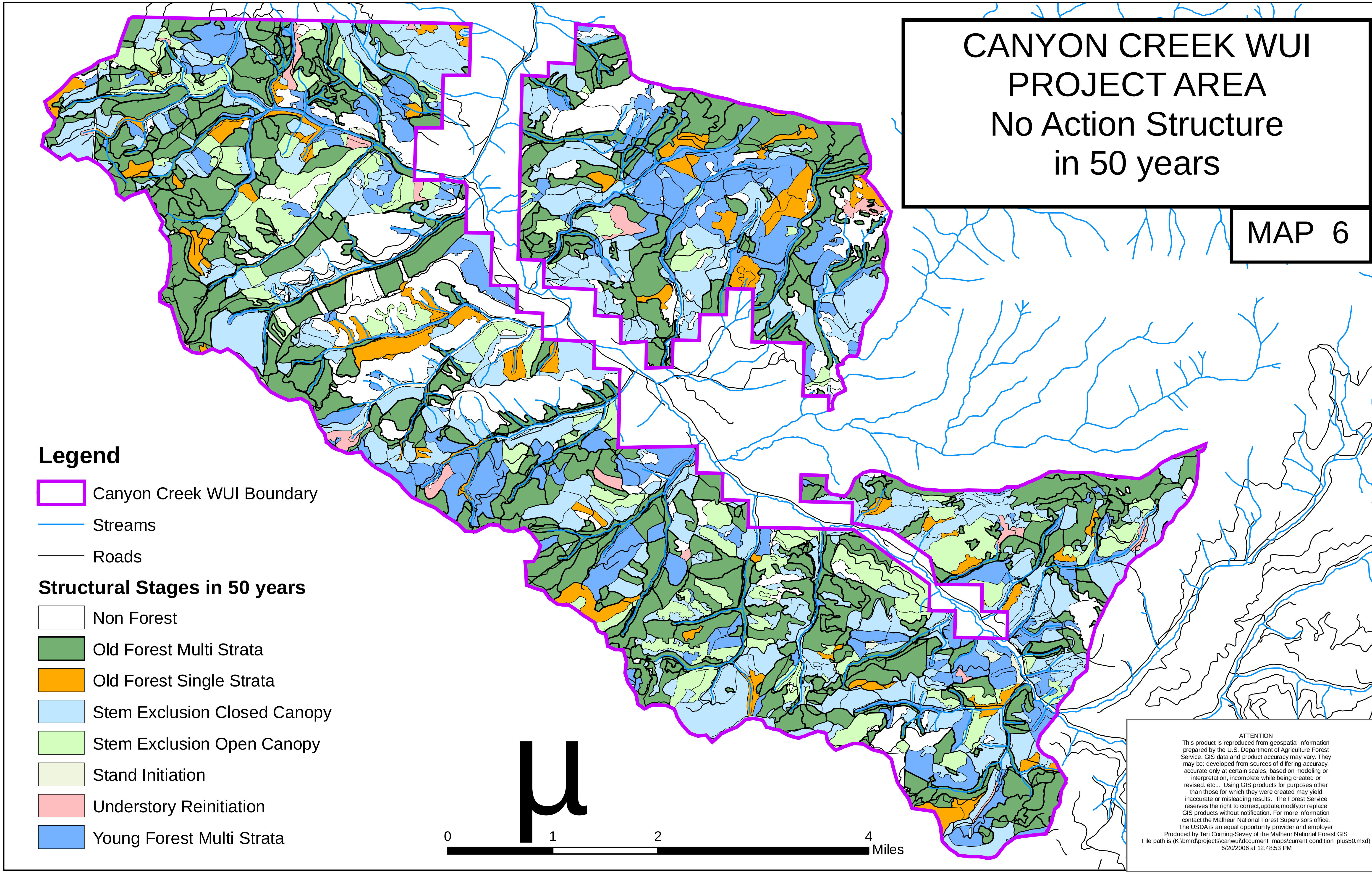
CANYON CREEK WUI
PROJECT AREA
No Action Structure
in 50 years
MAP 6
Legend
Canyon Creek WUI Boundary
Streams
Roads
Structural Stages in 50 years
Non Forest
Old Forest Multi Strata
Old Forest Single Strata
Stem Exclusion Closed Canopy
Stem Exclusion Open Canopy
Stand Initiation
Understory Reinitiation
Young Forest Multi Strata
0
1
2
4
Miles
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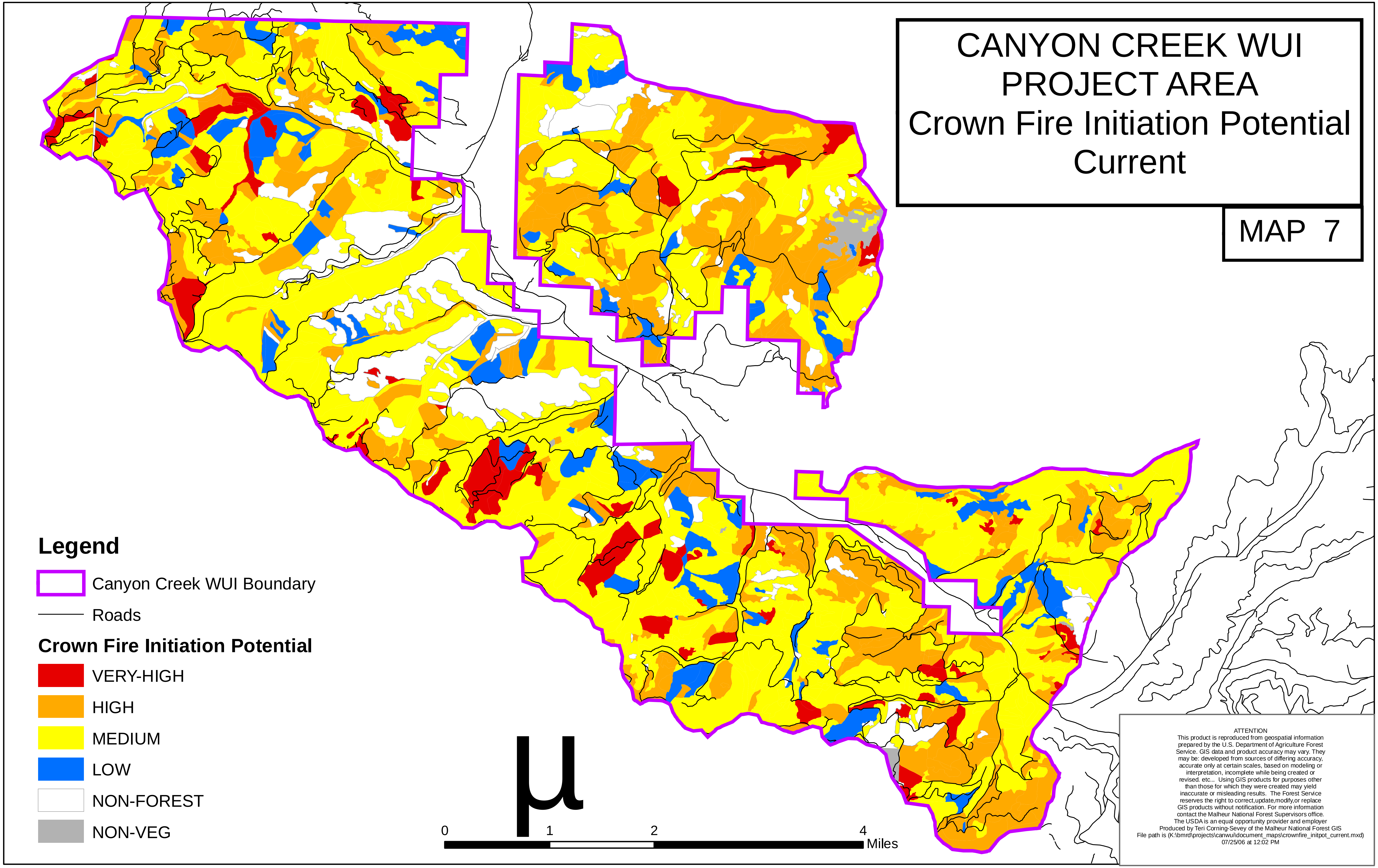
CANYON CREEK WUI
PROJECT AREA
Crown Fire Initiation Potential
Current
MAP 7
Legend
Canyon Creek WUI Boundary
Roads
Crown Fire Initiation Potential
VERY-HIGH
HIGH
MEDIUM
LOW
NON-FOREST
NON-VEG
0
1
2
4
Miles
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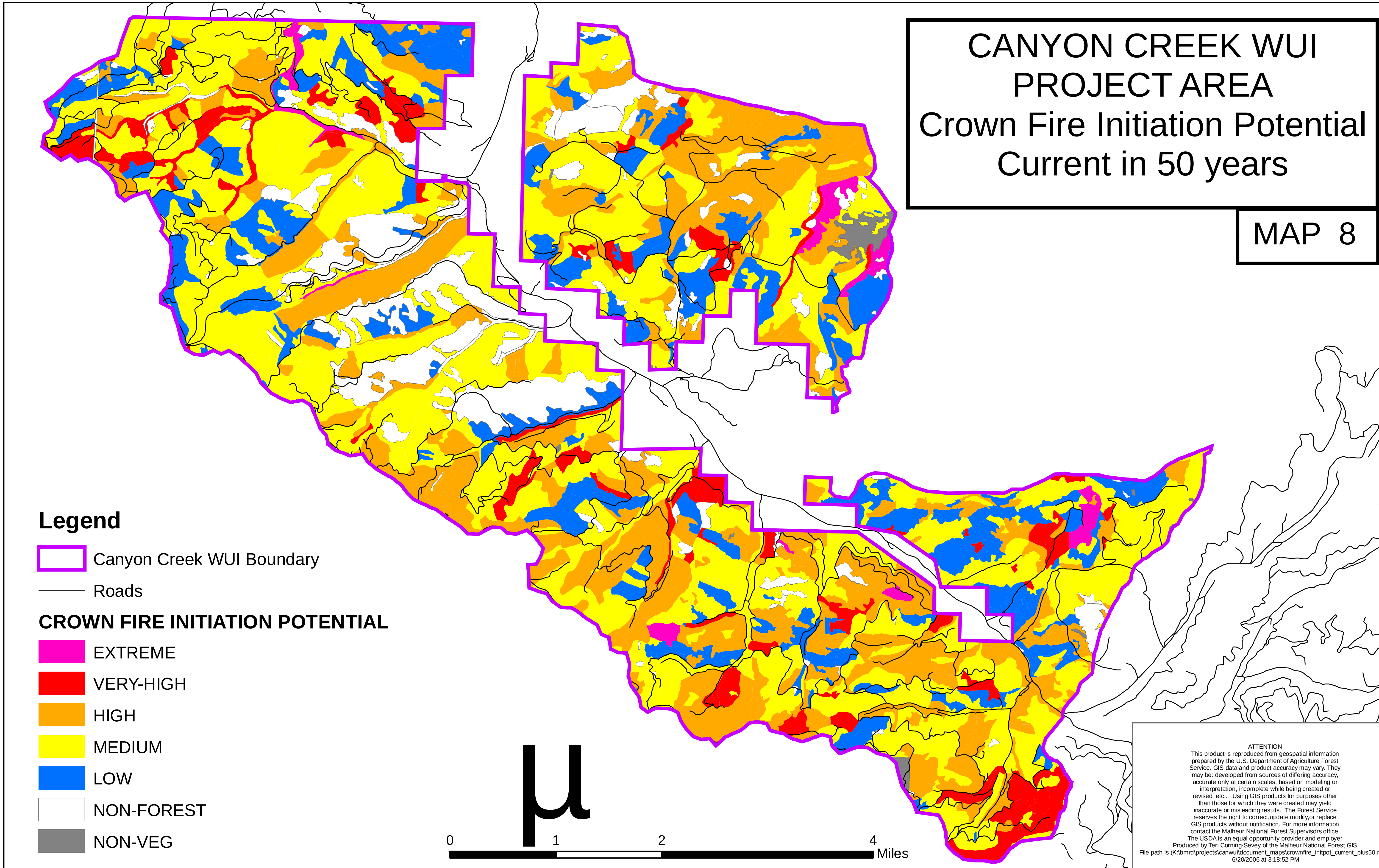
07/25/06 at 12:02 PM



CANYON CREEK WUI
PROJECT AREA
Crown Fire Initiation Potential
Current in 50 years
MAP 8
Legend
Canyon Creek WUI Boundary
Roads
CROWN FIRE INITIATION POTENTIAL
EXTREME
VERY-HIGH
HIGH
MEDIUM
LOW
NON-FOREST
NON-VEG
0
1
2
4
Miles
ATTENTION
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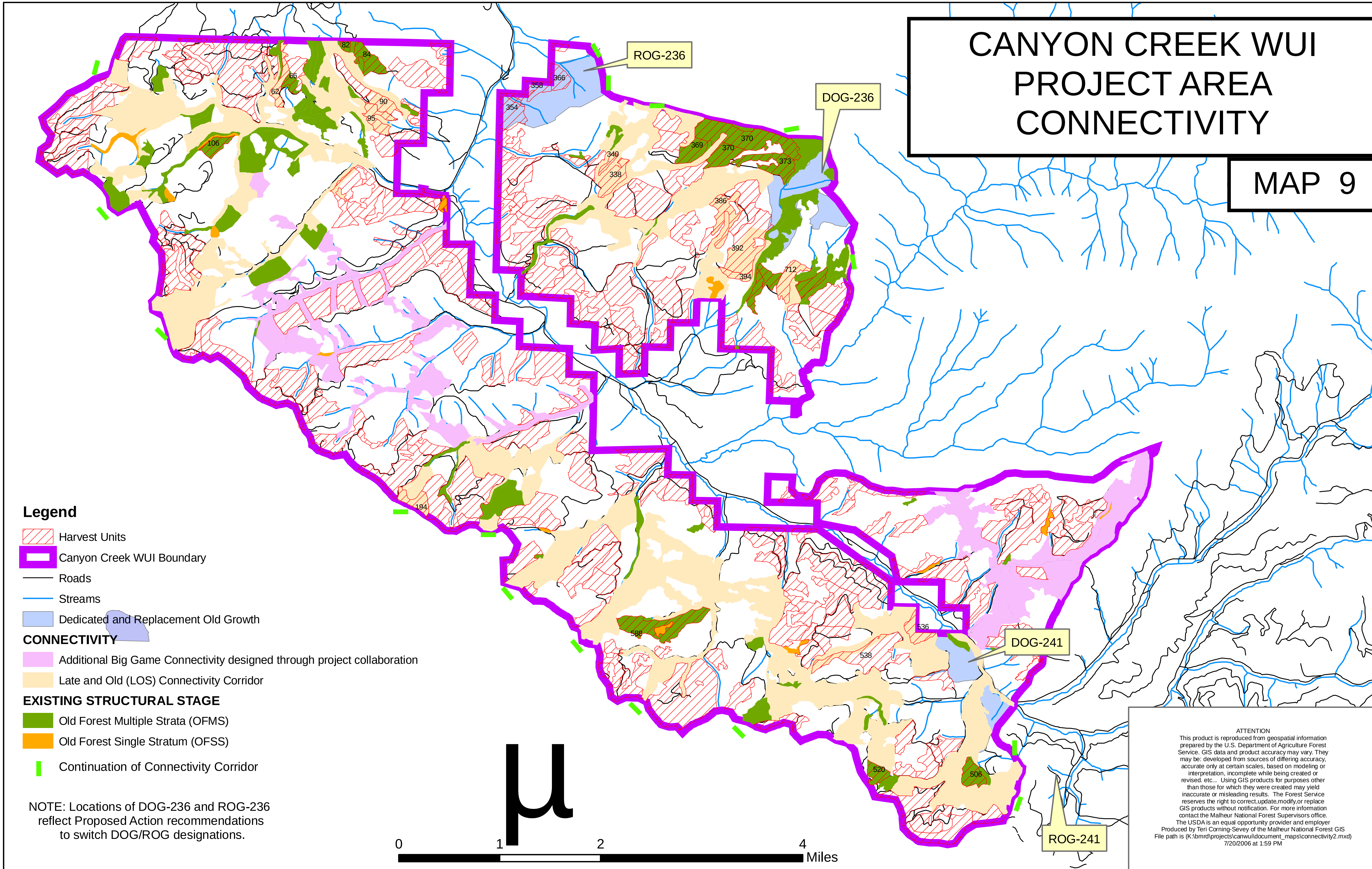
6/20/2006 at 3:18:52 PM


CANYON CREEK WUI PROJECT AREA CONNECTIVITY
MAP 9
ROG-236
DOG-236
DOG-241
ROG-241
Legend
Harvest Units
Canyon Creek WUI Boundary
Roads
Streams
Dedicated and Replacement Old Growth
CONNECTIVITY
Additional Big Game Connectivity designed through project collaboration
Late and Old (LOS) Connectivity Corridor
EXISTING STRUCTURAL STAGE
Old Forest Multiple Strata (OFMS)
Old Forest Single Stratum (OFSS)
Continuation of Connectivity Corridor
NOTE: Locations of DOG-236 and ROG-236 reflect Proposed Action recommendations to switch DOG/ROG designations.
0 1 2 4 Miles
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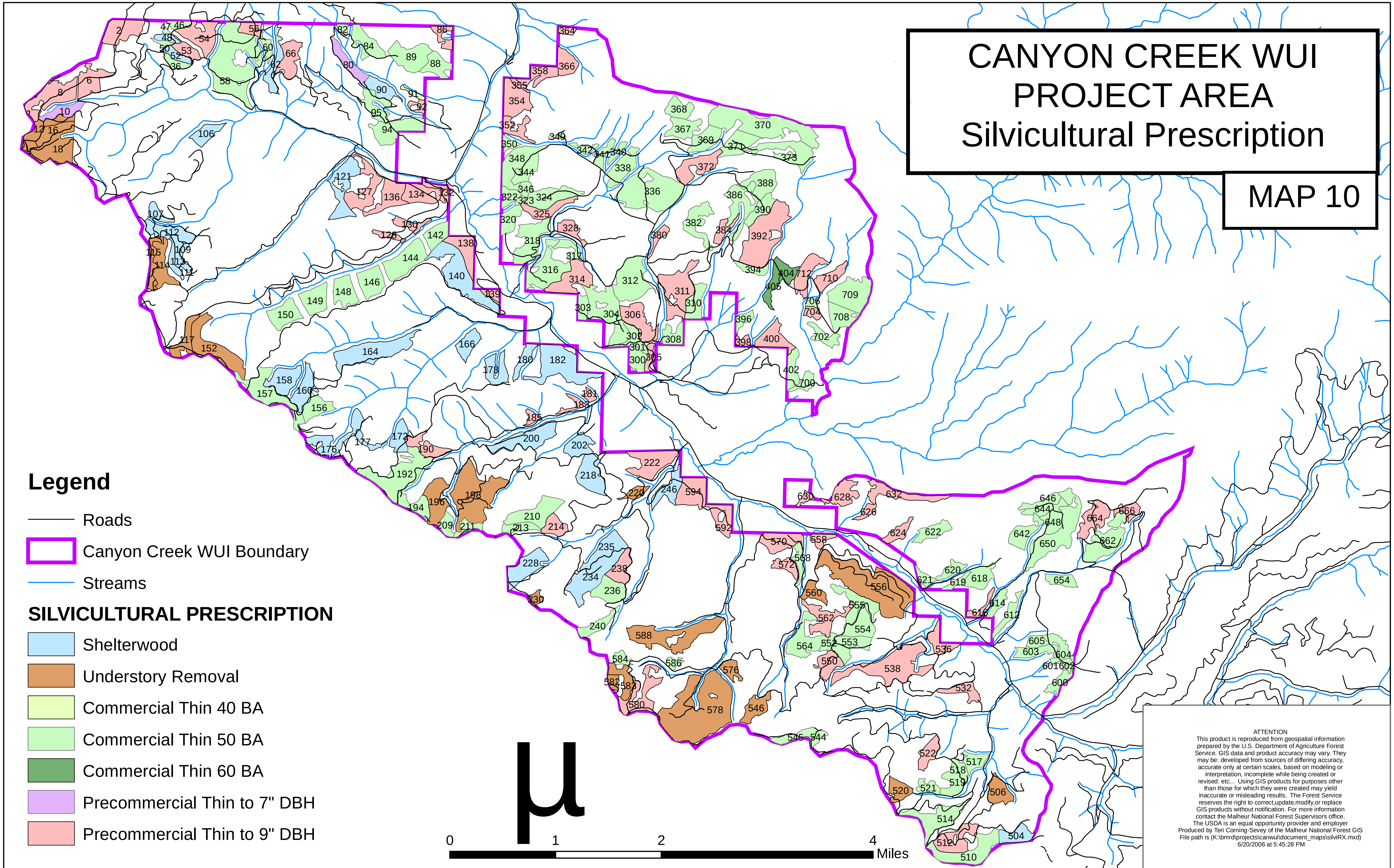
7/20/2006 at 1:59 PM



CANYON CREEK WUI
PROJECT AREA
Silvicultural Prescription
MAP 10
Legend
Roads
Canyon Creek WUI Boundary
Streams
SILVICULTURAL PRESCRIPTION
Shelterwood
Understory Removal
Commercial Thin 40 BA
Commercial Thin 50 BA
Commercial Thin 60 BA
Precommercial Thin to 7" DBH
Precommercial Thin to 9" DBH
0 1 2 4
Miles
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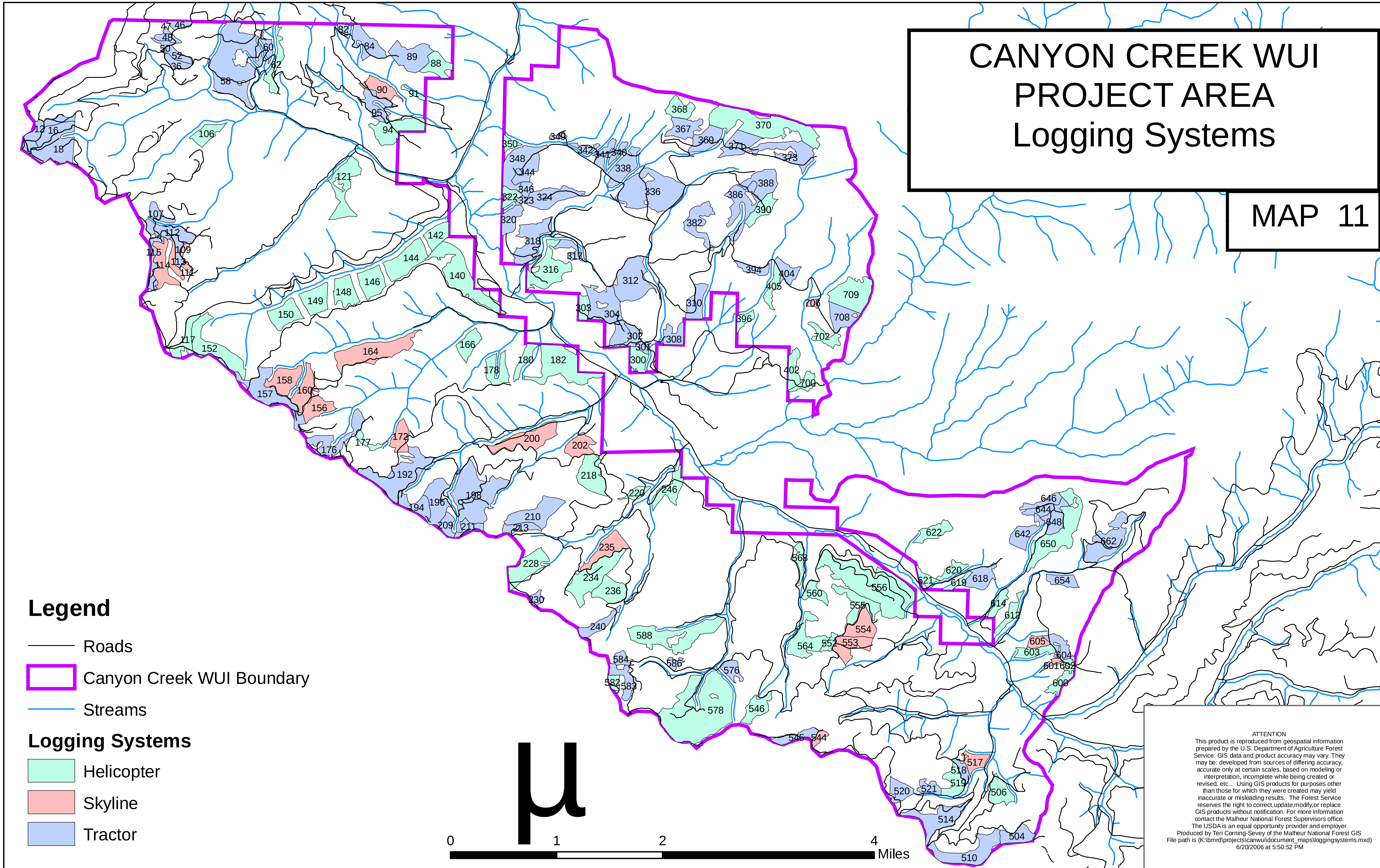
6/20/2006 at 5:45:28 PM


CANYON CREEK WUI
PROJECT AREA
Logging Systems
MAP 11
Legend
Roads
Canyon Creek WUI Boundary
Streams
Logging Systems
Helicopter
Skyline
Tractor
0
1
2
4
Miles
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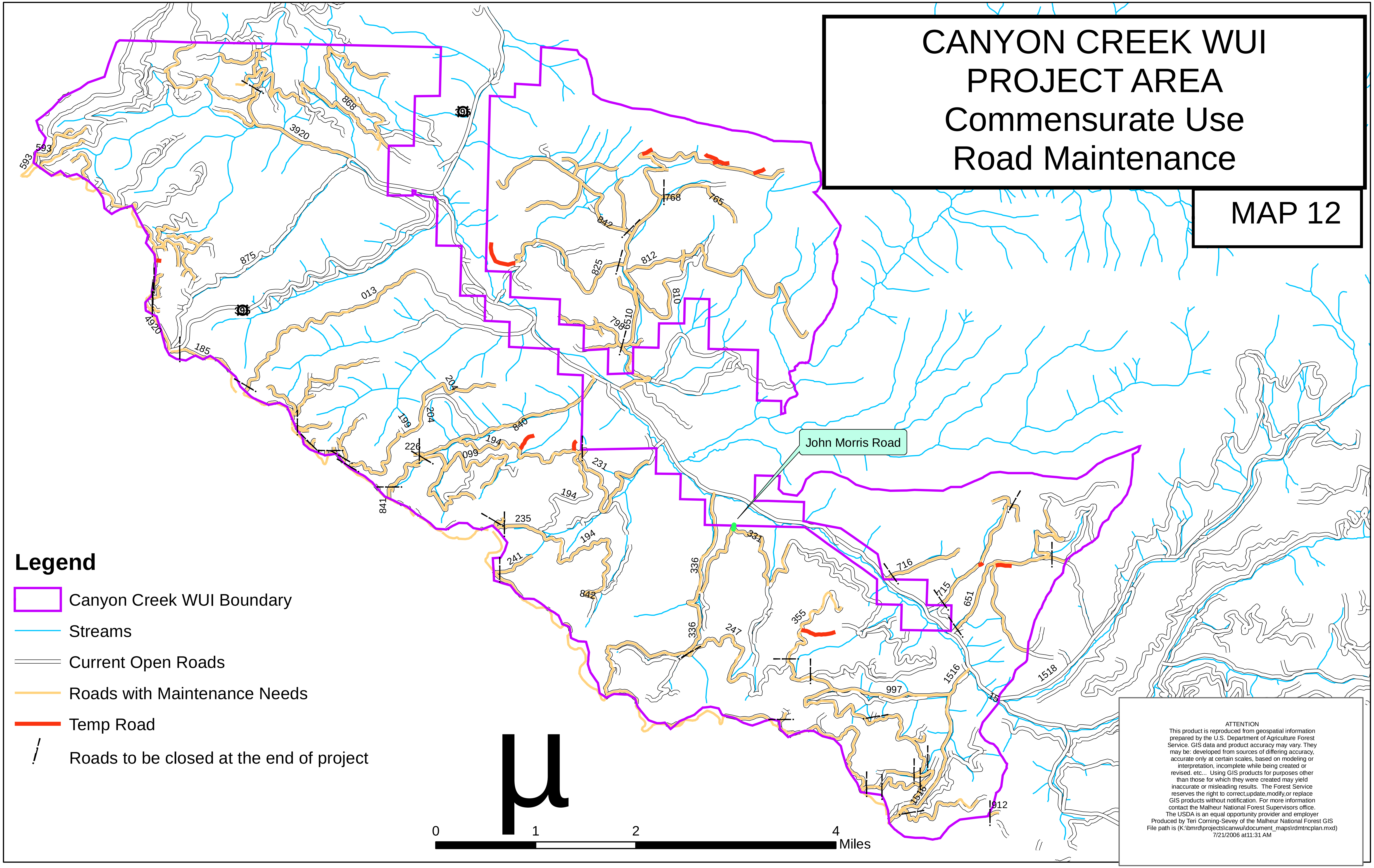
CANYON CREEK WUI
PROJECT AREA
Commensurate Use
Road Maintenance
MAP 12
Legend
Canyon Creek WUI Boundary
Streams
Current Open Roads
Roads with Maintenance Needs
Temp Road
Roads to be closed at the end of project
John Morris Road
0
1
2
4
Miles
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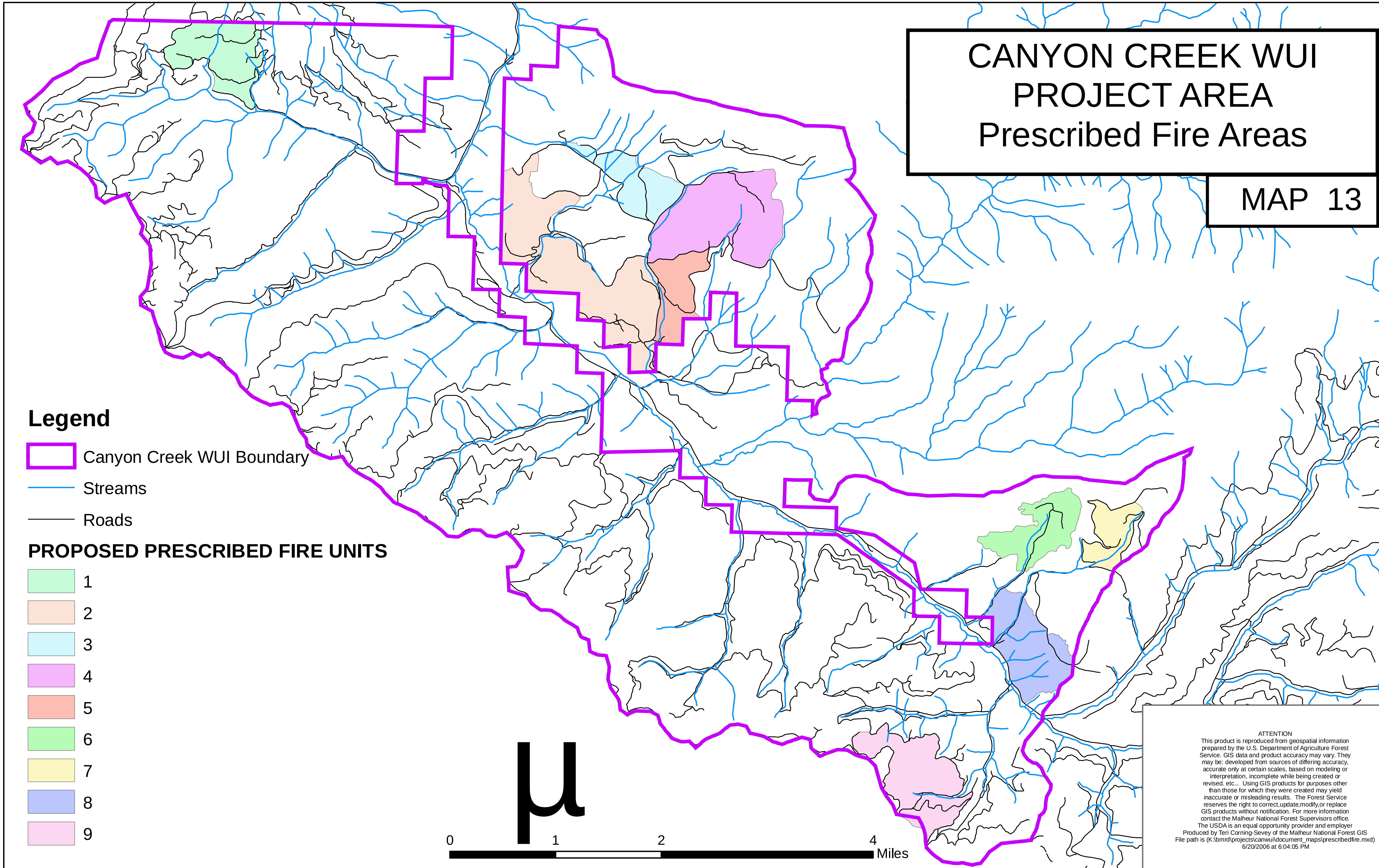
7/21/2006 at11:31 AM


CANYON CREEK WUI
PROJECT AREA
Prescribed Fire Areas
MAP 13
Legend
Canyon Creek WUI Boundary
Streams
Roads
PROPOSED PRESCRIBED FIRE UNITS
1
2
3
4
5
6
7
8
9
0
1
2
4
Miles
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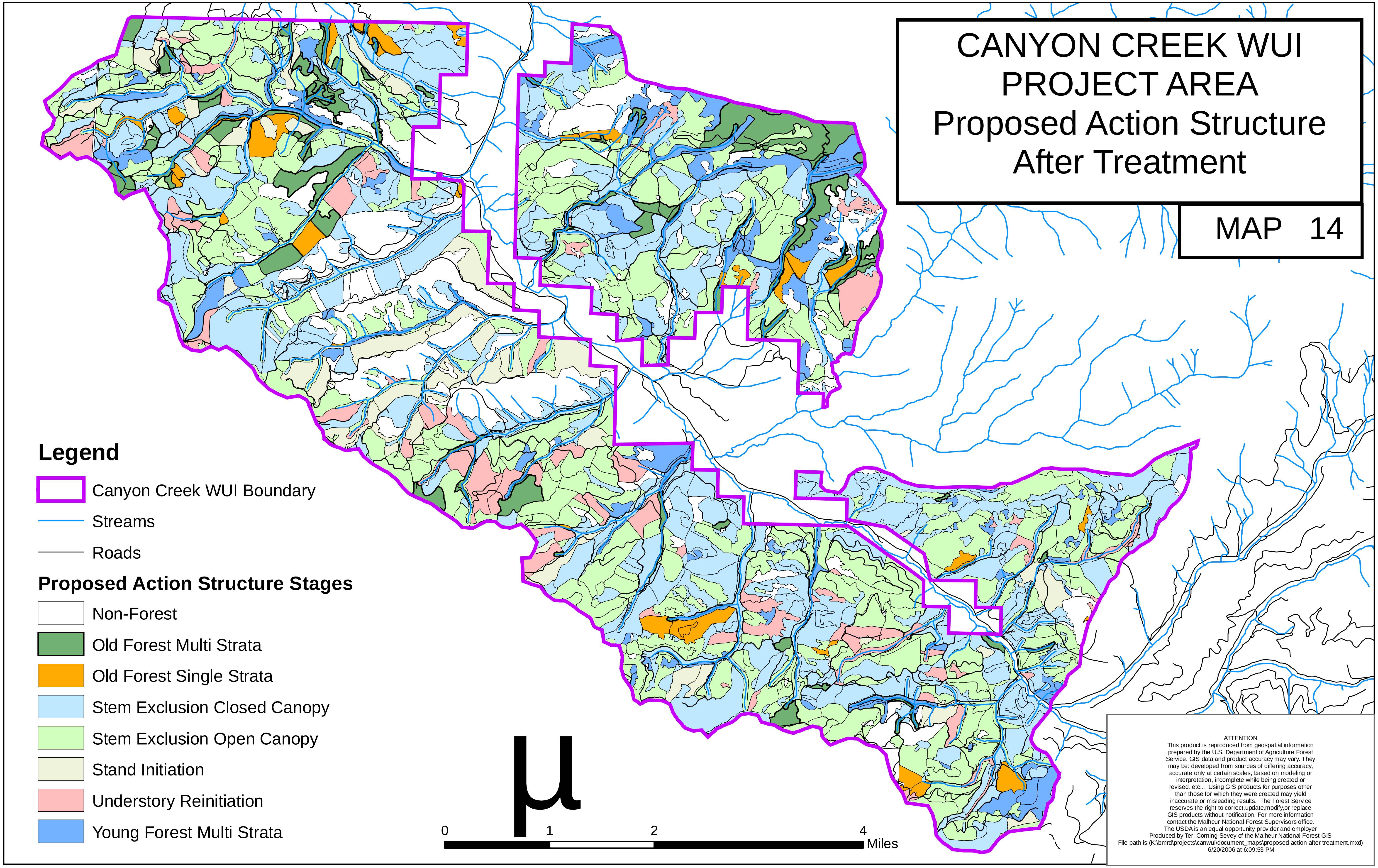
6/20/2006 at 6:04:05 PM


CANYON CREEK WUI
PROJECT AREA
Proposed Action Structure
After Treatment
MAP 14
Legend
Canyon Creek WUI Boundary
Streams
Roads
Proposed Action Structure Stages
Non-Forest
Old Forest Multi Strata
Old Forest Single Strata
Stem Exclusion Closed Canopy
Stem Exclusion Open Canopy
Stand Initiation
Understory Reinitiation
Young Forest Multi Strata
0
1
2
4
Miles
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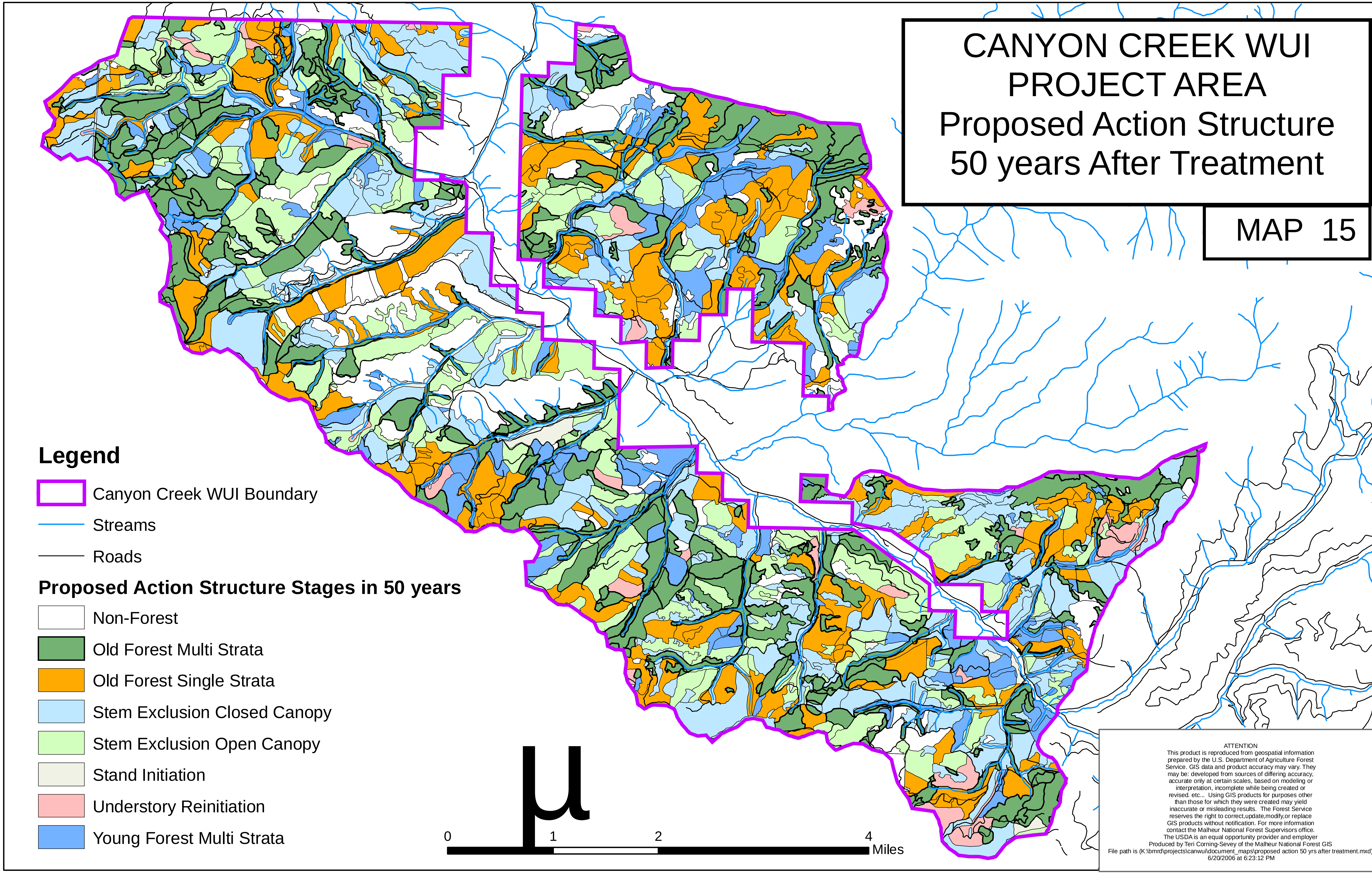
6/20/2006 at 6:09:53 PM



CANYON CREEK WUI
PROJECT AREA
Proposed Action Structure
50 years After Treatment
MAP 15
Legend
Canyon Creek WUI Boundary
Streams
Roads
Proposed Action Structure Stages in 50 years
Non-Forest
Old Forest Multi Strata
Old Forest Single Strata
Stem Exclusion Closed Canopy
Stem Exclusion Open Canopy
Stand Initiation
Understory Reinitiation
Young Forest Multi Strata
0
1
2
4
Miles
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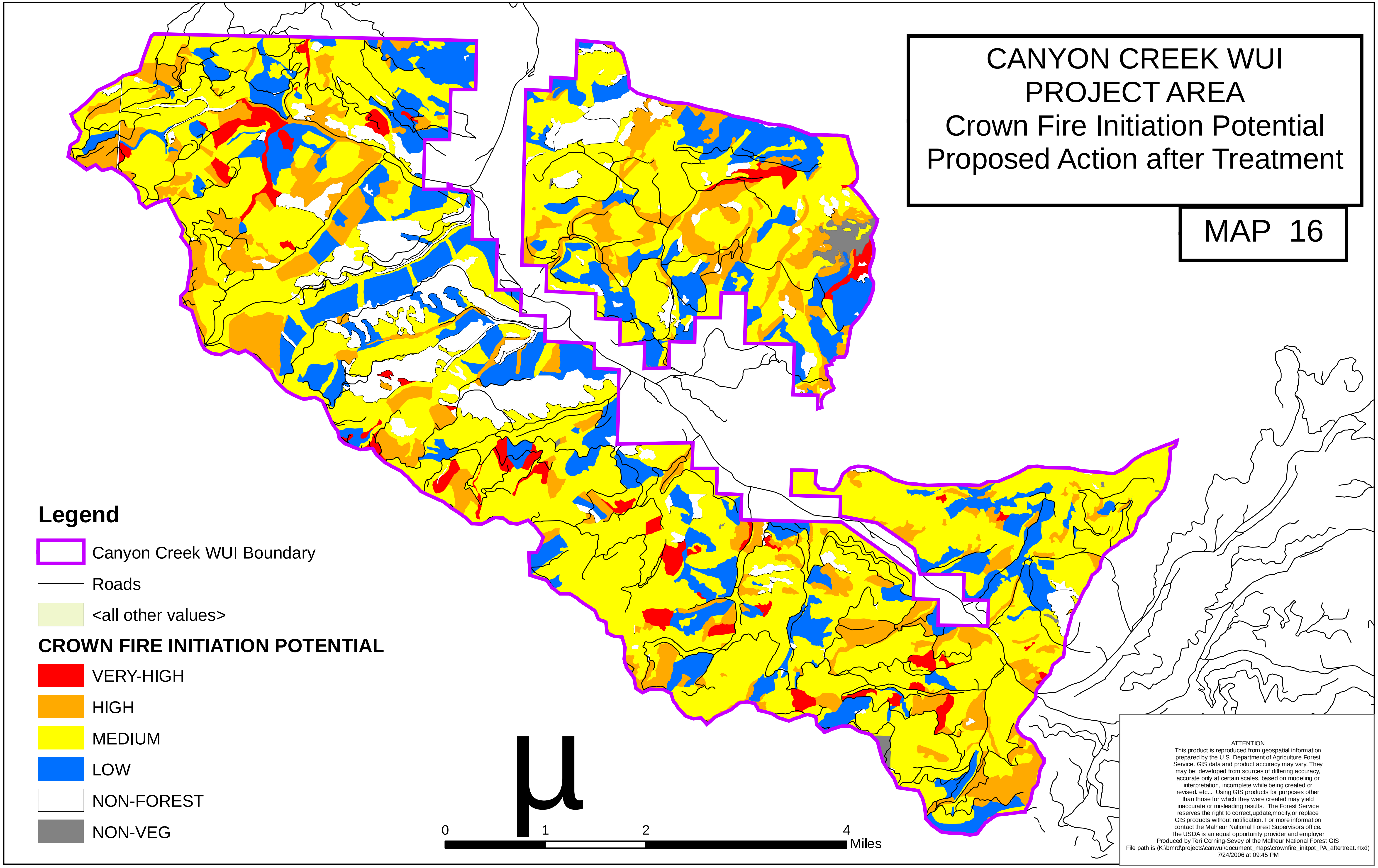
CANYON CREEK WUI
PROJECT AREA
Crown Fire Initiation Potential
Proposed Action after Treatment
MAP 16
Legend
Canyon Creek WUI Boundary
Roads
<all other values>
CROWN FIRE INITIATION POTENTIAL
VERY-HIGH
HIGH
MEDIUM
LOW
NON-FOREST
NON-VEG
0
1
2
4
Miles
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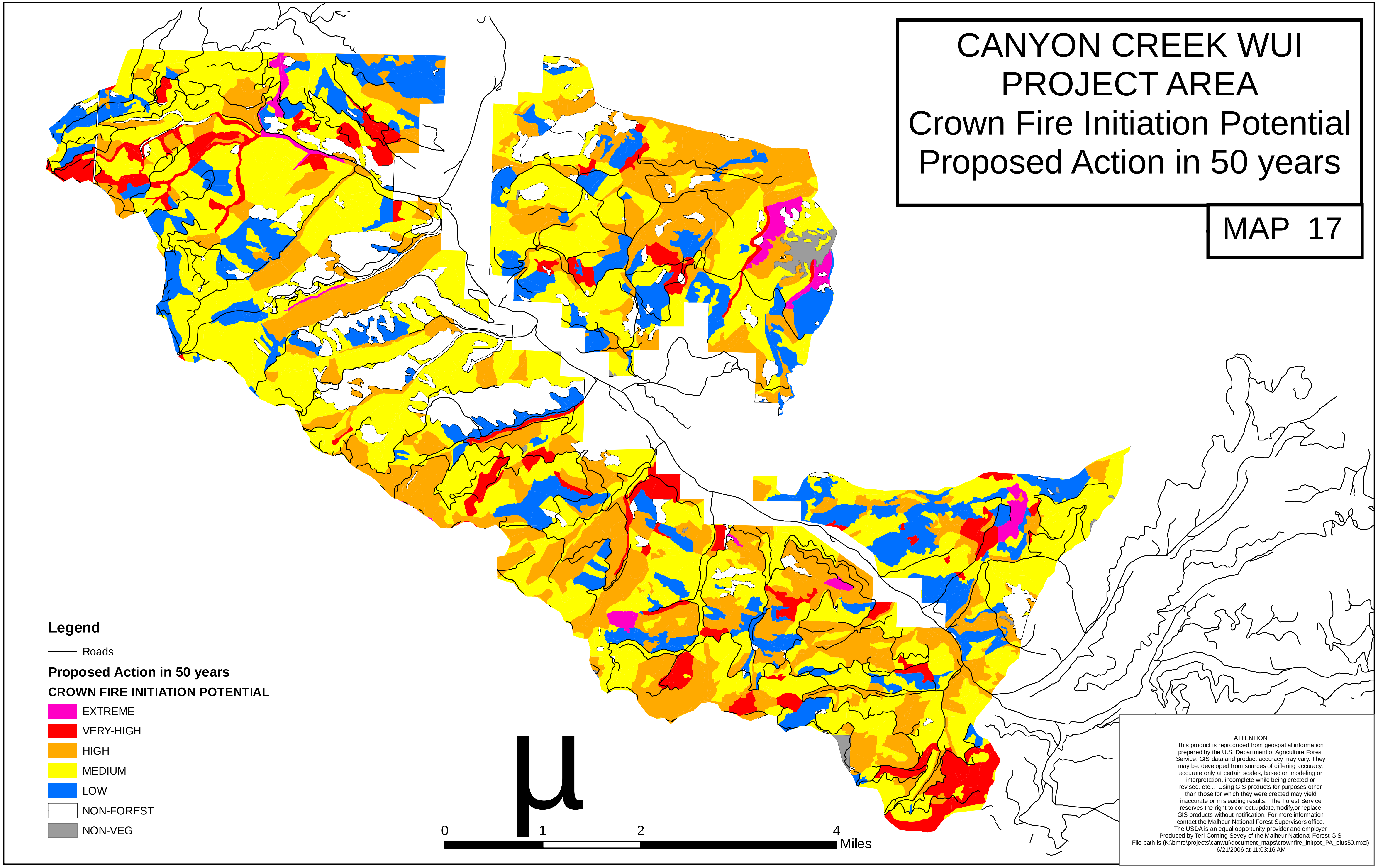
7/24/2006 at 09:45 PM


CANYON CREEK WUI
PROJECT AREA
Crown Fire Initiation Potential
Proposed Action in 50 years
MAP 17
Legend
Roads
Proposed Action in 50 years
CROWN FIRE INITIATION POTENTIAL
EXTREME
VERY-HIGH
HIGH
MEDIUM
LOW
NON-FOREST
NON-VEG
0
1
2
4
Miles
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