United States Department of Agriculture | Forest Service | Umatilla National Forest | North Fork John Day R.D.
P.O. Box 158
Ukiah, Oregon 97880

File Code: 1950 Planning

Date: April 13, 2007

Dear Interested Party;

This letter is to inform you that the Falls/Meadowbrook Environmental Assessment is nearing completion. Public comment is now being requested. This letter provides a summary of the purpose and need for action and the alternatives developed and analyzed. If you requested an EA during the scoping period, an EA will be provided with this mailing. Copies of the EA are available on request at the address found at the end of this letter or may be viewed at the website also found at *www.fs.fed.us/r6/uma/projects/readroom*

The project is located in Grant, Morrow, and Umatilla counties in eastern Oregon. The Falls portion is located between the North Fork John Day River and Forest Road 53 (Western Route) within T5S and T6S in portions of R29E and R30E. The Meadowbrook portion is located south of the North Fork John Day River and east of US Highway 395 in T7S and T8S in portions of R31E and R32E Willamette Meridian surveyed. The entire project is within the Potamus Watershed analysis area (see Figure 1).

The purpose of the Falls/Meadowbrook project is to improve the health and vigor of dry and moist upland forests and to reduce the potential for fires that would have uncharacteristic effects. The upland forests are currently outside the historical range of stand density, structural diversity, species composition and fire condition class. The Falls/Meadowbrook project Proposed Alternative would commercially treat approximately 6,327 acres, noncommercially thin 469 acres and landscape burn up to 7,130 acres to reduce live tree stocking, alter stand structure and species composition, reduce future fire severity. Three action alternatives were fully developed in addition to the Proposed Alternative. Alternative 2 would commercially treat approximately 3921 acres, noncommercially thin an additional 237 acres and landscape burn up to 17,244 acres. Alternative 3 would commercially treat approximately 5,113 acres, noncommercially thin an additional 469 acres and landscape burn up to 5,907 acres. Alternative 4 would commercially treat approximately 4,990 acres, noncommercially thin an additional 237 acres and landscape burn up to 18,266 acres. No new temporary or system roads would be constructed under any of the alternatives and three road segments would be closed under each of the action alternatives. The Proposed Action and Alternatives 2 and 3 would require a site specific Forest Plan Amendment due to changes in some of the components of habitat effectiveness index (HEI) for this project only. Even though the HEI in many units would improve they would remain below the recommended levels in several areas. Alternative4 would not affect any of the components of HEI so no Forest Plan Amendment would be necessary.

This comment period is intended to provide those interested in or affected by this proposal an opportunity to make their concerns known prior to a decision being made by the Responsible Official. Those who provide timely and substantive comments will be eligible to appeal the decision pursuant to 36CFR part 215 regulations.

How to Comment and Comment Timeframe

Written, facsimiled, hand-delivered, oral, and/or electronic comments concerning this action will be accepted for 30 calendar days following notice publication (April 13, 2007) in the *East Oregonian* (Pendleton, OR). The publication date in the newspaper of record is the exclusive means for calculating the comment period for this proposal. Those wishing to comment should not rely upon dates or timeframe information provided by any other source. The regulations prohibit extending the length of the comment period.

Written comments must be submitted to: Craig Smith-Dixon, District Ranger, P.O. Box 158, 401 Main St., Ukiah, Oregon 97880. The office business hours for those submitting hand-delivered comments are: 7:45 AM to 4:30 PM Monday through Friday, excluding holidays; the FAX number is 541-427-3018.

Oral comments must be provided at the North Fork John Day Ranger District Office during normal business hours via telephone 541-427-3231 or in person. Electronic comments must be submitted as part of the actual email message, or as an attachment in a format such as an email message, plain text (.txt), rich text format (.rtf), Word (.doc) or portable document format (.pdf) only to:

comments-pacificnorthwest-umatilla-northfork-johnday@fs.fed.us

E-mails submitted to e-mail addresses other than the one listed above, in other formats than those listed, or containing viruses will be rejected. In cases where no identifiable name is attached to a comment, a verification of identity will be required for appeal eligibility. If using an electronic message, a scanned signature is one way to provide verification.

Only those who submit timely and substantive comments will be accepted as appellants to this project; and for appeal eligibility, each individual or representative from each organization submitting substantive comments must either sign the comments or verify identity upon request. If using an electronic message, a scanned signature is one way to provide verification.

It is the responsibility of persons providing comments to submit them by the close of the comment period. It is the responsibility of persons providing comments by electronic means to ensure their comments have been received. Individuals and organizations wishing to be eligible to appeal must meet the information requirements of 36 CFR 215.6.

Additional information about the Falls/Meadowbrook project may be obtained by contacting Eric Geisler, NEPA Planner, at 541-427-5355, or at the above address.

Thank you for your interest in National Forest Management.

Sincerely,

CRAIG SMITH-DIXON
District Ranger
North Fork John Day

Enclosure

DOCUMENT STRUCTURE

The Forest Service has prepared this Environmental Assessment in compliance with the National Environmental Policy Act (NEPA), other relevant federal and state laws and regulations, and the Umatilla National Forest Land and Resource Management Plan (Forest Plan). The document is organized into five parts:

- **Purpose and Need**: includes a brief description of the area, the purpose of and need for the project, the agency's proposal for responding to that purpose and need, existing management direction, and what the decision will be based on.
- **Alternatives**: provides a more detailed description of the agency's proposed action as well as alternative methods for achieving the stated purpose and measures to mitigate resource concerns. It also details how the Forest Service informed the public of the proposal and how the public responded. A summary table comparing the predicted environmental consequences of each alternative considered completes this chapter.
- **Environmental Consequences**: describes existing resource conditions and the potential direct, indirect, and cumulative environmental effects of implementing the proposed action and its alternatives on those resources.
- **Supporting Information**: provides a list of persons, organizations, and agencies consulted during project development; preparers and contributors to the assessment; and a bibliography.
- **Appendices**: provide more detailed information to support the analyses presented in the environmental assessment.

Additional documentation, including more detailed analyses of project-area resources, may be found in the project planning record located at the North Fork John Day Ranger District Office in Ukiah, Oregon.

CHAPTER 1 - PURPOSE & NEED

BACKGROUND

The need for action in the Falls Meadowbrook area is based upon the results of the following analyses:

1. The 2004 Potamus Watershed Analysis
2. An analysis of the existing condition of the vegetation resource within the area
3. A site specific assessment of the existing condition of fuel levels within the area
4. A socio-economic analysis of resource dependent communities within Grant, Umatilla, and Morrow Counties (Blue Mountain Forest Plan Revision, 2005)
5. An analysis of the existing condition of big game habitat within the area, as measured by Habitat Effectiveness Index (HEI).

Unsustainable Forest Composition & Structure

Numerous studies, including the Interior Columbia Basin Ecosystem Management Project Scientific Assessment (1996), have described differences between the historical and current conditions of forests throughout the inland West. Forests within the Falls Meadowbrook area have been subject to the same forces and events that have resulted in forest conditions that are outside their range of historic variability[1]. Scientists working in the Blue Mountains of Northeastern Oregon have concluded that these conditions are symptoms of two underlying problems:

1. **Changes in forest composition.** Current conditions are favorable for shade-tolerant and fire-intolerant species that grow in densely stocked stands in greater numbers than what would have historically occurred.
2. **Changes in forest structure.** Harvest, fire suppression, and associated tree stress and mortality have shifted the forests in the area to earlier structural stages (defined on following pages). As a result, old forest and open-structured stands occur less frequently than the historic range of variability.

Two prominent actions that have dramatically changed forest conditions in the area are fire suppression and harvest that focused on removing the biggest trees. In the early 1900's, forest managers and local residents considered all forest fires to be bad because of the negative consequences they can have on homes, grazing pastures, and trees that were needed for lumber and other wood products. As a result, most fires that have

[1] Historic Range of Variability is an indicator of ecological sustainability. Historical conditions are believed to reflect sustainable conditions given the premise that native species evolved with and are adapted to the historic disturbance system of an area. The "range of variability" is a spread of numbers showing minimum and maximum amounts (e.g. trees per acre or percent species composition) to reflect that conditions weren't exactly the same on every acre of land.

occurred within the Falls Meadowbrook area in the past 90 years have been actively suppressed. This has allowed fire-intolerant species (such as grand fir) to increase in numbers and mature. Coupled with 60 years of harvesting primarily mature ponderosa pine from these forests, many stands within the Falls Meadowbrook area were left in a condition that is far outside the historic range of variability for trees per acre, basal area per acre, and tree species occupying the site. These conditions are not sustainable over time due to natural forces at work in these forests (ICBEMP-SA 1996; Powell 1999).

Local changes in the Falls Meadowbrook area that have occurred over the past 20 years provide compelling evidence that forests in their current condition are not sustainable. During the 1980s and 90s, a succession of dry years caused moisture-loving trees (such as Douglas-fir and grand fir) to become stressed. In their stressed condition, these forests became more susceptible to defoliating insects, bark beetles, and fungal diseases. This, coupled with previous harvest, caused a loss of old forest structure, which is currently below historic levels throughout this area.

The resulting mortality within these forests also increased dead fuel loadings, both on the ground and vertically, making forests more susceptible to large, lethal fires. The Potamus Watershed Analysis found almost 60 percent of upland-forest sites within its analysis area have fire regimes with moderate or high departures from their characteristic composition, structure and density. These altered areas (fire regime condition class 2 or 3) are not sustainable (Powell 2004).

The Potamus Watershed Analysis contains an historic range of variability analysis that compares current and historic stand composition and structure in the Potamus ecosystem (Powell 2004). The analysis revealed:

- Dry-forest sites currently support too much of the interior Douglas-fir and grand fir forest cover types and too little of the ponderosa pine forest cover type;
- Moist-forest sites support too much of the interior Douglas-fir forest cover type and too little of the western larch forest cover type;
- Cold-forest sites support too much of the grand fir, grass-forb, and interior Douglas-fir cover types and too little of the spruce-fir cover type;
- The stand initiation[2] and stem exclusion[3] open canopy structural classes are above the upper limit of their historic ranges for cold and moist upland forests;
- The stem exclusion closed canopy and understory re-initiation[4] structural classes are above the upper limits of their historic ranges for dry upland forests;

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[2] The **stand initiation** stage begins immediately after a disturbance that removes vegetation, usually by fire or harvesting. More water, nutrients, and sunlight become available on the site allowing new species (herbs, shrubs, and trees) to become established. This includes many different species with various degrees of shade tolerance and different regeneration habits. The species that grow best are generally intolerant of shade (herbaceous plants, shrubs, and some trees like ponderosa pine and western larch).

[3] The **stem exclusion** stage takes over when sunlight, moisture, or nutrients become limiting, preventing the further establishment of new plants. Some herbaceous species disappear and the main canopy is dominated by trees. The new stand occupies the site completely, and plants must compete for nutrients, moisture, and light.

[4] The **understory reinitiation** stage begins when trees in the main canopy begin to die, either singly or in small groups, from lightning, windthrow, or insects and disease. The resulting gap in the canopy allows sunlight, moisture, and nutrients formerly used by the dead tree to be used by the surviving vegetation. Enough sunlight may penetrate to the forest floor to support the establishment of new trees.

- Old forest structure is below the lower limits of the historic ranges for cold and dry upland forests;
- Young multi-layered forest structure is below the lower limits of the historic ranges for moist forests.

Big Game Habitat Effectiveness

The Forest Plan designated 22,442 acres of the Falls Meadowbrook analysis area to be managed as C3-Big Game Winter Range. The goal of this designation is to "manage big game winter range to provide high levels of potential habitat effectiveness and high quality forage for big game species" (Forest Plan page 4-151).

The Forest Plan chose Habitat Effectiveness Index (HEI), percent satisfactory cover, and percent total cover as standards for assessing the quality of big game winter range habitat. HEI calculations for this project reveal current deficiencies in the Monument, Bone Point, and Desolation winter ranges (Table 1**)**. Satisfactory cover is also deficient in the Bone Point Winter Range.

Table 1. Big game habitat conditions in winter ranges that overlap the Falls/Meadowbrook analysis area (shading indicates where conditions do not meet Forest Plan Standards)

Winter Range	Forest Plan Mgt. Area	Forest Plan Standard			Existing Condition		
		Sat. Cover (%)	Total Cover (%)	HEI	Sat. Cover (%)	Total Cover (%)	HEI
Monument	C3	10	30	70	10.2	42.5	69
Bone Point	C3	10	30	70	8.3	53.4	68
Desolation	C3	10	30	70	22.2	60	63
Desolation	C4	15	30	60	30.6	64.7	63
Potamus	E2 (east)	10	30	45	11.2	60.7	55

Field reconnaissance of forest vegetation within the Falls Meadowbrook analysis area revealed that approximately 14% of the winter range areas (3,049 acres) have unsustainable species compositions or stand densities. Based on local insect, disease, and fire trends over the past 20 years, the future health of these stands and associated wildlife cover appears questionable.

PURPOSE AND NEED FOR ACTION

The purpose of the Falls Meadowbrook Vegetation Management project is to improve sustainability and fire resistance of upland forests in the analysis area that are currently outside their historic range of variability for composition, structure, and fire regime condition class.

To accomplish this, there is a need to amend the Regional Forester's Amendment #2 to allow treatment in some old forest single stratum dry forest sites (one of the forest components that is currently below its historic range of variability).

Some of the areas needing improved sustainability and fire resistance occur in old forest single stratum dry upland forest, which is currently below its historic range of variability. To treat these stands, an amendment of the Regional Forester's Amendment #2 (Eastside Screens—see page XX) is needed.

A need exists to reduce fuels and stand densities and restore appropriate species in old forest single stratum dry upland forest. This dry upland forest structural stage is currently below its historic range of variability, so an amendment of the Regional Forester's Amendment #2 (Eastside Screens—see page XX) is needed.

There is also a need to capture the commercial value of trees that are removed. In addition, a need exists to improve the sustainability of some stands that provide cover in big game winter range. Addressing this need would require a Forest Plan amendment, because cover is a component of the HEI formula and HEI is currently below Forest Plan standards in the Bone Point, Desolation, and Monument winter ranges.

PROPOSED ACTION

The North Fork John Day Ranger District of the Umatilla National Forest proposes to treat approximately 6,704 acres in the Falls/Meadowbrook area. This area is located in the southwest part of the North Fork John Day Ranger District (Figures _____) within Umatilla, Morrow, and Grant counties, Oregon. Treatments would occur within the following sections (Willamette Meridian surveyed):

Township	**Range**	**Sections**
5 South	29 East	9, 15, 16, 22, 24, 25, 26, 28, 34, 35, 36
5 South	30 East	31
6 South	29 East	1, 2, 11, 12, 13, 14, 15, 22, 24
7 South	31 East	5, 7, 8, 9, 18, 19, 20, 25, 27, 28, 30, 31, 32, 33, 34
8 South	31 East	1, 2, 11, 12, 13, 14, 23, 24
8 South	32 East	5, 9, 10, 14

Treatments are proposed as follows:

Treatment (definitions follow below)

Thinning harvest

Mechanical non-harvest thinning

Combined thinning harvest & non-harvest thinning

Harvest of heavily pest-infested stands

Combined harvest of heavily pest-infested stands

& non-harvest thinning

	Acres
	1,347
	469
	3,289
	1,392
	207

Thinning harvest would remove trees from the understory (the tallest trees would remain) to reduce the number of trees per acre to a sustainable level as indicated by the applicable historic range of variability. Trees that are cut would be sold to recover their economic value. Stands would remain fully stocked after harvest is complete.

Harvest of stands heavily infested with insects or disease would involve removal of dead, infested, and susceptible trees. On approximately 11 acres, the entire overstory would need to be removed due to a widespread infestation of dwarf mistletoe. The remaining acres in this category have lesser infestations of insects or disease so some overstory trees would remain. Where available, about 12-15 overstory trees would be left per acre on dry sites or 25 overstory trees per acre would remain on moist sites. All stands treated in this manner would be reforested with less susceptible species. Harvest of pest-infested stands, together with the thinning harvest described above, would produce an estimated 14,775 hundred cubic feet (Ccf) of merchantable material.

Mechanical non-harvest thinning would remove trees less than 9 inches diameter at breast height. Thinning would be done using chainsaws or other mechanical methods (slashbuster, chipping, grapple piling, etc.). If chainsaws are used for non-harvest thinning, cut trees would be lopped and scattered or hand-piled and burned when conditions permit. Stands would be fully stocked after thinning and no reforestation would be necessary.

Tree seedlings would be planted on about 1,622 acres to achieve desired stocking and shift stand compositions. Prescribed fire would be used as needed to prepare sites for seedling planting. Vexar® tubing would be placed around planted seedlings to control animal damage.

Fuel loads in treatment units would be reduced to Forest Plan standards using machines or prescribed fire. Up to 93 miles of fire control lines could be built by tractor or hand if prescribed fire is used.

Soil disturbance and compaction would be rehabilitated using subsoiling or scarifying, waterbars, seeding with native seed, and mulching as necessary to retain soil on site. Noxious weeds in close proximity to disturbed soil would be treated, including about 130 acres (16 sites) of known weed infestations (see Map XX).

All activities would be accomplished using existing system roads; no new or temporary road construction would occur. Approximately 98 miles of open and seasonally open roads would be maintained. Also the road surface would be reshaped on 3 miles of Forest Road 3900900 (a spur off of Highway 395). Approximately 36 miles of closed roads would be temporarily re-opened to access treatment units. These roads would be re-closed following the completion of activities. Snowplowing could occur on portions of

roads outside of big game winter range (specifically Forest Roads 53, 5316, 5320, 5327, and associated spurs).

The Forest Supervisor proposes to amend the Forest Plan (page 4-152) as follows:

- In Bone Point Winter Range, HEI would change from 70 to 68
- In Desolation Winter Range, HEI would change from 70 to 63
- In Monument Winter Range, HEI would change from 70 to 69

This amendment would only apply to these three winter ranges for the duration of the Falls Meadowbrook project.

The Forest Supervisor also proposes to amend the Regional Forester's Amendment #2 wildlife standard at page 9, section, 6(d) which currently states: *"If either one or both of the late and old structural (LOS) stages falls BELOW HRV in a particular biophysical environment within a watershed, then there should be NO NET LOSS OF LOS from that biophysical environment. DO NOT allow timber sale harvest activities to occur within LOS stages that are BELOW HRV."*

The new amendment would add the following paragraph: *"An exception to this occurs in the Falls Meadowbrook area in dry upland forest with old forest single stratum structure. XX acres can be treated to prevent existing insect and disease centers from spreading to adjacent stands and to reduce stress on the trees that would remain in the treated stands."*

This proposed action could be implemented as early as the fall of 2007. See the Proposed Action in Chapter 2 for more detail.

MANAGEMENT DIRECTION

This Environmental Assessment (EA) process and documentation have been completed in accordance with direction contained in the *National Forest Management Act*, the *National Environmental Policy Act*, the Council on Environmental Quality regulations, the *Clean Water Act*, the *Clean Air Act*, and the *Endangered Species Act*.

This EA is tiered to the *Umatilla National Forest Land and Resource Management Plan Final Environmental Impact Statement, Record of Decision*, and the accompanying *Land and Resource Management Plan* (USDA 1990), dated June 11, 1990. The Forest Plan provides programmatic direction for the entire Forest. The Forest Plan does this by assigning parts of the Forest to different resource emphasis areas or "management areas". The Forest Plan then prescribes the type and intensity of management that may occur within each management area. This EA documents the site-specific implementation of the Forest Plan in the Falls Meadowbrook analysis area.

The sections that follow describe the goals of management areas that would be affected by proposed treatments. See Map XX for locations of these management areas and refer to Land and Resource Management Plan, Umatilla National Forest, pages 4-99 to 4-186 for detailed descriptions.

A3- Viewshed 1

Goal: Manage the area seen from a primary travel route, use area, or water body, where forest visitors have a major concern for the scenic qualities (Sensitivity Level 1) as a natural appearing landscape.

Proposed Activities	Acres
Combination thinning harvest and non-harvest thinning	304
Mechanical non-harvest thinning	231
Total	**535**

C3- Big Game Winter Range

Goal: Manage big game winter range to provide high levels of potential habitat effectiveness and high quality forage for big game species.

Proposed Activities	Acres
Thinning harvest	765
Harvest of pest infested stands	536
Combined thinning harvest & non-harvest thinning	1,633
Combined harvest of pest infested stands & non-harvest thinning	74
Mechanical non-harvest thinning	39
Total	**3,049**

C4- Wildlife Habitat

Goal: Manage forest lands to provide high levels of potential habitat effectiveness for big game and other wildlife species with emphasis on size and distribution of habitat components (forage and cover areas for elk, and snags and dead and down materials for all cavity users). Unique wildlife habitats and key use areas will be retained or protected.

Proposed Activities	Acres
Combined thinning harvest & non-harvest thinning	1
Harvest of pest infested stands	69
Combined harvest of pest infested stands & non-harvest thinning	133
Total	**204**

C5- Riparian (Fish & Wildlife)

Goal: Maintain or enhance water quality, and produce a high level of potential habitat capability for all species of fish and wildlife within the designated riparian habitat areas while providing for a high level of habitat effectiveness for big game.

Proposed Activities	Acres
Thinning harvest	5
Combined thinning harvest & non-harvest thinning	64
Harvest of pest infested stands	1
Total	**70**

E2- Timber and Big Game

Goal: Manage forest lands to emphasize production of wood fiber (timber), encourage forage production, and maintain a moderate level of big game and other wildlife habitat.

Proposed Activities	Acres
Thinning harvest	667
Combined thinning harvest & non-harvest thinning	1,285
Harvest of pest infested stands	785
Mechanical non-harvest thinning	198
Total	**2,935**

Regional Forester's Forest Plan Amendment No. 2 (Eastside Screens)

The Regional Forester's Forest Plan Amendment #2, *Continuation of Interim Management Direction Establishing Riparian, Ecosystem, and Wildlife Standards for Timber Sales* (Eastside Screens), established additional management direction regarding riparian area buffers, structural diversity, connectivity of late/old structure, retention of snags and downed wood, and goshawk nest-sites on National Forests east of the Cascades. Details of the Eastside Screens amendment can be found in the analysis file for the Falls Meadowbrook project.

Forest Plan Amendment #10 (Pacfish)

The Forest Plan was also amended in 1995 by Plan Amendment #10, *Interim Strategies for Managing Anadromous Fish-producing Watersheds in Eastern Oregon and Washington, Idaho, and Portions of California (*PACFISH). The PACFISH amendment provided further protection for fish habitat, particularly regarding activities within riparian areas, to arrest and reverse the decline in anadromous fish habitat in the Pacific Northwest Region. Details of the PACFISH amendment can be found in the analysis file for the Falls Meadowbrook project.

OTHER TIERING & INCORPORATION BY REFERENCE_

This Environmental Assessment is also tiered to the *Pacific Northwest Region Invasive Plant Program: Preventing and Managing Invasive Plants, Final Environmental Impact Statement* (referred to as "Regional Weed EIS") and its Record of Decision (2005). This EIS amended the Umatilla Forest plan with goals, objectives, and standards that complement and lend further weight to the Best Management Practices already in effect on the Umatilla. The R6 Weed EIS standards also prescribe prevention, cleaning of equipment, use of weed-free straw and mulch, use of weed-free rock and gravel sources, and prompt revegetation with native species or non-invasive non-natives.

This EA also incorporates by reference the following:

- Best Management Practices, which identify methods for protection of water, soil, and vegetation.
- The 1999 Executive Order on invasive species (Forest Service Manual 2080), which details National strategies for noxious weed management, and the Pacific Northwest Region's Mediated Agreement of May 24, 1989, which identifies prevention as the preferred strategy for managing competing and unwanted vegetation.
- North Fork John Day District *Wildlife Tree and Down Wood Guidelines* letter dated March 22, 1996 (which provides direction on the number and distribution of snags to retain in harvest units);
- Environmental Assessment for the Management of Noxious Weeds and its Decision Notice dated May 24, 1995 (which identifies prevention and appropriate treatment methods for known noxious weed populations);
- Environmental Assessment for the North Fork John Day Motorized Access and Travel Management Program and its Decision Notice dated June 5, 1990 (which provides District-wide direction on the management of roads and OHV trails, both open and closed)
- Potamus Ecosystem Analysis (which is a watershed-level ecosystem analysis of current and reference conditions, along with recommendations for restoration)
- Other sources of information cited in this EA and its analysis file, such as specialist reports, published studies, and books. The analysis file is available for review at the North Fork John Day Ranger District, Main Street (Highway 244), Ukiah, Oregon, 97880.

DECISION TO BE MADE

The Deciding Official for this project is Kevin Martin, Umatilla National Forest Supervisor. The Deciding Official will decide whether to implement the proposed action, another action alternative, or the no action alternative, and his decision will be based on the following criteria:

• Reponsiveness to HRV	Which alternative best achieves stocking, structure and species composition conditions that are more consistent with the historical range of variability?
• Short-term and Long-term risks	Which alternative best balances short-term risk of resource impacts from thinning and harvest with the long-term risk of resource impacts from doing nothing?
• Commercial Value	Which alternative maximizes the recoverable value of timber and thinning material?

If implementation is chosen, the Deciding Official will also determine:

- Whether a Forest Plan amendment is necessary
- What, if any, measures are needed to mitigate potential undesired effects
- What monitoring requirements are needed to assure the selected alternative and mitigation are implemented as designed and are effective

CHAPTER 2 – ALTERNATIVES

This chapter describes in detail and compares the Proposed Action, No Action, and two alternative ways to manage forest vegetation in the Falls Meadowbrook analysis area. A team of resource specialists ("Interdisciplinary Team"—see Chapter 4, List of Preparers) developed these alternatives within the framework of the Forest Plan and applicable laws. These alternatives were designed to address or resolve the significant issues identified through public involvement and cause/effect analysis. Each action alternative was also required to respond to the purpose and need for the project (identified in Chapter 1). This chapter is divided into the following sections:

- Issues and Public Involvement
- Alternative Development (including a description of each alternative)
- Standard Operating Procedures
- Monitoring
- Potential Knutsen-Vandenburg Projects
- Comparison of the Alternatives

ISSUES & PUBLIC INVOLVEMENT

"Issues" are potential conflicts that could occur as a result of the proposed action. The Forest Service encourages public involvement in the identification of issues and development of alternatives to the proposed action. A description of this project was sent to the public (see Chapter 4 for a list of contacts) inviting them to comment on the potential conflicts posed by the proposed action. These comments were then used to identify issues, alternatives to the proposed action (including mitigation), and the extent of environmental analysis necessary for making an informed decision. The issues also help display differing resource effects between the proposed action and its alternatives. A summary of effects is presented at the end of this chapter, with more details discussed in Chapter 3.

Public involvement for this EA began when the project was listed in the Summer 2005 quarterly edition of the Umatilla National Forest Schedule of Proposed Activities. Letters were also sent on December 1, 2005 to three local Tribes and 69 organizations, individuals, and other agencies that had indicated an interest in this type of project. These efforts produced responses from the following:

- Chandra LaGue, Oregon Natural Resources Council
- Karen Coulter, Blue Mountains Biodiversity Project/League of Wilderness Defenders
- Steve Cherry and Darren Bruning, Oregon Dept. of Fish & Wildllife
- Asante' Riverwind, Sierra Club

These responses were then evaluated as to whether they presented an issue or alternative, indicated scope or method of analysis, referenced pertinent research, or provided an opinion. This evaluation is contained in the project analysis file at the North Fork John Day Ranger District, along with the original comments.

The Interdisciplinary Team also considered potential issues not identified during the comment period, but which could have effects based on past experience and public comments from previous, similar projects. All issues associated with the proposed action are discussed below.

Issues Related to Biophysical Resources

Big Game Cover

Proposed harvest could decrease the density of the canopy (converting big game satisfactory cover to marginal cover or marginal cover to forage) in the Monument, Bone Point, and Desolation winter ranges, which already do not meet some Forest Plan standards for winter range. The Oregon Dept. of Fish and Wildlife commented that *"Continued forest plan amendments to HEI and cover in winter range could cumulatively reduce thermal protection for herds that use these areas*." Several commenters requested that the District explore other options or mitigate for lost cover instead of amending the Forest Plan.

Proposed harvest and thinning also reduces vegetation that hides animals from human disturbance. This is particularly true in big units and units that would not remain fully stocked after harvest. Coupled with increasing human use of this area (mushroom hunting, big game hunting, driving, and other recreational activities) and ineffectiveness of some road closures, loss of thermal and hiding cover could add to disturbance and stress on big game animals. Response of the proposed action and its alternatives to this issue will be measured using the following criteria:

- Habitat Effectiveness Index (considers amount of thermal and marginal cover, its proximity to forage, road densities, and fragmentation of habitat)
- Miles of road closed/change in road density
- Number of improved closures on currently closed roads Predicted response of animals to habitat changes

Snag and Down Wood Habitat

Snags and down wood provide important habitat for many wildlife species. Proposed harvest and prescribed burning could reduce the amount of this type of habitat. Snags that are retained in harvest units could be more susceptible to falling during high wind. Also, removing live cover from around snags would reduce protection for animals that use snag and down wood habitat, exposing them to predators. Response of the proposed action and its alternatives to this issue will be measured using the following criteria:

- predicted snag loss within treatment units based on logging system, and effect of treatment activities on snag densities at the watershed (snag analysis area) scale
- Predicted effectiveness of snag retention measures
- Comparison of pre-and post-harvest snag densities with DecAid species curves

Late/Old Structure Habitat

Past harvest, other treatments, and insect/disease epidemics have reduced the amount of late old structure habitat as well as reduced the connective corridors between remaining late old structure stands. Proposed harvest and fuels treatments (including burning) would have the potential to further reduce this habitat type. Response of the proposed action and its alternatives to this issue will be measured using the following criteria:

- Percent of Late/Old structure affected by proposed activities
- Effects on habitat and associated late and old structure-dependent species.
- Spatial comparison of pre- and post-harvest connectivity between Late Old Structure habitats (discussion of Eastside Screens) Species of Interest

Proposed treatments could reduce habitat for species of interest like the Northern goshawk. Also, application of fire often occurs in the spring because the cool temperatures and moisture aid in fire control. Spring is a critical and vulnerable time for fledging of birds, small mammal reproduction in burrows, and sensitive plant flowering and seeding. These species could be disturbed or killed by burning activities, particularly neotropical migratory birds, which are protected under the Neotropical Migratory Bird Treaty Act. Response of the proposed action and its alternatives to this issue will be measured using the following criteria:

- Acres of potential foraging and nesting habitat for goshawk, olive sided flycatcher, and upland sandpiper that would be affected by activities
- Loss of potential roosts (snags) for forest dwelling bats at the unit and watershed scales.
- Acres of Old Forest Single Stratum habitat for white headed woodpecker restored in short and long term.
- Acres of potential habitat for Lewis woodpecker affected.
- Acres of each neotropical bird habitat type affected and resulting impacts on associated bird species;
- Short and long term impacts of underburning on various habitat types and their associated species.

Threatened, Endangered, Proposed, and Sensitive Species

The proposed action would change the composition and structure of wildlife and plant habitat within the Falls Meadowbrook analysis area, which could affect Threatened, Endangered, Proposed, or Sensitive species. Based on local surveys and monitoring,

as well as published literature regarding distribution and habitat use, the following Threatened, Endangered, Proposed, or Sensitive species have the potential to occur in or adjacent to the analysis area: gray wolf, California wolverine, Columbia spotted frog, painted turtle, bald eagle, peregrine falcon, upland sandpiper, grey flycatcher, Canada lynx, yellow-billed cuckoo, Rocky Mountain big horn sheep, steelhead, spring Chinook, redband trout, California floater, *Carex crawfordii, Carex interior*, and *Silene spaldingii* (the last three are plants). Response of the proposed action and its alternatives to this issue will be measured using the following criteria:

- Effects of treatment activities on federally listed species habitat and populations

Soil

Proposed landings, construction of fireline, and burning of activity debris piles could compact soil and expose it to erosion. In particular, some people commented that 93 miles of fire line is excessive and proposed use of existing fire barriers to reduce effects on soils. Also, burning of large piles can create enough heat to sterilize the soils beneath, and create hydrophobic conditions, exposing those sites to erosion for a longer period. Response of the proposed action and its alternatives to this issue will be measured using the following criteria:

- Percent of soil exposure across the treatment area
- Percent of soil disturbance across the treatment area

Fish Habitat

There are two species of salmonids that use streams within the Falls/Meadowbrook analysis area: steelhead and redband trout. Steelhead have been listed as a Threatened species under the Endangered Species Act. Soil disturbance created by proposed use of heavy equipment, construction of 93 miles of fireline, and burning could result in sediment reaching streams and degrading fish habitat. Prescribed burning in the riparian areas could remove vegetation that would filter out sediment before it reaches streams. Such fire could also kill overstory trees that shade the stream from high temperatures. Response of the proposed action and its alternatives to this issue will be measured using the following criteria:

- Proximity of activities to Riparian Habitat Conservation Areas
- Amount of sediment expected to reach the streams (displayed as embeddedness)
- Percent of Riparian Habitat Conservation Areas vegetation removed by fire
- Predicted response of fish to potential habitat changes

Invasive Plants

Use of large machines for harvest and thinning would remove existing vegetation and disturb soil in some areas, creating opportunities for invasive plants. In addition, commentors are concerned that the proposed 93 miles of fireline would *"disrupt plant*

continuity… and open up vectors for invasive weed introduction and dispersal". Reseeding of disturbed soil could also introduce invasive plants.

In addition, 16 populations of weeds within the analysis area cannot currently be treated with herbicides because site-specific NEPA analysis of their treatment has not been completed. The proposed action would add these sites to the treatment schedule used on other weed sites throughout the analysis area. One commentor was concerned that "*Any herbicide or biocontrol use on the 16 new invasive plant populations not authorized for control should await the outcome of the new Region 6 Invasive Plant Management Plan"*. Response of the proposed action and its alternatives to this issue will be measured using the following criteria:

- Proximity of activities to existing invasive plant populations
- Effectiveness of proposed weed prevention measures

Issues Related to Social, Cultural, & Economic Concerns

Treaty Rights

The Falls Meadowbrook analysis area lies within the area ceded to the United States Government by the Confederated Tribes of the Umatilla Indians (CTUIR) as a result of the Treaty of 1855. Specific treaty rights applicable to this land base are generally articulated in Article I of the CTUIR Treaty of 1855 and include:

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

Although the 1855 treaties do not specifically mandate the federal government to manage habitats, there is an implied assumption that an adequate reserve of water be available for executing treaty-related hunting and fishing activities. Proposed activities have the potential to change habitats for wildlife, cultural plants and fish, which could then affect treaty rights of local tribes. Response of the proposed action and its alternatives to this issue will be measured using the following criteria:

- Discussion of how proposed activities could affect treaty rights (fish, wildlife, and cultural plant habitat)

Cultural Resources

Proposed thinning, harvest, roadwork, and burning have the potential to disturb artifacts of cultural significance, reducing their value for interpretation. Response of the proposed action and its alternatives to this issue will be measured using the following criteria:

- Proximity of known cultural sites to proposed activities

- Number of affected sites that are potentially eligible for the National Register of Historic Places
- Effectiveness of proposed protection measures

Unroaded Areas

ONRC provided a map with areas that they consider to be roadless and > 1,000 acres. They pointed out that some of the proposed units in the Falls area occur within these unroaded areas. Another commentor was concerned that proposed actions *"stay out of Potamus Canyon, which is a roadless area suitable for Wilderness Area designation."* Response of the proposed action and its alternatives to this issue will be measured using the following criteria:

- Treated acres within Potamus Canyon and areas identified by ONRC
- Discussion of predicted effects on roadless character and eligibility for wilderness designation

Access

Proposed opening of closed roads for administrative access to treatment units could result in unauthorized public vehicle use. Also, proposed mechanized fireline construction around treatment units could create access opportunities for Off-Highway Vehicles, resulting in new unauthorized trails. Response of the proposed action and its alternatives to this issue will be measured using the following criteria:

- Number of improved road closure devices
- Discussion of effectiveness of control measures

Human Health and Safety

Proposed activities could affect suppression of wildfire and associated risks to fire fighters, property, and the public. Proposed burning of thinning debris would emit smoke, particulates, and gases into airsheds. This could impact the health of people in adjacent and downwind communities, and impair visibility along roadways. One commentor was concerned that proposed ignition using helicopters would likely lead to the fire getting out of control. Response of the proposed action and its alternatives to this issue will be measured using the following criteria:

- Estimates of smoke emissions (measured as pm^{10} and $pm^{2.5}$)
- Proximity to adjacent communities and airsheds
- Predicted safety of proposed fire ignition and control methods
- Estimated tons of fuel remaining after proposed treatments

Economics/Social

Proposed sale of merchantable material could create jobs and income for local communities. Unit selection and project design and mitigation could create costs that render the commercial sale of trees unfeasible. Response of the proposed action and its alternatives to this issue will be measured using the following criteria:

- Predicted volume of merchantable material produced by proposed activities
- Predicted present net value
- Issues Considered but not Analyzed in Detail

Some issues were outside the scope of the proposed action, covered by existing direction, irrelevant to the decision, or not affected by the proposed action:

- **Gophers should only be live-trapped and relocated.** Our December 1, 2005 letter to the public stated that gopher trapping would be connected to reforestation of proposed harvest units. Upon further consideration, the silviculturist has determined that this activity should not be necessary. Use of Vexar tubing to protect seedlings would still occur.
- **Any commercial harvest activities or road construction in municipal watersheds should be avoided in order to protect water quality.** The proposed action would not occur in any municipal watersheds.
- **In older forests we only support thinning if there is no road construction.** No road construction has been proposed.
- **Enforcement of road closures needs to improve to accomplish the reasons for closing the road. Current closures (often signs) are not effective.** The Interdisciplinary Team and District Ranger discussed this concern with Oregon Department of Fish and Wildlife at a meeting on January 26, 2006. Enforcement of road closures does not apply to the purpose and need for this proposed action. However, the group discussed that closed roads reopened and used to implement the proposed action could be more effectively closed upon completion of activities. Other road closures could be improved as future funding permits.

Issues Recommended for Alternative Development

Most of the issues carried through analysis can be resolved through project design, mitigation, or the required No Action alternative. However, four issues stood out as needing an alternative to the Proposed Action in order to be resolved (40 CFR 1500.4(g), FSH 1909.15 12.3). These issues are:

- Loss of big game cover due to proposed activities
- Loss of late/old structure connectivity due to proposed harvest and thinning
- Disturbance of soil related to proposed 93 miles of fireline construction
- Proposed herbicide treatment of 16 invasive plant populations currently not covered for herbicide use under NEPA analysis

ALTERNATIVE DEVELOPMENT

The interdisciplinary team used the purpose and need statement and information from field reconnaissance to develop the Proposed Action. Units were located and activities designed in an attempt to avoid changes in water quality or measurable effects on federally listed fish and wildlife species. Units were also located and treatment

prescriptions adapted to improve the spatial distribution of big game forage and cover and create foraging areas completely surrounded by cover.

The interdisciplinary team defined the No Action alternative as no change from current management. Proposed thinning, harvest, road openings, burning, and other connected action would not occur. However, other activities not associated with the proposed action (such as road maintenance, grazing, recreation, etc.) would continue.

Four issues then served as a basis for development of three alternatives to the Proposed Action. The following bullets briefly describe how alternatives were designed to address these four issues. Remaining issues were addressed either by avoiding associated activities or by mitigating their effects.

- The big game cover issue was addressed in Alternative 1 by eliminating harvest that would not leave fully stocked stands. Alternative 2 addressed it by eliminating units that would reduce satisfactory cover in winter range or in corridors outside winter range that connect important habitat types. Big game was further protected by mitigation (visual buffers along open roads, road closures, etc.) Alternative 3 eliminates any proposed units that would require a Forest Plan amendment for HEI or satisfactory cover.
- All alternatives to the proposed action dropped units that were identified within late old structure stands.
- Alternative 2 reduced the amount of constructed fireline by expanding underburning boundaries to existing fire barriers (roads, streams).
- Alternatives 2 and 3 dropped the herbicide use on 16 weed populations not currently authorized for such treatment.

Alternatives Dropped from Consideration

No Commercial Logging

During the 30-day public review of the environmental assessment, Blue Mountain Biodiversity Project expressed concern that a “Restoration only/No commercial logging alternative” was not considered. The project leader and silviculturist discussed developing an alternative that would not involve commercial logging. The silviculturist pointed out that her prescriptions would not change as a result, since they were based on tree health objectives and not economic recovery objectives. The only difference between this alternative and the developed alternatives would be that the cost of the no commercial logging alternative would be the highest. Ground equipment would still be used to thin and treat fuels so effects on soils, water, fish, and wildlife would be the same. All treatments would be implemented through a contract; however there would be no income to defray the contract cost. As a result, this alternative was not pursued further.

Reduce open road density

Oregon Department of Fish and Wildlife suggested that losses in cover resulting from the Proposed Action could be offset by closing some open roads. Road closure and

travel management was not identified as part of the purpose and need for this analysis. Many of the roads in this area were closed in 1990 through the District Access & Travel Management Plan to improve big game habitat and escape. This limited access for the public and caused many people to be displaced from their preferred recreation and forest product collecting areas. The District Ranger views the Access & Travel Management Plan as an implied contract with the public for access and believes further extensive closures would break that trust.

Also, this area is very flat and it is physically difficult and expensive to effectively close many roads. As noted by ODFW, many current closures are not effective. Alternative 2 does include some road closures and implementation of this project would not preclude future road closures. Therefore, an alternative that would reduce open road density was not pursued.

Alternative 1 –Eliminate harvest that would not leave fully stocked stands

Some respondents were concerned about regeneration harvest prescriptions.

They were concerned that these prescriptions would leave few trees in the treated areas, creating a "virtual clearcut". They also pointed out that such prescriptions did not make sense if the area is deficient in big game cover.

The IDT considered an alternative that would drop these units. However, most of the units proposed for such treatment are largely dead already and prescriptions would retain all live trees. In other units under this prescription there is not a large component of dead trees, but many of the living trees are infected with root rots specific to fir species. While root rots are a natural part of the environment, root rot infections have grown in recent decades due to past logging practices and a reduction of fire across the landscape[1]. Root rot spreads by root to root contact, so trees that may look healthy now may actually be infected by adjacent sick trees. The typical treatment is to remove the species specific to the particular root rot involved and replant with resistant species (like pine and larch). The District Ranger considered the above and decided that this alternative was not consistent with the Purpose and Need for Action. He determined that treatment of these stands was necessary to ensure the future health of big game cover and to slow the spread of the root rots to adjacent stands. Therefore this alternative was dropped from further consideration.

Alternatives Studied in Detail

No Action

This alternative addresses the requirement of the National Environmental Policy Act and the National Forest Management Act to consider taking no action. Under this

[1] Fire historically burned more often, killing thinner-barked species such as firs (which are also most susceptible to the root rots in this area). With the reduction in fire, root rot-susceptible species have increased across the landscape, spreading the disease. Spread of root rots were also caused by historic logging practices that permitted extensive soil disturbance, widespread soil compaction, and exposed tree stumps (which provide another vector for the disease).

alternative, current management direction and existing activities such as grazing, fire suppression, and road maintenance would continue.

This alternative would allow the stands identified as needing treatment at this time to progress through natural successional processes at their own rate (see Map 2 in Back). Biological and ecosystem processes would continue to progress along their present path to provide a baseline for comparison with other alternatives.

Proposed Action

Approximately 6,796 acres would be treated within the Falls Meadowbrook analysis area (see Map 3), producing an estimated 14,775 hundred cubic feet (Ccf) of merchantable material. The Proposed Action could be implemented as early as the fall of 2007and could take 5-10 years to complete[2]. Following are specific details of treatments:

Thinning

Thinning (non-harvest or harvest) would be used to change stand compositions, improve stand structure, reduce competition between trees, and increase overall stand health. Where large blocks of marginal big game cover are available, thinning would be used to increase edge habitat for big game in an attempt to improve habitat effectiveness. These thinning prescriptions would create 10- to 30-acre forage openings (areas where canopy closure is less than 40%) completely within the stands of cover. This would occur within units AQ, CC, 10, 19, 21, 22, 24, 28, and 29 and would total approximately 172 acres.

Figure 1 Before treatment

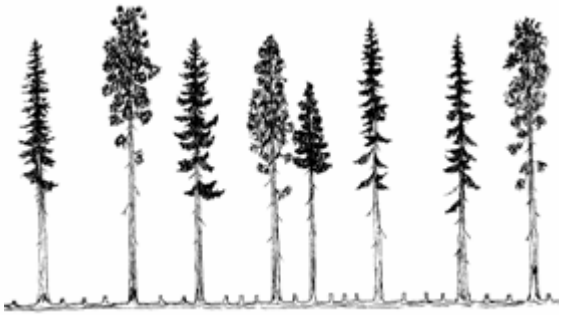


Figure 2 After treatment

[2] Burning could take up to 5 years to implement after mechanical treatments are completed due to unpredictable weather and fuel conditions.

Thinning Harvest (1,439acres)

Unit	Acres	Unit	Acres	Unit	Acres	Unit	Acres
AB	35	AQ	278	CD	113	17	59
AD	29	AR	24	Y	269	71	18
AE	85	AT	64	Z	110		
AG	146	CC	148	16	61		

Mechanical Non-harvest Thinning (469 acre)

Unit	Acres	Unit	Acres	Unit	Acres
O	198	8	39	27	232

Combined Thinning Harvest and Non-harvest thinning (3,290 acres)

Unit	Acres	Unit	Acres	Unit	Acres	Unit	Acres
AA	182	10	53	28	68	42	31
AL	66	18	51	29	123	46	91
N	317	21	117	33	100	50	93
V	139	22	73	35	265	51	68
V1	85	23	86	36	116	56	91
V2	123	24	102	38	85	58	71
V3	89	25	55	40	34	70	23
VA	325	26	74	41	42	72	52

Trees would be thinned using chainsaws, a harvester, or other mechanical methods (e.g. slashbusting, chipping, grapple piling). No whole-tree yarding would be allowed. Harvest-related landings[3] would be about ¼ acre in size and occur on average once every 25 acres. The majority of thinning debris would remain on site and would be lopped and scattered or burned, unless excessive fuel loading requires mechanical treatment (grapple piling, grinding, crushing, etc.). Stands would remain fully stocked after thinning; however, seedlings would be planted in Unit 58 to achieve desired species compositions.

No heavy equipment would enter Riparian Habitat Conservation Areas. However, this equipment would be allowed to reach into Class 4 Riparian Habitat Conservation Areas to remove material. Heavy equipment would not be allowed to cross Riparian Habitat Conservation Areas except on existing roads.

Thinning harvest would remove merchantable material (i.e. sawlog, chip, or hog fuel) for sale using a forwarder, skidder, or other similar system for achieving at least one end log suspension.

[3] A landing is an area where logs are stacked in preparation for transport. They are areas that are heavily affected by machinery and tend to have high concentrations of fuels.

Harvest of stands heavily infested with insects/disease

Many stands proposed for treatment have been heavily affected by insects and disease. In over half of these stands, few live or healthy trees remain. Such stands have low stocking already (see figure 3) and reforestation would be required after harvest.

There is also one 11-acre stand that is so infested with parasitic dwarf mistletoe that most overstory trees need to be removed (though much of the understory would remain because it is healthy). This unit would not need to be replanted because the unit would remain fully stocked after treatment

Figure 3 Post-treatment appearance of stands mostly killed by insects or disease.

The remaining stands still retain many live trees, but one or two species are infested with insects or disease. Proposed treatments of these stands would remove dead trees and live trees of affected species resulting in stands that need to be replanted to meet stocking requirements (see figure 4). Replanting would consist of tree species that are less susceptible to the site-specific pest. Planting would also help achieve the goal of moving stands toward the Historic Range of Variability for species composition.

Treatment and removal of merchantable material would otherwise occur as described under the "*Thinning*" section. Merchantable material would produce an estimated volume of 4,850 hundred cubic feet (Ccf).

Figure 4 Post-treatment appearance of live stands that have a species-specific infestation of insects or disease.

Harvest of heavily infested stands (1,391 acres)

Unit	Acres	Unit	Acres	Unit	Acres	Unit	Acres
AC	126	I	111	U	38	47	84
AF	30	J	15	7	49	48	100
AH	82	L	40	34	38	49	119
AK	17	P	45	43	46	61	69
AS	68	R	79	44	11		
H	31	T	152	45	41		

Combined Harvest of heavily infested stands and Non-harvest thinning (207 acres)

Unit	Acres	Unit	Acres
19	74	60	133

Planting of Tree Seedlings

Approximately 1,622 acres would be planted with a mixture of ponderosa pine, western larch, and Douglas-fir seedlings. Units would be burned for site preparation prior to planting. Vexar® tubing would be placed around planted seedlings to protect them from animal damage.

Treatment of Residual Materials

Where post-treatment fuel loads are above Forest Plan standard, fuels would be treated manually (lop and scatter or piled), mechanically (grapple piling, grinding, crushing), and/or with prescribed burning to reduce fuel loads to standard. The types of burning treatment options would range from broadcast burning all residual materials left in the units to piling and burning materials.

Fire would be applied by hand-held drip torch, ATV-mounted drip torch, or helicopter on approximately XX acres. Burning could occur in either spring or fall for up to five years after mechanical treatments are complete. Water would be drafted from local sources for suppression. No prescribed burning would be ignited within Riparian Habitat Conservation Areas. However, prescribed fire would be allowed to burn into Riparian Habitat Conservation Areas after ignition.

Up to 93 miles[4] of tractor or hand constructed fire line would be built to control fire used to reduce activity fuels within units. No fire lines would be built in Riparian Habitat Conservation Areas, except in Class 4 stream corridors. Fire lines in Class 4 stream corridors would be built by hand.

Access

All activities would be accomplished using 142 miles of existing system roads; no new or temporary road construction would occur. Of this amount, approximately 111 miles are open and seasonally open roads. Open roads would be cleared of brush to meet visibility standards and bladed where needed. Existing culverts would be maintained to support harvest traffic, but no new culverts would be installed. The surface of approximately 3 miles of Forest Road 3900900 (this spur is accessed by Highway 395) would be reshaped.

Approximately 9 miles (Forest Roads 3969000, 3900900, and 3963030) would need reconstruction to accommodate hauling. Reconstruction would include removing log culverts, installing drainage dips, placing subgrade reinforcement, reconstruction of road template through entrenched segments and developing additional turnouts for safety.

Approximately 31 miles of closed roads would be temporarily re-opened for administrative access to treatment units for the duration of activities. Opening would involve removal of closure devices, brush clearing, and blading as necessary. These roads would be re-closed by the contractor following the completion of activities using the most effective method of closure available for the site-specific conditions. Methods of closure could include ripping the road entrance, installing berms, reclosing or installing barricades or gates. Waterbars and/or seeding with native seed would be applied as needed to prevent soil movement.

[4] This amount of fireline is the worst case scenario. Some units would be mechanically treated to reduce fuels or fuels would be piled and burned (which doesn't require construction of fire line). In other cases, units could be combined for burning or fireline would be moved to an existing barrier (i.e. roads, streams, etc), further reducing the amount of fireline.

No winter harvest would occur in Big Game Winter Range (i.e. Meadowbrook units). Snowplowing by permit would be allowed on portions of roads outside of Big Game Winter Range, specifically Forest Roads 53, 5316 (only the portion outside of Big Game Winter Range), 5320, 5327, and any spurs from these roads.

Rehabilitation of Soil Disturbance

Upon completion of activities, skid trails, landings, or exposed mineral soil would be treated as necessary and appropriate to the site to reduce soil erosion or compaction. This could include seeding, waterbarring, subsoiling subsoiling or scarifying of landings, temporary roads, etc. Displaced soil in berms or ruts would be returned to its prior location.

Noxious Weed Treatments

Best management practices would be applied to prevent the initiation and spread of noxious weeds by equipment from outside the project area. Any noxious weed sites found would be treated consistent with the Regional Weed EIS (2005). This includes 16 weed populations (130 acres) identified since the 1995 Forest Noxious Weed EA (see Map XX). Chemical Treatment may be authorized for treatment of these 16 sites under the Proposed Alternative.

Forest Plan Amendment

The Forest Supervisor proposes to amend the Forest Plan (page 4-152) as follows:

- In Bone Point Winter Range, HEI would change from 70 to 68
- In Desolation Winter Range, HEI would change from 70 to 63
- In Monument Winter Range, HEI would change from 70 to 69

This amendment would only apply to these three winter ranges for the duration of the Falls Meadowbrook project.

The Forest Supervisor also proposes to amend the Regional Forester's Amendment #2 wildlife standard at page 9, section, 6(d) which currently states: *"If either one or both of the late and old structural (LOS) stages falls BELOW HRV in a particular biophysical environment within a watershed, then there should be NO NET LOSS OF LOS from that biophysical environment. DO NOT allow timber sale harvest activities to occur within LOS stages that are BELOW HRV."*

The new amendment would add the following paragraph: *"An exception to this occurs in the Falls Meadowbrook area in dry upland forest with old forest single stratum structure. XX acres can be treated to prevent existing insect and disease centers from spreading to adjacent stands and to reduce stress on the trees that would remain in the treated stands."*

This amendment would only apply to the Falls Meadowbrook project to allow treatment of approximately XX acres of old forest single stratum structure in dry upland forest that is at risk.

Alternative 2

This alternative would treat approximately 4,161 acres within the Falls Meadowbrook analysis area (see Map 3), producing an estimated 9,044 hundred cubic feet (Ccf) of merchantable material. The alternative was designed to address the following issues:

- **Retain big game cover**—The interdisciplinary team, with the assistance of Oregon Department of Fish & Wildlife biologists, identified blocks of cover that should be kept intact (no harvest). They considered the three winter ranges as well as travel corridors that connect important habitat outside of winter range (such as a corridor between C1-Old Growth and the Potamus Inventoried Roadless Area). Roads would be buffered, closed, or closure devices improved to mitigate the reduction of tree cover that would occur. A Forest Plan amendment would be needed in Big Game Winter Range to allow treatment of unhealthy stands, as described under the Proposed Action.
- **Retain old forest single stratum structure in the dry upland forest type, which is below its historic range of variability**—Harvest would not occur in any of the old forest single stratum structure of dry upland forest. There would not be a Forest Plan Amendment to the Regional Forester's Amendment #2.
- **Minimize disturbance of wildlife and soil related to prescribed burning**—Burn treatment boundaries would use existing firebreaks (i.e. roads and riparian areas) to the extent possible. This would reduce the amount of soil displacement from fireline construction and increase the area treated with fire (with a secondary benefit of enhancing forage). The timing of burns would be limited to protect nesting birds.
- **Prevent use of unauthorized herbicides or biocontrol agents**—Chemicals would not be used to treat the 16 new noxious weed sites discovered since the 1995 Forest-wide noxious weed management decision

Thinning and Harvest

Thinning and harvest would occur as described under the Proposed Action, except as follows:

- Thinning would be used to increase edge habitat for big game within treatment units AQ, 10, 19, 21, 22, and 28 and would total approximately 108 acres.
- Treatments would leave a screen of young trees along open and seasonally open roads to protect big game from disturbance and avoid an increase in big game vulnerability to hunting. This would occur only where such trees exist.
- Whole tree yarding with full suspension would be used in units XXX to reduce the need for tractor-built fireline. Branches of harvested trees would be detached and left in the unit, except for 15-20 feet of the tree top (which would remain attached to the log). Logs with attached tree tops would

require full suspension to avoid undesired soil displacement. Tops would be removed at the landing, piled and burned.

The following units would be treated under this alternative:

Thinning Harvest (916 acres)

Unit	Acres	Unit	Acres	Unit	Acres	Unit	Acres
AB	35	AG	54	AT	64	Y	269
AE	85	AQ	278	CD	113	71	18

Mechanical Non-harvest Thinning (237 acres)

Unit	Acres	Unit	Acres
O	198	8	39

Combined Thinning Harvest and Non-harvest thinning (2,038 acres)

Unit	Acres	Unit	Acres	Unit	Acres	Unit	Acres
AA	110	18	51	28	68	46	91
V1	85	21	117	35	265	50	93
V2	123	22	73	36	116	58	71
V3	89	23	86	41	42	70	23
VA	325	26	74	42	31	72	52
10	53						

Harvest of heavily infested stands (763 acres)

Unit	Acres	Unit	Acres	Unit	Acres	Unit	Acre
AC	74	I	111	T	152	61	69
AH	82	J	15	34	38		
AK	17	L	40	44	11		
AS	68	P	45	45	41		

Combined harvest of heavily infested stands and Non-harvest thinning (207 acres)

Unit	Acres	Unit	Acres
19	74	60	133

Planting of Tree Seedlings

Tree planting would occur as described under the Proposed Action, except that only 993 acres would be planted.

Treatment of Residual Materials

Fire would be applied on 17,244 acres as indicated on Map XX via methods described in the Proposed Action. Fire control lines would be moved to the nearest existing barrier (i.e. roads, streams) where they exist. As a result, tractor-constructed fireline would only occur on 16 miles. Fire would be completely excluded from fish-bearing Riparian Habitat Conservation Areas through use of wet line or hand-constructed line.

Burning would not be permitted after vegetation green-up in spring or May 15, which ever comes first. This should avoid burning during nesting and fledging of birds.

Access

All activities would be accomplished using 125 miles of existing system roads; no new or temporary road construction would occur. Of this amount, approximately 104 miles are open and seasonally open roads, and 9 miles (Forest Roads 3969000, 3900900, and 3963030) would need reconstruction as described in the Proposed Action. The remaining 21 miles are closed roads that would be temporarily re-opened for the duration of activities. These roads would be re-closed as discussed in the Proposed Action. Seeding of these roads with forage species could also be done upon re-closure to enhance big game habitat. The following open/seasonally open roads would be closed (in addition to those miles already closed in 1990 under the District Travel and Access Management Plan). These measures would mitigate for loss of big game cover.

- FS Roads 5316135 and 350 (currently seasonally closed and within a treatment unit)
- FS Road 5316070 (outside winter range, parallels another road for a quarter mile)

Noxious Weed Treatments

This alternative would not authorize any additional chemical treatment of noxious weeds but all previously authorized treatments and methods could be applied.

Forest Plan Amendment

The Forest Plan amendments for the Bone Point, Desolation, and Monument winter ranges would be applied as described under the Proposed Action. These amendments would only apply to this project to allow treatment of approximately 3,049 acres of big game cover that is at risk.

Alternative 3

This alternative would treat approximately 5,582 acres within the Falls Meadowbrook analysis area (see Map 5) and produce an estimated 12,128 Ccf of merchantable material. The alternative was developed in response to concerns regarding the proposed Forest Plan amendment. Under this alternative, units that would otherwise affect big game cover in Winter Range would be modified or dropped. Also, the 16 new noxious weed sites discovered since the 1995 Forest-wide noxious weed management decision could be treated with all available methods except chemical. The remainder of this alternative would be the same as described under the Proposed Action.

Thinning and Harvest

Thinning and harvest would occur as described under the Proposed Action, however there would not be any thinning to increase edge habitat for big game. Units that would be treated in this alternative are as follows:

Thinning Harvest (1,255 acres)

	Unit	Acres		Unit	Acres		Unit	Acres		Unit	Acres
AB	35		AD	29		AE	85		AG	54	

AQ	252	CC	148	Z	110		
AR	22	CD	113	16	56		
AT	64	Y	269	71	18		

Mechanical Non-harvest Thinning (469 acre)

Unit	Acres	Unit	Acres	Unit	Acres
O	198	8	39	27	232

Combined Harvest and Non-harvest thinning (2890 acres)

Unit	Acres	Unit	Acres	Unit	Acres	Unit	Acres
AA	182	VA	325	26	74	46	77
AL	66	10	53	28	68	50	85
N	317	18	51	29	123	51	68
V	139	22	73	33	73	56	91
V1	85	23	86	35	258	58	57
V2	123	24	102	36	91	72	42
V3	89	25	55	41	37		

Harvest of heavily infested stands (835 acres)

Unit	Acres	Unit	Acres	Unit	Acres	Unit	Acres
AC	126	H	31	P	45	61	69
AF	30	I	111	R	79		
AH	82	J	15	T	152		
AK	17	L	40	V	38		

Combined Harvest of heavily infested stands and Non-harvest thinning (133 acres)

Unit	Acres
60	133

Planting of Tree Seedlings

Approximately 1,026 acres would be planted with a mixture of ponderosa pine, western larch, and Douglas-fir seedlings as described in the Proposed Action.

Treatment of Residual Materials

Fire would be applied on 5,907 acres as indicated on Map XX via methods described in the Proposed Action. Tractor-constructed fireline would occur on 71 miles.

Access

All activities would be accomplished using 133 miles of existing system roads 107 miles of open and seasonally open roads and 26 miles of closed road that would be temporarily reopened as described under the Proposed Action. Reconstruction would occur on 9 miles (Forest Roads 3969000, 3900900, and 3963030) as described in the Proposed Action.

Noxious Weed Treatments

This alternative would not authorize any additional chemical treatment of noxious weeds but all previously authorized treatments and methods could be applied.

Forest Plan Amendment

No Forest Plan amendments would be necessary.

Alternative 4

This alternative would treat approximately 5,227 acres within the Falls Meadowbrook analysis area (see Map 4), producing an estimated 11,366 hundred cubic feet (Ccf) of merchantable material. The alternative was developed to provide an option that incorporated the reduced miles of fireline from Alternative 2 but treated more forest acres while not requiring any Forest Plan amendments (as in Alternative 3). Also chemicals would not be used to treat the 16 new noxious weed sites discovered since the 1995 Forest-wide noxious weed management decision.

Thinning and Harvest

Thinning and harvest would occur as described under the Proposed Action, except as follows:

- Thinning would be used to increase edge habitat for big game within treatment units AQ, 10, 19, 21, 22, and 28 and would total approximately 108 acres.
- Treatments would leave a screen of young trees along open and seasonally open roads to protect big game from disturbance and avoid an increase in big game vulnerability to hunting. This would occur only where such trees exist.
- There would be no whole tree yarding.

The following units would be treated under this alternative:

Thinning Harvest (1,255 acres)

Unit	Acres	Unit	Acres	Unit	Acres	Unit	Acres
AB	35	AQ	252	CC	148	Z	110
AD	29	AR	22	CD	113	16	56
AE	85	AT	64	Y	269	71	18
AG	54						

Mechanical Non-harvest Thinning (237 acre)

Unit	Acres	Unit	Acres
O	198	8	39

Combined Harvest and Non-harvest thinning (2,767 acres)

Unit	Acres	Unit	Acres	Unit	Acres	Unit	Acres
AA	182	VA	325	26	74	50	85
AL	66	10	53	28	68	51	68
N	317	18	51	33	73	56	91
V	139	22	73	35	258	58	57
V1	85	23	86	36	91	72	42
V2	123	24	102	41	37		
V3	89	25	55	46	77		

Harvest of heavily infested stands (835 acres)

Unit	Acres	Unit	Acres	Unit	Acres	Unit	Acres
AC	126	H	31	P	45	61	69
AF	30	I	111	R	79		
AH	82	J	15	T	152		
AK	17	L	40	U	38		

Combined Harvest of heavily infested stands and Non-harvest thinning (133 acres)

Unit	Acres
60	133

Planting of Tree Seedlings

Tree planting would occur as described under the Proposed Action, except that only 1,026 acres would be planted.

Treatment of Residual Materials

Fire would be applied on 18,266 acres as indicated on Map XX via methods described in the Proposed Action. Fire control lines would be moved to the nearest existing barrier (i.e. roads, streams) where they exist. As a result, tractor-constructed fireline would only occur on 35 miles. Fire would be completely excluded from fish-bearing Riparian Habitat Conservation Areas through use of wet line or hand-constructed line.

Burning would not be permitted after vegetation green-up in spring or May 15, which ever comes first. This should avoid burning during nesting and fledging of birds.

Access

All activities would be accomplished using 131 miles of existing system roads; no new or temporary road construction would occur. Of this amount, approximately 107 miles are open and seasonally open roads, and 9 miles (Forest Roads 3969000, 3900900, and 3963030) would need reconstruction as described in the Proposed Action. The remaining 24.5 miles are closed roads that would be temporarily re-opened for the duration of activities. These roads would be re-closed as discussed in the Proposed Action. Seeding of these roads with forage species could also be done upon re-closure

to enhance big game habitat. The following open/seasonally open roads would be closed (in addition to those miles already closed in 1990 under the District Travel and Access Management Plan). These measures would mitigate for loss of big game cover.

- FS Roads 5316135 and 350 (currently seasonally closed and within a treatment unit)
- FS Road 5316070 (outside winter range, parallels another road for a quarter mile)

Noxious Weed Treatments

This alternative would not authorize any additional chemical treatment of noxious weeds but all previously authorized treatments and methods could be applied.

Forest Plan Amendment

No Forest Plan amendments would be necessary.

Standard Operating Procedures

The following are Standard Operating Procedures that would be applied to activities associated with the Proposed Action or any of its alternatives:

Layout and Marking

1. All riparian areas would be protected from harvest activities during layout using PACFISH and Best Management Practice Guidelines. Some thinning will be permitted in RHCAs along Class 4 streams.
2. Special habitats (scabflats and meadows) which occur within or adjacent to harvest units will be treated as follows to protect unique wildlife habitat:
   - Unit 49, buffer spring and elk wallows by 100 feet
   - Unit 27, buffer spring and elk wallow by 100 feet
3. If any goshawk nests are found during layout or implementation, they will be protected by deferring harvest on 30 acres of the most suitable nesting habitat. A 400-acre post-fledging area will be established around the nesting area where late old structure will be retained and younger stands will be enhanced toward late old structure.
4. Known or discovered raptor nest trees will be protected from management activities.
5. Snag retention will be achieved on a 40-acre basis with at least 10-15 percent of the snags represented on each 10 acres, if available, (as per District Ranger memo dated Aug. 4, 1997). Use Table 3 to identify the amount based on Plant Association Group. Retention trees will be distributed naturally, either individually or in small groups, in all plant association groups. Preferably, all snags retained will be greater than 18-inch diameter at breast height, but if there are not enough snags of this size within the 40-acre unit, all large snags will be left and some smaller snags will be retained to make up the difference. Tree species and soundness at the base will also be considered. The tree species

preferred in order of most to least desired are: Douglas-fir, ponderosa pine, western larch, other species, and grand fir. In addition, where safety allows, hollow or partially hollow, broken top snags greater than 15 inches diameter at breast height will be left to provide bat habitat.

Table 3: Snag retention per acre by plant association group.

Plant Association Group	Snags per Acre	Green Trees left for Snag Replacement
Warm – Dry	2.3	15.8
Cool – Moist	1.8	9.4
Cold – Dry	1.8	14.4

6. Large down wood will be retained as illustrated in Table 4.

Table 4: Down wood retention per acre by plant association group.

Plant Association Group	Pieces per acre	Diameter at small end	Length per piece	Total length per acre
Ponderosa pine	3	12 inches	>6 feet	>20 feet
Warm grand fir	15	12 inches	>6 feet	>100 feet
Cool grand fir	15	12 inches	>6 feet	>100 feet
Lodgepole pine	15	8 inches	>8 feet	>120 feet

Implementation

7. A copy of known noxious weed infestations and identification material will be given to the Forest Service contracting representative. Known infestations will be treated by the Forest Service prior to implementation of activities according to the Umatilla National Forest Environmental Assessment for the Management of Noxious Weeds (1995).
8. All equipment to be operated on the project area will be cleaned in a manner sufficient to prevent noxious weeds from being carried on to the project area. This requirement does not apply to passenger vehicles or other equipment used exclusively on roads. Cleaning, if needed, will occur off of National Forest System lands. During the fire season, the fire truck, as required to be at the worksite, shall be reserved for fire use and not be used to clean equipment, unless otherwise agreed.
9. Fences, gates, and cattleguards will be maintained in their existing condition during activities to prevent cattle from passing between allotments or pastures.
10. Where conditions and safety permit, trees will be felled away from riparian areas, residual conifers, large broken or hollow top snags, dispersed campsites, fences, landlines, research plots (ecology plot center markers and condition and trend transect markers) and improvements (i.e. stock ponds, section corner monuments, etc.). If a tree is felled into a Riparian Habitat Conservation Area or

unique habitat buffer, the portion within the buffer will be left in place (except along Class 4 streams identified for thinning).

11. No ground-based equipment will operate in units where the average slope is greater than 35 percent in order to reduce the potential for soil movement. Skid trails, forwarder trails, other log transportation routes, and landings will be approved by the Forest Service to meet the Best Management Practices and applicable management requirements during timber sale contract administration. All equipment will operate outside of Riparian Habitat Conservation Areas, except on existing roads.
12. Cross-ditches and water-spreading ditches will be installed at locations as designated by the Forest Service as a means of reducing the potential for soil displacement and sedimentation.
13. Equipment operation within ephemeral draws will be confined to designated crossings in order to minimize soil disturbance. Debris will be placed into the crossings to reduce soil displacement and compaction.
14. Use of ground-based equipment will be suspended when conditions (such as intense or prolonged rainfall, saturated soil, or winter breakup) would otherwise result in excessive soil displacement, damage to roads, a reduction in beneficial uses of streams (as defined by the Clean Water Act).
15. Non-harvest thinning debris will be simultaneously lopped and scattered, mulched, piled, burned, or removed to reduce the risk of high intensity wildfire.
16. If any cultural resource sites are discovered during layout or implementation, they will be protected until an archeologist can assess them and determine appropriate actions.
17. Burn prescriptions will be designed to Forest Plan standards. Burning will take place when heavier fuels and duff moisture contents are high. Prescribed fire will not be ignited in Riparian Habitat Conservation Areas; however, fire will be allowed to back into them.
18. Fire control lines adjacent to Riparian Habitat Conservation Areas, on slopes exceeding an average of 35 percent, and on other sensitive areas where soil disturbance is of concern will be an average of 24” of bare mineral soil. Fire line will be rehabilitated as needed after the burn (by returning displaced soil to the line, construction of waterbars, seeding, and placement of down wood).
19. Roads will be kept open to the public where safety permits. Safety signs that comply with the Manual on Uniform Traffic Control Devices specifications will be posted to warn motorists of harvest-related hazards.
20. Dust abatement on roads will be conducted according to Best Management Practices (see Appendix XX) in order to protect the water and fisheries resources.
21. Snowplowing will meet road maintenance specifications. In summary:
    a. Snowplowing will occur in a way that prevents erosion damage to roads and streams
    b. There will be no side casting of snow into Riparian Habitat Conservation Areas

c. No plowing will occur during winter breakup conditions
d. To prevent the blade from digging into the road prism, snowplow height will be a minimum of two inches above the road surface

Post-Treatment

22. Upon completion of activities, skid trails, landings, or exposed mineral soil will be treated as necessary and appropriate to the site to reduce soil erosion, soil compaction, or establishment of noxious weeds. This may include seeding, waterbarring, subsoiling or scarifying of landings, temporary roads, etc. Displaced soil in berms or ruts may be returned to its prior location.
23. The Forest Service will provide necessary seed, using seed that has been tested to be free of noxious weeds (list in the State of Oregon). Native grass and forb seeds will be used as available, otherwise non-persistent exotic species will be provided.

Monitoring

1. Units will be spot checked during layout by an aquatic specialist to assure that riparian protection, as delineated by PACFISH requirements and Best Management Practices, is implemented as stated. Boundaries that do not meet mitigation requirements will be adjusted accordingly. This monitoring is considered essential.
2. Number, size, and distribution of snags and down logs within units will be field checked by Forest Service personnel. Layout and treatment practices will be adjusted where mitigation parameters are not met. This monitoring will be done as funding is available.
3. The Forest Service contract representative will spot monitor during and after activities to ensure sediment and soil compaction constraints are met. If constraints are not met, Forest Service personnel will identify and document modifications to be used in future projects. This monitoring is considered essential.
4. The District noxious weed coordinator or crew will conduct noxious weed species surveys prior to initiation of harvest or other ground disturbing activities within the project area. This monitoring will be done as funding is available.
5. Cleaning of weeds from equipment will be inspected and approved by the Forest contract representative. This monitoring is considered essential.
6. For five years after activities are completed, the District noxious weed coordinator or crew will conduct an annual inventory of the treatment area and access routes to determine if existing noxious weed populations have spread or if new sites have occurred. This monitoring is considered essential.
7. After prescribed fire treatments, Forest Service personnel will field check a sample of burn units to determine whether the prescription and mitigation (i.e. mortality, mineral soil exposure, fuel load reductions, etc.) have been met. If objectives or mitigation have not been met, additional burning may be delayed or

the fire prescription and procedures adapted to ensure the mitigation is achieved. This monitoring is considered essential.

Potential Knudsen-Vandenburg Projects

The following projects and opportunities have been identified as possible candidates to receive funding under the Knudsen-Vandenburg Act. These are commonly referred to as KV funds and are collected from the sale of timber. These are not mitigation measures.

Some of these projects are connected to the Proposed Action or its alternatives as identified under the alternative descriptions earlier; other projects are not included in this analysis but are possible activities for future consideration. Projects not covered by this analysis would require analysis under the National Environmental Policy Act before they could be implemented.

If harvest occurs, KV funds might not be generated for all enhancement projects listed because the predicted value of timber is low. Therefore, other funding sources would be necessary or the unfunded projects would not be implemented.

KV Projects Included in this Analysis

The following projects are part of project design for all action alternatives:

- Site preparation and tree planting where minimum stocking is not achieved and to adjust forest species compositions
- Noxious weed control
- Non-commercial thinning
- Treating debris created by harvest and non-commercial thinning
- Installing guardrails/gates to replace closures on currently closed roads used to access treatment units

KV Projects Requiring Future Analysis

These are opportunities that may be pursued in the future and are not currently proposed under the action alternatives:

- Installing guardrails/gates/barricades on other closed roads in the area to improve closure effectiveness
- Seeding closed roads with forage species to enhance big game habitat
- Decommissioning roads no longer needed (as identified in the Roads Analysis for this project)
- Underburning treated ponderosa pine stands to maintain structure and control undesirable vegetation
- Planting hardwoods in riparian areas
- Maintaining instream structures
- Constructing or reconstructing spring water sources

- Constructing or reconstructing range improvement fences

COMPARISON OF ALTERNATIVES

This section is intended to clearly define the differences in effects between alternatives with regard to the Purpose and Need described in Chapter 1 and the issues detailed earlier in this chapter. The environmental effects for some issues did not vary by alternative or varied only in minor ways. Those effects were not included in this comparison, though they are described in detail in Chapter 3. Issues with effects common or similar for all alternatives were: Snag and Down Wood Habitat, Species of Interest, Soils and Water, Threatened, Endangered, Proposed and Sensitive Species, Range, Cultural Resources, Recreation, Access. Table 5 summarizes the area affected and operational outcomes of the alternatives. Tables 6 and 7 summarize the responsiveness of each alternative to the purpose and need for action and issues.

Table 5. Summary of Operational Outcomes Among Alternatives

Activity	No Action	Proposed Action	Alternatives 2	3	4
Thinning harvest	0	1,439	915	1,255	1,255
Non-harvest thinning	0	469	237	469	237
Combined thinning harvest & non-harvest thinning	0	3,290	2,038	2,890	2,767
Harvest of pest-infested stands	0	1,391	763	835	835
Combined harvest of pest-infested stands & non-harvest thinning	0	207	207	133	133
Total Acres	**0**	**6,796**	**4,158**	**5,582**	**5, 227**
# of Units	0	73	46	57	55
Volume produced (Ccf)	0	14,775	9,044	12,128	11,366
Harvesting System	n/a	Ground-based	Ground based	Ground -based	Ground-based
Whole tree yarding (acres)	0	0	605	0	0
Reforestation (acres)	0	1,621	993	1,026	1,026
Open Road Reconstruction (miles) MARILYN?	0	9	9	9	9
Closed Roads Opened for Access (miles)	0	29	20	27	24.5
Prescribed fire (acres)	0	7,130	17,244	5,907	18,266
Tractor fire line (miles)	0	90	16	71	35
Hand fire line (miles	0	3.5	1	3	1

Table 6: Responsiveness of the Alternatives to the Purpose and Need for Action –

Purp. & Need	No Action	Proposed Action	Alternative 2	Alternative 3	Alternative 4
Affects on HRV for composition	Species compositions would remain out of balance with historical conditions, with ponderosa pine and larch declining on Dry Upland Forest sites due to their shade intolerance. The Dry Upland Forest landscape would continue to lose its resiliency in the face of disturbance.	Species compositions on 6,484 acres would shift closer to historical conditions, particularly on 3,970 acres of Dry Upland Forest sites, improving resiliency to disturbance.	Effects similar to Proposed Action. However, 1,271 fewer acres would experience a shift in species compositions, with 519 fewer acres of Dry Upland Forest sites shifted towards dominance by ponderosa pine and larch.	Effects similar to the Proposed Action. However, species compositions on 99 more acres of Cold Upland and Moist Upland forests would shift to an earlier seral mix.	See Chapter 3 for detailed discussion
Affects on HRV for structure	See Chapter 3 for detailed discussion				
Affects on HRV for fire regime condition class	See Chapter 3 for detailed discussion				

Purp. & Need	No Action	Proposed Action	Alternative 2	Alternative 3	Alternative 4
Affects on Big Game Habitat Effectiveness	HEI would remain at 69 in the Monument Winter Range, 63 in the Desolation Winter Range and C4 management area, 68 in the Bone Point Winter Range, and 55 in the E2 management area.	HEI would not change in the Monument and Desolation winter ranges or in the E2 management area. HEI in the Bone Point winter range would increase to 69. HEI in the C4 management area would increase to 64 in response to treatment.	HEI would not change in the Monument, Desolation, or Bone Point winter ranges or in the E2 management area. HEI in the C4 management area would increase to 64 in response to treatment.	HEI would not change in the Monument, Desolation, or Bone Point winter ranges or in the E2 management area. HEI in the C4 management area would increase to 64 in response to treatment.	See Chapter 3 for detailed discussion
Recovered economic value	$0	$777,570	$430,228	$617,396	See Chapter 3 for detailed discussion

Table 7: Responsiveness of the Alternatives to the Issues

Issue	No Action	Proposed Action	Alternative 2	Alternative 3	Alternative 4
Big Game Cover	There would be no change in road density or effectiveness of road closures. There would be no affect on big game populations.	There would be No change in road density. Not expected that populations or distribution would be adversely affected by treatment. would improve the spatial distribution of cover and forage in these stands.	No change in road density. Not expected that populations or distribution would be adversely affected by treatment.	No change in road density. Not expected that populations or distribution would be adversely affected by treatment.	See Chapter 3 for detailed discussion

Issue	No Action	Proposed Action	Alternative 2	Alternative 3	Alternative 4
Snag & Down Wood Habitat	Snag densities would remain the same in all Potential Vegetation Groups (PVGs) throughout the watershed.	Watershed-scale snag densities in **Dry Upland PVG**: >10-inch dbh group would decrease 0.2 snags/acre >20-inch dbh group would not decrease In **Moist Upland PVGs**: >10-inch dbh group would decrease 0.5 snags/acre >20-inch dbh group would decrease 0.1 snags/acre Snag densities in all cases would remain well above Forest Plan standards following treatment. No difference from existing condition when compared to DecAID cumulative species curves.	Watershed-scale snag densities in **Dry Upland PVG**: >10-inch dbh group would decrease 0.1 snags/acre >20-inch dbh group would not decrease In **Moist Upland PVGs**: >10-inch dbh group would decrease 0.4 snags/acre >20-inch dbh group would decrease 0.1 snags/acre Snag densities in all cases would remain well above Forest Plan standards following treatment. No difference from existing condition when compared to DecAID cumulative species curves.	Watershed-scale snag densities in **Dry Upland PVG**: >10-inch dbh group would decrease 0.1 snags/acre >20-inch dbh group would not decrease In **Moist Upland PVGs**: >10-inch dbh group would decrease 0.4 snags/acre >20-inch dbh group would decrease 0.1 snags/acre Snag densities in all cases would remain well above Forest Plan standards following treatment. No difference from existing condition when compared to DecAID cumulative species curves.	No change in road density. Not expected that populations or distribution would be adversely affected by treatment.
Late/Old Structure Habitat		534 acres treated, including 162 acres that are currently below HRV. LOS habitat conditions would be enhanced in the mid and long term.	290 acres treated, including XX acres that are currently below HRV. LOS habitat conditions would be enhanced in the mid and long term.	290 acres treated, including XX acres that are currently below HRV. LOS habitat conditions would be enhanced in the mid and long term.	See Chapter 3 for detailed discussion

Issue	No Action	Proposed Action	Alternative 2	Alternative 3	Alternative 4
Species of Interest	**Goshawk:** 0 acres of potential nesting or foraging habitat treated. **Olive-sided flycatcher:** no treatments, so no affect on habitat. **White-headed woodpecker:** 0 acres of potential habitat treated. No increase in old forest single strata ponderosa pine stands. **Lewis' woodpecker:** 0 acres of potential habitat treated. Habitat suitability/ quality unchanged. **Forest dwelling bats:** No change in amount of large standing wood, no affects. **Migratory birds:** Mesic mixed conifer habitat: 0 acres treated Dry forest habitat: 0 acres treated Riparian shrub habitat: 0 acres treated Shrub steppe habitat: 0 acres treated Aspen habitat: 0 acres treated	**Goshawk:** 534 acres of potential nesting habitat & 6,398 acres of potential foraging habitat treated. Treated nesting habitat not likely used in short and mid-terms. **Olive-sided flycatcher:** not known to occur in analysis area. No commercial thinning/harvest in RHCAs, so no affect on habitat. **White-headed woodpecker:** 233 acres of potential habitat treated. Treatment would improve habitat quality by favoring old forest single strata ponderosa pine stands. **Lewis' woodpecker:** 434 acres of potential habitat treated. Habitat suitability/quality would be improved. **Forest dwelling bats:** Minor impacts expected. Losses of large diameter standing wood would be minimal because only green trees will be targeted for removal. **Migratory birds:** Mesic mixed conifer habitat: 821 acres treated. Multi-layered canopy & dense overstory habitats reduced in short and mid-terms.	**Goshawk:** 293 acres of potential nesting habitat & 3,849 acres of potential foraging habitat treated. Treated nesting habitat not likely used in short and mid-terms. **Olive-sided flycatcher:** not known to occur in analysis area. No commercial thinning/harvest in RHCAs, so no affect on habitat. **White-headed woodpecker:** 233 acres potential habitat treated. Treatment would improve habitat quality by favoring old forest single strata ponderosa pine stands. **Lewis' woodpecker:** 288 acres of potential habitat treated. Habitat suitability/quality would be improved. **Forest dwelling bats:** Minor impacts expected. Losses of large diameter standing wood would be minimal because only green trees will be targeted for removal. **Migratory birds:** Mesic mixed conifer habitat: 568 acres treated. Multi-layered canopy & dense overstory habitats reduced in short and mid-terms.	**Goshawk:** 293 acres of potential nesting habitat & 5,287 acres of potential foraging habitat treated. Treated nesting habitat not likely used in short and mid-terms. **Olive-sided flycatcher:** not known to occur in analysis area. No commercial thinning/harvest in RHCAs, so no affect on habitat. **White-headed woodpecker:** 233 acres potential habitat treated. Treatment would improve habitat quality by favoring old forest single strata ponderosa pine stands. **Lewis' woodpecker:** 288 acres of potential habitat treated. Habitat suitability/quality would be improved. **Forest dwelling bats:** Minor impacts expected. Losses of large diameter standing wood would be minimal because only green trees will be targeted for removal. **Migratory birds:** Mesic mixed conifer habitat: 763 acres treated. Multi-layered canopy & dense overstory habitats reduced in short and mid-terms.	See Chapter 3 for detailed discussion

Issue	No Action	Proposed Action	Alternative 2	Alternative 3	Alternative 4
		Migratory birds continued: Dry forest habitat: 5,465 acres treated, with an additional 5,714 acres underburned. In the mid and long term, stand composition and structure would improve. Treatments could temporarily displace birds and destroy nests. However, populations would not likely be affected due to bird mobility and a propensity to re-nest if a nest is lost. Riparian shrub habitat: Prescribed fire could back into this habitat. High fuel moistures would prevent fire from killing habitat. Shrub steppe habitat: no acres treated; habitat not affected. Aspen habitat: 8 treatment units include this habitat. Removal of conifers within aspen stands would reduce stress on this habitat.	**Migratory birds continued:** Dry forest habitat: 3,220 acres treated, with an additional 12,808 acres underburned. In mid & long-terms, composition & structure would improve. Treatments could temporarily displace birds and destroy nests. However, populations would not likely be affected due to bird mobility and a propensity to re-nest if a nest is lost. Riparian shrub habitat: Prescribed fire could back into this habitat. High fuel moistures would prevent fire from killing habitat. Shrub steppe habitat: 2,423 acres underburned. Birds could be displaced or nests lost; however, habitat quality would improve in short and mid-terms. Aspen habitat: 4 treatment units include this habitat. Removal of conifers within aspen stands would reduce stress on this habitat.	**Migratory birds continued:** Dry forest habitat: 4,172 acres treated, with an additional 4,652 acres underburned. In the mid and long term, the composition and structure of these stands would improve. Treatments could temporarily displace birds and destroy nests. However, populations would not likely be affected due to bird mobility and a propensity to re-nest if a nest is lost. Riparian shrub habitat: Prescribed fire could back into this habitat. High fuel moistures would prevent fire from killing habitat. Shrub steppe habitat: no acres treated; habitat not affected. Aspen habitat: 8 treatment units include this habitat. Removal of conifers within aspen stands would reduce stress on this habitat.	See Chapter 3 for detailed discussion

Issue	No Action	Proposed Action	Alternative 2	Alternative 3	Alternative 4
Threatened, Endangered, & Sensitive Species	**Canada lynx:** No effect **Gray wolf:** No effect **California wolverine**: No Impact **Gray flycatcher:** No Impact **Upland sandpiper:** No Impact **Columbia spotted frog:** No Impact	**Canada lynx:** No effect—analysis area classified as unoccupied lynx habitat, no potential habitat treated **Gray wolf:** No effect—not known to occur in analysis area. **California wolverine**: No Impact—not known to occur in analysis area. potential foraging habitat treated, but reduction minor. **Gray flycatcher:** No Impact—habitat not within treatment units **Upland sandpiper:** No Impact— habitat not within treatment units **Columbia spotted frog:** May Impact—Developing tadpoles/froglets could be sucked into pumps used to remove water for dust abatement or fire control.	**Canada lynx:** No effect—analysis area classified as unoccupied lynx habitat, no potential habitat treated **Gray wolf:** No effect—not known to occur in analysis area. **California wolverine**: No Impact—not known to occur in analysis area. potential foraging habitat treated, but reduction minor. **Gray flycatcher:** May Impact—not known to occur in analysis area, but burning could adversely affect suitable habitat. **Upland sandpiper:** No Impact—although grasslands would be burned, potential habitat is too small/dispersed to support species. **Columbia spotted frog:** May Impact—Developing tadpoles/froglets could be sucked into pumps used to remove water for dust abatement or fire control.	**Canada lynx:** No effect—analysis area classified as unoccupied lynx habitat, no potential habitat treated **Gray wolf:** No effect—not known to occur in analysis area. **California wolverine**: No Impact—not known to occur in analysis area. **#ACRES?** potential foraging habitat treated, but reduction minor. **# WOULD SHOW HOW MINOR** **Gray flycatcher:** No Impact—habitat not within treatment units **Upland sandpiper:** No Impact— habitat not within treatment units **Columbia spotted frog:** May Impact—Developing tadpoles/froglets could be sucked into pumps used to remove water for dust abatement or fire control.	See Chapter 3 for detailed discussion

Issue	No Action	Proposed Action	Alternative 2	Alternative 3	Alternative 4
Soil	% of soil exposure across the treatment area Miles of constructed fireline % of soil compaction across the treatment area % of soil sterilization across the treatment area	See Chapter 3 for detailed discussion			
Fish Habitat	Proximity of activities to RHCAs Amount of sediment expected to reach streams % of RHCA vegetation removed by fire Predicted response of fish to potential habitat changes	See Chapter 3 for detailed discussion			

Issue	No Action	Proposed Action	Alternative 2	Alternative 3	Alternative 4
Invasive Plants	None of the new weed populations discovered since the 1995 Forest EA would be treated. Effectiveness of proposed weed prevention measures	130 acres from 6 populations that were discovered since the 1995 Forest EA could be treated with all methods including chemicals.	Chemical treatments would not be allowed on the 6 new populations. As a result, only 45 acres would be treated because one site contains sulphur cinquefoil (which is only successfully controlled using chemicals)	Chemical treatments would not be allowed on the 6 new populations. There would be no treatment of the new sites containing sulphur cinquefoil (because manual methods spread this species). As a result, only 45 of the new acres would be treated.	See Chapter 3 for detailed discussion
Treaty Rights	Discussion of how proposed activities could affect treaty rights (fish, wildlife, and cultural plant habitat)	See Chapter 3 for detailed discussion			

Issue	No Action	Proposed Action	Alternative 2	Alternative 3	Alternative 4
Cultural Resources	Proximity of known cultural sites to proposed activities # of affected sites that are potentially eligible for the National Register of Historic Places Effectiveness of proposed protection measures	See Chapter 3 for detailed discussion			
Unroaded Areas	Treatment acres within areas identified by ONRC and Potamus Canyon Discussion of predicted effects on roadless character and eligibility for wilderness designation	See Chapter 3 for detailed discussion			

Issue	No Action	Proposed Action	Alternative 2	Alternative 3	Alternative 4
Access	# of improved road closure devices Discussion of effectiveness of control measures	See Chapter 3 for detailed discussion			
Human Health & Safety	Estimates of smoke emissions Proximity to adjacent communities and airsheds Predicted safety of proposed fire ignition and control methods Estimated tons of fuel remaining	See Chapter 3 for detailed discussion			
Economics	volume of merchantable material (Ccf) Present Net Value	14,775 $61,120	9,044 ($4,857)	12,128 $89,085	See Chapter 3 for detailed discussion

CHAPTER 3 – ENVIRONMENTAL CONSEQUENCES

This chapter summarizes the physical and biological environments of the affected project area and the anticipated changes to those environments due to implementation of the alternatives. It also presents the scientific and analytical basis for the comparison of alternatives. The chapter is separated by resources. The current condition of each resource is described followed by the environmental consequences of each action on that resource. Acreage differences between sections are due to rounding differences or how the Geographic Information System (GIS) was applied during spatial analysis, and should not be considered significant.

The current condition of the area is the result of past actions or inactions across the watershed. The management has interconnected with natural processes to produce conditions that now lead to the need for vegetative treatments, as described in Chapter 1. A list of past, present, and foreseeable future actions is contained in Appendix X. The effects of these actions, now the current conditions, and the effects of the proposed alternatives have been analyzed in this section.

FORESTED VEGETATION

This section incorporates by reference the Falls Meadowbrook Silviculture Report (January 25, 2007) contained in the project analysis file at the North Fork John Day Ranger District. Methodologies, assumptions, and limitations of analysis along with other details are contained in the report. The existing condition and predicted effects of the Proposed Action and its alternatives are discussed in this section.

Scale of Analysis

All effects analyses were accomplished at the project area scale, with the exception of the Historical Range of Variability analysis, which was conducted on a landscape scale (see next section). Temporal scales used are short term (loosely 0-5 years) and long term (loosely 20 to 100+ years). These time frames were chosen for a very long-lived resource (trees) so that immediate effects of treatments could be discussed, as well as "out-year" effects of alternatives on tree stands.

SETTING

Disturbances played a large part in the recent history of the forested landscape in the Falls/Meadowbrook analysis area, and are responsible for the condition that we see today. Following, is a general discussion of different factors that have affected the development of the forest in the analysis area.

Disturbance influences stand structure and species composition by reducing vigor and killing trees, either selectively or non-selectively. Insects have been a prominent disturbance agent in the analysis area; spruce budworm caused widespread damage and mortality in the fir species in the 1980's, and mountain pine beetle caused heavy mortality in the lodgepole pine in the 1970's. Currently, bark beetles continue to cause mortality in the fir and pine species. Both the spruce budworm and mountain pine beetle are examples of selective disturbance, as they target specific tree species as hosts. Two examples of a non-selective disturbance would be wildfire or wind.

Diseases in the area include root rots and bole rots: Both Annosus and Armillaria root rots are the most prominent and actively causing damage and mortality in the grand fir; Indian paint fungus, a bole rot, is reducing vigor in the grand fir.

Timber harvest has been a disturbance agent in the area over the past several decades; selective removal of tree species has influenced stand compositions, and past ground-based equipment practices have increased soil compaction in some areas (Schmitt 2005). Compaction can exacerbate root rot diseases by causing poor root development or stressing host trees enough to weaken their defense.

Fire, its historical cycles and subsequent suppression by humans, has had an influence on the analysis area as a whole. More than half of the project area has been classified as a Fire Regime I (Powell 2004), which indicates a 0-35 year fire frequency, and low fire severity. Frequent, low-intensity underburns were characteristic of this area in the past, creating the open stands of ponderosa pine, western larch and, to a lesser extent Douglas-fir, associated with this fire regime. Suppression of fire in these areas has helped create the current stand composition and structure. Stands that were maintained as open single-story pine and larch, with large trees scattered and in clumps surrounded by pockets of regeneration of seral species, are now dense with multi-stories. The less fire-tolerant fir species and lodgepole pine have become more dominant as they out-compete the ponderosa pine and western larch for light and moisture. Fire plays an important role in nutrient cycling in the dry forests of eastern Oregon and fire suppression has altered this process, affecting those species that have evolved with it (Harvey and others, 1994). When a fire does burn through the area now, nutrient cycling does not function in the same way due to increased fuel build-up resulting in "hotter" fires compared to historical conditions (Harvey and others, 1994).

SPECIES COMPOSITION

Existing Condition

Temperature, moisture (related to sun exposure, slope and aspect), and soils all influence the potential vegetation that may grow on a site. Since vegetation behaves in

a similar way on sites that are similar in temperature, moisture and soil type, it is possible to characterize a site and the vegetation that may be expected to grow there. Potential vegetation is what is expected to be there, if the vegetation is allowed to grow in response to a site's temperature, moisture and soil without any disturbance. The potential vegetation and the disturbance that occur on a site are the main drivers of plant succession.

The potential vegetation in the analysis area is mostly dry, upland forest type (43,819 acres), occurring on western and southern aspects. Cold, upland forest (5,997 acres) and moist upland forest (9,047 acres) make up the potential vegetation on the rest of the analysis area. Both of these types occur on eastern and northern aspects.

Stands currently occupying the area vary from mixed ponderosa pine and Douglas-fir, to subalpine fir and Engelmann spruce. Specific stand types and conditions vary across units, but most stands show many of the same characteristics. Most obvious are higher levels of downed wood and litter (needles, leaves, small twigs), and regeneration of shade tolerant species (grand fir, Douglas-fir, and lodgepole pine) in what were historically ponderosa pine-dominated stands. These conditions are a result of many years of fire suppression in stands that evolved with and adapted to frequent, low-intensity natural fires (USDA Forest Service 1992). The natural pattern of fire has been altered, causing a domino effect of changes in other landscape components. Less obvious is the alteration of the vegetative mosaic and stand structures in the landscape, the change in diversity for these stands from historical conditions, and the alteration of nutrient-cycling processes (USDA Forest Service 1991). Refer to the Historical Range of Variability analysis detailed in the next section for more information.

Areas of cool, grand fir plant associations are present in the analysis area, consisting of grand fir, western larch, lodgepole pine, sub-alpine fir and Engelmann spruce; these associations usually occur on north- or east-facing slopes, which receive less sun exposure and are generally moister. Regeneration in these stands is primarily grand fir and lodgepole pine. These types of stands typically experienced infrequent stand-replacement fires that killed much of the stand. They would then regenerate with early seral species (western larch, lodgepole pine, and ponderosa pine). Late seral species would regenerate underneath the new canopy and eventually become the primary stand component. Past spruce budworm defoliation has had an impact in these stands, creating heavy fuels and damaging the health of current grand fir and Douglas-fir.

The analysis area contains many small stands of Quaking aspen (*Populus tremuloides*), which occurs in clumps or as individual trees, with tree sizes ranging from large, old remnant trees to smaller saplings and suckers. In general, the aspen in this landscape are declining in numbers. Historically, the aspen stands were larger and fire was a frequent visitor that encouraged regeneration. With the suppression of fire and pressure from large ungulate populations, the aspen stands have been shrinking in size through the years (Shirley and Erickson, 2001). Presently, all stands either have the capability or are reproducing well, however unless fenced, the regeneration is heavily browsed and does not become established. Conifer encroachment into these stands is also a factor in the declining aspen population, as the conifers compete successfully against the aspen for water, nutrients and sunlight. Current overstory trees are becoming decadent and have been slowly dying out. Aspen stands are not only

providing a unique component in the landscape's diversity, but are valued for their aesthetic qualities in the forest as a whole.

Environmental Consequences

Effects Unique to No Action

Direct and Indirect effects:

Taking no action on the Falls/Meadowbrook analysis area would result in species compositions that remain out of balance with historical conditions. Species mixes in ponderosa pine communities would continue to be dominated by fir and other species. This lessens the chance of pine regeneration more as time passes, and would make it difficult for the species to maintain a presence or dominance in stands where it should be the primary species. As species compositions remain out of balance in the dry upland forest, the landscape would continue to lose its resiliency in the face of disturbance. In stands where insects or diseases are causing mortality, there is no chance for a timely shift in species composition to help dilute the effects of these agents. No action in these stands, foregoes the opportunity to reforest areas with poor stocking due to insects or disease.

Cumulative effects:

The analysis area falls under the description of Forest Cluster 5 in the Integrated Scientific Assessment for Ecosystem Management in the Interior Columbia Basin (ICBMP) (Quigley et al., 1996). An analysis arising from the ICBMP looked at historical and current forest landscapes, and discussed the trends found in vegetation patterns and compositions (Hessburg, et al. 1999). Hessburg, et al. states: “Dramatic change in vital ecosystem processes such as fire, insect, and pathogen disturbances, succession, and plant and animal migration is linked to recent change in vegetation patterns.” These types of changes have occurred in the Falls/Meadowbrook analysis area, and No Action will not change the trends. ICBMP found that “forest landscapes have changed significantly in their vulnerability to major insect and pathogen disturbances” (Hessburg, et al. 1999). This change was influenced by timber harvest, fire suppression and grazing, and resulted in a loss of large trees, an expansion of Douglas-fir cover, and grass/shrub understories replaced by encroaching conifers (Hessburg, et al. 1999). No Action, coupled with these trends stemming from the past, will have the cumulative effect of perpetuating the trends.

Effects Common to Proposed Action and All Action Alternatives

Direct and Indirect effects:

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

would be the primary species planted, with mixes of other species as appropriate to the site. Ponderosa pine and western larch are early seral species for plant associations in the cold and moist upland forests as well as the dry upland forest. The overall effect in the stands after treatments would be a shift toward more ponderosa pine and western larch, with all the other species intermixed.

This shift would bring species compositions within the project area more in line with what occurred historically, improving overall stand health in the long term. Across the landscape, the thinning and harvest of these stands would have little impact on species composition. On an individual stand basis, selecting against individual tree species would create stands whose species mix better reflects early seral conditions.

Some stands are infected with root rots, which are affecting the health of the grand fir and Douglas-fir. Root rots remain in infected roots and can be spread by direct root contact or by spores and root rots can be exacerbated by soil compaction. In areas where root rots are present, the most effective "treatment" is to change the species mix on the site so the loss of trees to the disease is not as damaging to the stand as a whole. The stands in the Falls/Meadowbrook analysis area that have identified root rots would be treated in this manner—selecting against susceptible fir and favoring less-susceptible species such as larch. Soil compaction from equipment entering the stand may be minimized by choosing machines that distribute their weight over a large area, and by the use of designated skid trails.

Table 1: Acres moved toward historic species compositions.

Potential Vegetation Group	Type of Treatment	No Action	Proposed Action	Alternative 2	Alternative 3	Alternative 4
Dry Upland Forest	Thinning/ Harvest (acres)	0	5,731	3,425	4,702	4347
	Planting (acres)	0	1,252	734	657	657
Cold Upland Forest	Thinning/ Harvest (acres)	0	190	111	190	190
	Planting (acres)	0	190	111	190	190
Moist Upland Forest	Thinning/ Harvest (acres)	0	877	626	691	691
	Planting (acres)	0	179	148	179	179

Selection of the silvicultural treatments was guided by standards in the Land and Resource Management Plan for the Umatilla National Forest (Forest Plan). Briefly:

> The treatments are designed to control vegetation to establish desired species composition to minimize risks from insects, disease and wildfire, and use available and acceptable logging methods.
>
> Stocking level control has been prescribed in some areas to improve stand health, promote desired forest structure and species composition, to reduce risk of severe wildfire and to improve conditions for re-introducing fire using prescribed fire techniques.

Commercially thinned stands could have 30 to 60 trees per acre greater than 9 inches dbh left, and some stands could have upwards of 80 trees per acre. The range of basal area left could be from 40 to 80 square feet, depending on individual tree sizes. The resulting stand will be more open, with larger trees; it could have clumpy spacing in places and other areas where the trees are more spaced out. Where they occur, many smaller understory trees of sapling or pole size will remain. Larger trees will generally have more space around them than the smaller trees; and in the areas where wildlife forage is emphasized, the stand will intentionally be more open with fewer trees to encourage grasses and forbs. Individual tree species found within the stands will be the same, but the mix will be generally more ponderosa pine and western larch as those species will be favored leave trees.

Harvest of stands heavily infected with insects/disease would vary only in the number of leave trees. Stands will generally have at least 12 trees per acre greater than 9 inches dbh, including all green trees greater than 21 inches dbh. These stands are generally unhealthy, or have many dead trees, and after harvest will appear very open. These stands will require planting to meet stocking guidelines. Planting will be done at an average of 200 trees per acre. Species compositions will remain the same or will become richer, as the planting mix will mainly feature ponderosa pine and western larch with other species included to a lesser extent. The smaller seedling/sapling and pole size trees will remain in clumps and scattered throughout, but may succumb to prescribed fire when the stand is burned to prepare for planting.

Noncommercial thinning will occur where stocking exceeds PVG tolerance levels. Most trees in these stands are smaller than 9 inches diameter-at-breast-height (dbh). Thinned stands would have approximately 100 to 150 trees per acre left, at spacing from 8 feet to 20 feet between trees. Thinning will be apparent in these stands of smaller trees, but less so than with a thinning in larger trees. Areas between the trees will fill in with grasses and forbs, and overtime, new tree seedlings.

Cumulative effects:

The activities proposed to treat the identified stands would begin to reverse the trends as discussed in Hessburg's 1999 publication (see cumulative effects discussion under No Action for details). The intent of the prescriptions for all action alternatives would be to start bringing species compositions and their pattern on the landscape back to historical conditions, which when considered with past trends, would begin to restore a more resilient landscape.

Effects Unique to Alternative 2

Direct and Indirect effects:

Alternative 2 is identical to the proposed action, except it would have 2,636 fewer acres of thinning and harvest and 628 fewer acres of planting than the proposed action. Underburning of 17,244 acres is mainly within open stands and would have very incidental effects on species composition.

Effects Unique to Alternative 3

Direct and Indirect effects:

Alternative 3 is identical to the proposed action, except that it would have 1,215 fewer acres of thinning and harvest and 595 fewer acres of planting than the proposed action.

Effects Unique to Alternative 4

Direct and Indirect effects:

Alternative 4 is identical to the proposed action, except that it would have 1,570 fewer acres of thinning and harvest and 595 fewer acres of planting than the proposed action. Underburning of 18,266 acres is mainly within open stands and would have very incidental effects on species composition.

STAND STRUCTURE

Existing Condition

In many areas, stand structures in the warm, dry plant associations have changed from historical conditions of open, well-spaced large trees with sparse regeneration (essentially two layers of trees), to current conditions of stands with semi- or closed canopies of smaller trees with occasional large trees and abundant regeneration in the understories (multi-layered). Structural diversity across the landscape has decreased somewhat, with the loss of old forest structure. The mosaic (arrangement on the landscape) of stands and structures has changed over the years with fire suppression and other management practices; the extent of open pine stands has been reduced (Hessburg and others, 1999). This shift has changed conditions not only for vegetative species, but also for other species that rely on the open stands of pine.

On the dry sites, changes in stand composition are a direct driver in changing stand structure. Fire suppression has allowed stands to follow a different successional path, allowing tree species to grow where they would not commonly be as successful. As canopies close in and the ground becomes more shaded, shade-tolerant (and some fire-intolerant) species regenerate and prosper with more ease than the shade-intolerant species (western larch, ponderosa pine). Past harvest selections have accelerated the effect of this shift by removing more of the ponderosa pine and larch than other species.

On the cool sites, the area has had a loss of multi-storied old forest, primarily due to past spruce budworm damage and harvest. Many stands have experienced a loss of the large tree component and retained damaged/unhealthy understory trees due to

heavy mortality from insects and disease. Past harvest dating from the early 1970s and 1980s, shifted structural stages back to stand initiation (SI) or understory re-initiation (UR).

Tables 3 and 4 show the current area in different forest size classes and structural stages across the analysis area.

Table 3: Forest Size Classes (from Powell 2004)

Size Class	Description	Acres
Saplings	<5" DBH, seedlings and saplings	9,122
Poles	5" to 9" DBH, Pole-size trees	35,520
Small trees	9" to 21" DBH, Small-diameter trees	12,233
Large trees	>21" DBH, Medium and large trees	3,702

Table 4: Forest Structural Stages within the Potamus Watershed (from Powell 2004)

Structural Stage	Description	Current Acres
OFMS	Old Forest Multi-Strata	2,109
OFSS	Old Forest Single Stratum	2,294
SECC	Stem Exclusion Closed Canopy	18,502
SEOC	Stem Exclusion Open Canopy	8,968
SI/BG	Stand Initiation/Bare Ground	9,914
UR	Understory Re-initiation	7,059
YFMS	Young Forest Multi-Strata	9,905

Table 5: Definitions (Powell 2004):

OFMS	Old Forest Multi-Strata	Multi-layer stand, old trees in overstory
OFSS	Old Forest Single-Stratum	Single layer stand, old trees in overstory
SECC	Stem Exclusion, Closed Canopy	Fast-growing trees occupy site, understory excluded by lack of sunlight
SEOC	Stem Exclusion, Open Canopy	Fast-growing trees occupy site, understory excluded by lack of moisture
SI	Stand Initiation	Single layer of seedlings and saplings becoming established after disturbance
UR	Understory Re-initiation	Understory becoming established after overstory trees begin to die
YFMS	Young Forest Multi-Strata	3 or more layers, mix of sizes and ages, large

		trees scarce, high horizontal and vertical diversity

Historic Range of Variability (HRV) Analysis

The Falls/Meadowbrook analysis area is contained within a larger area described and analyzed under the Potamus Ecosystem Analysis. A historical range of variability analysis was conducted for the Potamus landscape, which included comparisons of current and historical conditions of stand composition and stand structure. HRV analysis is a "landscape-scale" type of analysis, and therefore the larger area of the Potamus Ecosystem Analysis is appropriate for this purpose, and applies to the smaller Falls/Meadowbrook project area.

The following HRV analysis is excerpted from Powell's Potamus Ecosystem Analysis Vegetation Report (Powell 2004b):

"HRV Analysis For Composition. To understand the implications of current conditions, it is often helpful to interpret them in an historical context. An analytical technique was recently developed to help put current conditions in their historical context – the historical range of variability (HRV).

Managers often consider HRV to be an indicator of ecological sustainability – historical conditions are believed to reflect sustainable conditions. A key premise of HRV is that native species have evolved with, and are adapted to, the historical disturbance regime of an area. For that reason, ecosystem components occurring within their historical range are believed to represent a sustainable condition (Morgan et al. 1994, Swanson et al. 1994)."

The implications of the composition HRV analysis (table 5-20) are:

1. Dry-forest sites currently support too much of the interior Douglas-fir and grand fir forest cover types and too little of the ponderosa pine forest cover type;
2. Moist-forest sites support too much of the interior Douglas-fir forest cover type and too little of the western larch forest cover type; and
3. Cold-forest sites support too much of the grand fir, grass-forb and interior Douglas fir cover types and too little of the spruce-fir cover type.

Table 5-20. Historical range of variability analysis for existing vegetation composition.

Cover Type	Dry UF PVG[1]		Moist UF PVG		Cold UF PVG	
	Historical Range (%)[2]	Current Percent[3]	Historical Range (%)	Current Percent	Historical Range (%)	Current Percent
Grass-forb	0-5	2	0-5	4	0-5	7
Shrub	0-5	< 1	0-5	3	0-15	2
Western juniper	0-5	< 1				
Ponderosa pine	50-90	21	5-15	9	0-5	1
Douglas-fir	5-15	54	15-30	41	0-15	18
Western larch	0-10	1	10-30	< 1	0-15	2

Broadleaved trees			0-5	< 1		
Lodgepole pine	0-5	7	5-30	12	20-60	19
Western white pine			0-5	0		
Grand fir	1-5	15	5-30	29	0-10	51
Whitebark pine					0-5	0
Spruce-fir			0-15	3	20-40	< 1

[1] Potential vegetation groups (PVG)

[2] Historical ranges, derived from Morgan and Parsons (2000), were based on multiple 1200-year simulations representing landscapes in a "dynamic equilibrium" with their disturbance regime.

[3] Current percentages, derived from the Potamus existing vegetation database (Powell 2004), include National Forest System lands only.

HRV Analysis For Forest Structure. HRV analysis for forest structure was based on two primary factors – forest structural classes and potential vegetation (as represented by PVGs).

Results of the forest structure HRV analysis are provided in table 5-21. It summarizes the current percentage of each structural class by potential vegetation group; the historical range for each structural class is also shown.

The implications of table 5-21 are: (Definitions are in Table 4)

1. The SI and SEOC structural classes are above the upper limit of their historical ranges for the cold and moist upland forest PVGs;
2. The SECC and UR structural classes are above the upper limits of their historical ranges for the dry upland forest PVG; and
3. The OFMS, YFMS and OFMS, and OFSS structural classes are below the lower limits of their historical ranges for the cold, moist and dry upland forest PVGs, respectively.

Table 5-21. Historical range of variability (HRV) analysis for forest structural classes.

		FOREST STRUCTURAL CLASSES[1]							NFS
PVG		BG/SI	SEOC	SECC	UR	YFMS	OFMS	OFSS	Acres
Cold	H%[2]	1-20	0-5	5-20	5-25	10-40	10-40	0-5	11,328
	C%[3]	**27**	**16**	9	11	30	**1**	4	
Moist	H%	1-10	0-5	5-25	5-25	40-60	10-30	0-5	10,678
	C%	**18**	**27**	14	7	**24**	**2**	**8**	
Dry	H%	5-15	5-20	1-10	1-10	5-25	5-20	15-55	56,329
	C%	16	8	**38**	**19**	12	3	**2**	

[1] Structural class codes are described in table 4. Gray cells show where the current percentage (C%) is above the historical range (H%) for a structural class. Black cells show where the current percentage is below the historical range. *Deviations were noted only when the current percentage differs from the historical range by more than two percent*.

[2] Historical ranges (H%) were derived from Hall (1993), Johnson (1993) and USDA Forest Service (1995), and are summarized in Blackwood (1998).

[3] Current percentages, derived from the Potamus existing vegetation database (Powell 2004), include National Forest System lands only."

For further information and maps, refer to Powell 2004b.

> **Note:** The historic range of variability (HRV) analysis (Powell 2004b), as part of the Potamus Ecosystem Analysis, encompassed an area larger than the Falls/Meadowbrook project area. This larger area was determined to be the most appropriate for this landscape-scale type of analysis and "Existing Condition" acres will not match the size of the analysis area.

Environmental Consequences

Effects Unique to No Action

Direct and Indirect effects:

No action in the analysis area would leave the current stand structures as they are. With the current condition of SECC, and assuming fire suppression would continue, the chance that this part of the District would be able to recover its historical range of OFSS would be small. The level of shade-tolerant species within many stands would make it difficult for ponderosa pine and western larch to succeed to the point of becoming the primary large trees across the landscape in the future. More likely, large pine and larch would continue to decline in numbers, slowly maintaining less and less of a presence in the landscape. In the case of OFMS structure, many stands of young fir (the future OFMS) are currently in an unhealthy condition, having suffered in the recent spruce budworm epidemic and drought conditions, and are continuing susceptibility to the insects and diseases present. Potentially, these trees may not be relied upon to contribute to large tree structure in the long term. Since grand fir is a shade tolerant species and has shown an ability to regenerate under more heavily vegetated conditions, new trees will eventually become established and grow where the opportunities exist. Seedling establishment may likely take many years; achieving the large size and stand conditions defined as OFMS will likely take 150-200 years beyond that.

The Forest Plan, when describing the goals and desired future conditions for the Forest, often mentions diversity in habitats and visual resources, and healthy and natural-appearing forests. The loss of OFSS and OFMS structure across the Falls/Meadowbrook landscape has had a direct effect on all those components. Leaving the analysis area in its current state (taking no action), would do little to achieve the goals and desired future conditions, and would most likely allow conditions to continue their decline.

Cumulative effects:

ICBMP and Hessburg (1999) also discussed patterns of living and dead structure on the landscape, from both a current and historical perspective as affected by changes in disturbance processes. Hessburg et al. (1999) found that in the Blue Mountains, old

single-story structures declined "*by nearly 63 percent*". No Action, coupled with these trends stemming from the past, would have the cumulative effect of perpetuating the trends, which would not improve the 63-percent decline and would allow it to decline further.

Effects Common to Proposed Action and All Action Alternatives

Direct, and Indirect effects:

Table 7: Acres of treatment to enhance Old Forest structure

	No Action	Prop. Action	Alternative 2	Alternative 3	Alternative 4
Ac. treated to promote OFSS	0	5,731	3,425	4,702	4,347
Ac. treated to promote OFMS	0	1,067	737	881	881

As shown in Table 7, all action alternatives would be focused primarily upon increasing old forest structure, including OFSS and OFMS, which are well below their historic range of variability in this part of the District. Thinning would be the primary means of enhancing OFSS, especially in those stands that are in the SECC stage. Thinning would shift the site's growing potential to fewer trees, allowing those trees to grow larger more quickly; in the case of the lack of OFSS structure, this would directly affect the path each stand takes toward old forest structure. Since many of these stands are young, development of large trees would be a long process (100+ years), but the action alternatives would start these stands down this path. The stands treated to promote OFMS will minimize the current impacts of insects and disease, and combined with planting, establish these stands for a healthy future. The effect of this treatment would be to shift their current structure of either Young Forest Multi-Strata (YFMS), Stem Exclusion Closed Canopy (SECC) or Understory Re-initiation (UR) in the cold and moist upland forests to UR, SEOC, or Stand Initiation (SI) structure.

Growing old forest structure is obviously a long-term process, but any enhancement with silvicultural treatments would have far-reaching effects in the future. Influencing species composition and individual stand health now would encourage ponderosa pine and western larch to prosper and compete effectively with other species as the stands grow, ultimately speeding the process of becoming OFSS. Thinning from below would begin to reduce the multiple layers found in these stands, further enhancing the development of OFSS. Improving stand health by influencing species compositions with removal and planting will promote healthy trees that have a chance to grow into OFMS conditions.

Table 8: Acres treated within PVGs to enhance old forest structure.

PVG	**Total Landscape**	**Area treated to enhance old forest structure**

	(HRV) Acres	No Action		Proposed Action		Alternative 2		Alternative 3		Alternative 4	
Cold UF	11,328	0	0	190	2%	111	1%	190	2%	190	2%
Dry UF	56,329	0	0	5,731	10%	3,425	6%	4,702	8%	4,347	8%
Moist UF	10,678	0	0	877	8%	626	6%	691	7%	691	7%

Cumulative effects:

As discussed under No Action, ICBMP and Hessburg (1999) also discussed patterns of living and dead structure on the landscape. The intent of the prescriptions for all action alternatives is to begin bringing stand structures and their pattern on the landscape back to historical conditions. When considered with past trends, this treatment would begin to return conditions toward a more resilient landscape, particularly with a regard to OFSS and OFMS

Effects Unique to the Proposed Action

Direct and Indirect effects:

The proposed action includes some harvest within stands designated as OFSS structure in the forest vegetation database. Since current HRV analysis indicates the project area is below the historical range for OFSS, harvest within these stands would require a site-specific forest plan amendment (Regional Forester 2003) to depart from Scenario A guidelines in the Eastside Screens. The silvicultural treatments for these stands include commercial thinning to varying spacing. The thinning would be from below, removing small trees from around the vicinity of the large, remnant ponderosa pine and thinning pockets of younger pine to improve growing conditions and encourage future large trees. In several stands, a mosaic of large ponderosa pine pockets and Douglas-fir/grand fir pockets exist, primarily due to past logging and differing soil types. Some of the fir and Douglas-fir have been damaged by spruce budworm in the past and currently are in poor shape, with dead tops and poor crowns. Also, active Armillaria root rot is present in some areas, causing mortality and poor health. Heavier thinning is proposed to treat the unhealthy fir pockets interspersed among the large ponderosa pine. This prescription will remove pockets of trees from one quarter to 1 acre in size, resulting in a mosaic of openings with both small and large ponderosa pine left where they are encountered. The openings will be planted with ponderosa pine and western larch both to encourage growth of these species on the dry site and to increase the stands' resistance to the spread of root rot.

Effects Unique to Alternative 2

Direct and Indirect effects:

Alternative 2 is identical to the proposed action, except it would treat 2,636 fewer acres and would not include harvesting within OFSS. The treatments prescribed in this

alternative would follow the direction set forth in Forest Plan Amendment #8 for Scenario A.

Effects Unique to Alternative 3

Direct and Indirect effects:

Alternative 3 is identical to the proposed action, except it would treat 1,215 fewer acres, and would not include harvesting within OFSS. The treatments prescribed in this alternative would follow the direction set forth in Forest Plan Amendment #8 for Scenario A.

Effects Unique to Alternative 4

Direct and Indirect effects:

Alternative 4 is identical to the proposed action, except it would treat 1,570 fewer acres and would not include harvesting within OFSS. The treatments prescribed in this alternative would follow the direction set forth in Forest Plan Amendment #8 for Scenario A.

STOCKING

Existing Condition

A little more than half of the acres within the Analysis Area are classified as "dense" (as identified in forest database queries). Trees in these dense stands tend to be stressed by competition with their neighbors for light and water. Stressed trees are more susceptible to insect attack or disease infestation, and are usually slower growing (Powell 1999).

Table 9: Areas of overstocking (from Powell 2004):

Potential Vegetation Group	Acres of Overstocking
Dry Upland Forest	31,538
Cold Upland Forest	3,609
Moist Upland Forest	3,692

Stocking is closely tied to disturbance cycles. Insects and disease have been more prevalent in these stands due to the stress caused by dense stocking. The spruce budworm epidemic in the 1980's and early 1990's and the resulting defoliation, dead tops, sparse crowns and tree mortality was an example of what can occur from disruption of natural patterns by something such as fire suppression. Many stands

within the analysis area were heavily impacted by the budworm, and remain in poor health. A variety of insect and disease damage is currently evident as individual, weak trees succumb to infestation or attack (Schmitt 2005). Dense stocking appears to be a noteworthy obstacle for trees and stands in the area to overcome, which, if this condition continues, would weaken trees and create opportunities for insects or disease to increase above present levels. Many of the large, old ponderosa pine are currently at risk of attack, primarily from bark beetles. Their large root systems require even greater growing space to maintain tree health. Increased shade cover (less sunlight on the forest floor) and lack of soil exposure for seed germination, resulting from a lack of frequent fire, has reduced the amount of ponderosa pine and western larch regeneration in some areas, and encouraged regeneration of shade-tolerant fir and lodgepole pine.

Environmental Consequences

Effects Unique to No Action

Direct and Indirect effects:

Thinning would not occur with No Action, which would leave stands at higher risk from unnatural levels of disturbance. Insects and diseases increse where trees are weakened by competition for light, moisture and growing space. Stands with denser understories would be at higher risk of wildfire.

Cumulative effects:

No Action, coupled with past activities in the analysis area (see list of Past, Present, and Future Projects in the Analysis File), would have the cumulative effect of perpetuating trends of increased stocking as described in ICBMP and Hessburg (1999).

Effects Common to Proposed Action and All Action Alternatives

Direct and Indirect effects:

Table 10: Acres of reduced stocking.

	No Action	Proposed Action	Alternative 2	Alternative 3	Alternative 4
Acres of reduced stocking	0	5,199	3,191	4,614	4,259

As displayed in Table 10, all action alternatives would reduce stocking in the treatment units, primarily by thinning. Thinning can mimic low-intensity surface fires, defoliator damage or other similar natural disturbance processes (Powell 2000), by removing trees that would be absent given a natural disturbance. Prescriptions for all action alternatives would be designed to begin bringing stand densities back to historical conditions. Removal of some of the trees in the treatment units would allow remaining

trees more access to sunlight, nutrients, water and growing space, which would improve the overall health of affected stands. Maintaining or improving tree health could reduce damage and mortality from insects and disease, and create a more long-lived and resilient stand.

A "variable density" thinning would be applied where stand conditions allow, using a basal area-type marking. Rather than the more uniform appearance of using set spacing rules, variable density thinning leaves pockets of more closely-spaced trees interspersed with more openly-spaced trees. Where opportunities exist, more closely-spaced trees would be left near roads or areas where wildlife may benefit from screening effects.

Cumulative effects:

Past activities of fire suppression and selective timber harvest helped create the stocking problems observed in current stands within the analysis area. The proposed thinning would counteract these effects by creating more sustainable stand densities in the treated units, which would begin to re-initiate a more resilient landscape. Some areas within this project are proposed for underburning. Since fire is a natural thinning tool, it is expected that this activity would enhance the effects of the action alternatives.

Effects Common to Proposed Action and Alternative 2

Direct and Indirect effects:

The Proposed Action and Alternative 2 have some delineated areas inside thinning units that would receive a heavier thinning for the purpose of creating more forage for wildlife. A few more trees would be removed within these areas in comparison to the surrounding unit, opening portions of the thinning unit up to increase sunlight and growing space for increased forage production. These areas total 161 acres in the Proposed Action and 108 acres in Alternative 2.

Effects Unique to Alternative 2

Alternative 2 would thin 2,008 fewer acres than the Proposed Action.

Effects Unique to Alternative 3

Alternative 3 would thin 585 fewer acres than the Proposed Action.

Effects Unique to Alternative 4

Alternative 4 would thin 940 fewer acres than the Proposed Action.

SOIL

This section incorporates by reference the Falls Meadowbrook Soils Report (January 16, 2007) contained in the project analysis file at the North Fork John Day Ranger District. Methodologies, assumptions, and limitations of analysis along with other details are contained in the report. The existing condition and predicted effects of the Proposed Action and its alternatives are discussed in this section.

Scale of Analysis

The analysis area for soil disturbance is the existing roads, proposed fire lines, and treatment units for the Falls Meadowbrook Project in the North Fork John Day and Middle Fork John Day River sub-basins.

The analysis area for soil erosion is the North Fork John Day River/Potamus Watershed plus 1709 acres which encompass activities in the Middle Fork John Day sub-basin. The soil erosion analysis area is 186,992 acres, of which 101,277 acres are managed by the North Fork John Day Ranger District.

The analysis area for riparian road density is the Falls Meadowbrook Project Area, which includes the North Fork John Day River/Potamus Sub-watershed and 1709 acres of Middle Fork John Day Sub-Watersheds. Detailed information is available for this area, which allows riparian road density to be calculated.

Analysis of cumulative effects will include Forest Service activities which are believed to be currently affecting the soil resource.

Existing Condition

Soil Disturbance

Soils in the 99 original Falls Meadowbrook activity units were screened for disturbed soil conditions such as compaction, displacement, rutting, and scorching with the Umatilla NF Soil Screening Protocol. No units were chosen for follow-up screening, because existing soil disturbance was low in all units. The conditions observed are shown in the Soils Report in the analysis file.

Soil Erosion

Exposed soil resulting from land management is primarily located in the road system. Minor areas of exposed soil are approximately 9 acres of cattle trails and range improvements on public land with an assumption of the same amount on private land. The roads, cattle trails, and range improvements total approximately 2779 acres, and are the only sources of management induced soil erosion.

The analysis area is 292.2 square miles, resulting in a road density of approximately 3.9 miles of roads per square mile of area. The North Fork John Day Ranger District average road density is 2.6 miles per square mile. The Upper Potamus subwatershed has a road density of 3.4 miles per square mile, which is the highest road density in the Potamus Watershed.

The riparian road density is approximately 3.0 miles of roads per square mile of riparian area. Soil erosion was observed on roads in the area. Roads built in riparian areas may constrict floodplains. A lack of vegetation resulting in part from roads was also observed. The effects of the road system on water quality are analyzed in the Falls Meadowbrook Water Resources Report (2007).

There have been three large wildfires in the analysis area since 1960. The Ditch Creek Fire burned 21,269 acres in 1961, the Mallory/Monument Fire burned 203 acres in 2001, and the Bull Springs 2 Fire burned 458 acres in 2003. Recovery is complete from the Ditch Creek fire. The Bull Springs 2 Fire burned hottest in riparian areas and in heavy timber on the Middle Fork side. The fire was less intense on the Meadowbrook side, because of the generally northern aspect and flatter ground. Fire effects in this analysis area were low to moderate, resprouting was prompt, and no soil exposure or detrimental soil conditions remain from the fire.

The desired condition for soil is to "maintain a minimum of 80 percent of a project area ... in a non-detrimental soil condition with respect to ... compaction, displacement, and erosion" (Forest Plan, p. 4-43). However, "a small percentage of the Forest soil in roads, trails, rock pits, and other allocations will be in a nonproductive state" (Forest Plan, p. 4-10).

Issues:

Soil Disturbance

It is expected that the existing system roads would be compacted, and in some instances rutted. However, there are also non-system roads, road prisms, landings, and abandoned skid trails which exhibit compaction and rutting, but are below the detrimental threshold. Harvest activities, including skidding, loading, trucking, pile burning, and underburning in this project may increase the amount of soil compacted, rutted, displaced or scorched, though no detrimentally affected soil was observed in pre-planning screening. Soil is detrimentally affected when its ability to sustain vegetation is reduced. Impacts to soil would be mitigated with the standard operating procedures and Best Management Practices (BMPs).

Soil Exposure

Existing roads are sites with exposed soil. Forest roads, especially native surface roads, are more likely to erode than forest soil because they contain large continuous areas of bare soil providing efficient locations for collecting and channeling water. Roads in riparian areas are more likely to direct eroded soil into streams, because of the close proximity, and tend to be the largest source of sediment in forested watersheds. Un-maintained roads erode more than new or recently maintained roads. Periodic road maintenance reduces, but does not eliminate erosion.

Roads along streams and roads that cross streams reduce stream bank stability, contributing to stream sediment and turbidity.

Indicators of Soil Disturbance

The indicators for detrimental soil disturbance such as compaction, displacement, and scorching are "ruts greater than 6 inches deep; missing litter and duff layers; evidence

of topsoil removal, gouging, and piling; removal of the *majority* of the surface soil (surface soil may be mixed with subsoil, subsoil partially or totally exposed); and/or burning has consumed the duff layer, root crowns, and surface roots of grasses (evidence of severely burned soils such as mineral surface soil is red in color)" (Umatilla National Forest Soil Disturbance Protocol, 2002).

Soil exposure is the indicator for soil erosion hazard. Soil exposure is usually short-lived (one to three years). The soil exposure indicator depends on revegetation processes to determine how long the risk of erosion lasts. Erosion control measures and/or revegetation normally occur in the same season as the treatment with full effectiveness of new vegetation occurring in the first year or two.

Environmental Consequences

No Action Alternative

Direct and Indirect Effects

Soil Disturbance

Forest Service records indicate that approximately 33,589 acres have had harvest activity since 1960, which is approximately 56 percent of the forested area (59,135 acres) in these sub-watersheds under Forest Service management. This 56 percent is likely to represent the area accessible to ground based harvest. These harvests were primarily partial cuts, with some commercial thinning and overstory removal. Most of the road system was developed in conjunction with harvest, although some roads were/are in use for general transportation by the public.

Pre-analysis soil screening observed low levels of soil disturbance, and no soils in a detrimental condition. Private lands in the area were not observed.

Under this Alternative, the detrimental soil indicators would remain the same as they are now.

Soil Erosion

Existing roads would remain at an estimated 1141 miles added to an estimated 18 acres of cattle trails and range improvements, resulting in approximately 2779 acres of exposed soil in the analysis area (Table 1). The analysis area includes approximately 186,992 acres or 292.2 square miles.

Table 1, Existing condition soil exposure.

Activity	Exposed Acres
FS, county, private roads*	2761
Forest Service Grazing	9
Private Grazing	9
Total Existing	2779

***road totals on private land are estimated.**

Road density in the analysis area would remain at 3.9 miles of road per square mile. This figure includes estimated roads on private land. The county portions of roads 3963 and 3980, which have a length of approximately 14 miles, have received periodic maintenance, and it is assumed this would continue. The 15 miles of Highway 395 is maintained annually by the State of Oregon. The other 1112 miles of open, closed, and seasonal roads would not be consistently maintained, and would continue to be used in a deteriorating condition. This deterioration involves erosion of fine material from the road surface and adds fine sediment and turbidity to the stream system. Roads in riparian areas are more likely to introduce sediment into streams, because of their proximity.

Riparian road density would remain at 3.0 miles of road per square mile. Existing riparian roads, including open, closed, seasonal, and non-system roads would continue to constrict flood plains in the area. This increases stream bank instability and sediment production above the level it would be if the roads had not been constructed.

Fire prone timber stands outside HRV, line the riparian areas and escalate the risk that post wildfire conditions would cause erosion, increasing stream sediment and turbidity. For this Alternative, the soil erosion indicators would not change.

Proposed Action

Direct and Indirect Effects

Soil Disturbance

Detrimental soil disturbance is expected to occur with this alternative. Increases in soil disturbance may result in decreased vegetative production. The soils in detrimental condition would recover at different rates, based on the impacts which caused them.

The Proposed Action would non-harvest thin and treat the resulting fuels on 469 acres using a single machine making one pass, harvest thin 1439 acres with two passes, and harvest thin and non-harvest thin with slash treatment on 3290 acres using three passes. Also, it would remove most standing green timber and snags in decadent and diseased stands on 1598 acres. Because more trips with logging equipment would be required to remove most of the timber on the 1598 acres, these treatments would have similar effects to three passes by heavy equipment.

Monitoring of similar soils showed soil disturbance did not reach the detrimental threshold after 1 or 2 passes. However, soil disturbance did become detrimental after 3 passes, estimating a 3 percent increase in the detrimentally affected area. The areas with detrimental soil conditions were isolated within the units where multiple skid trails converged. It is estimated that a similar increase in detrimental soil conditions in isolated patches would occur on this project.

The Proposed Action would underburn 7130 acres of fuels. Forest Plan monitoring on the South Zone of the Umatilla National Forest has found that prescribed underburning resulted in exposed mineral soil on less than 3 percent of burned units. The areas of exposed mineral soil were not continuous (2005 South Zone Forest Plan Monitoring Report).

The 214 acres of detrimentally affected soil resulting from underburning are expected to begin growing moss in 1-3 years. Vascular plants would begin to appear in 3-5 years, possibly sooner if re-sprouting roots are present. It is difficult to artificially restore efficiently in burns because the small areas needing treatment are scattered throughout large units. The remaining 6916 acres which were not detrimentally affected by burning would "green up" with grass and shrub growth in a few weeks.

Ninety miles of mechanical fire lines and 3.5 miles of wet line or hand line would be constructed around units before burning. The mechanical fire line is expected to include a trail of bare mineral soil approximately 18 inches wide, which would be 100 percent detrimentally affected, because of the displacement of top soil. Hand line is approximately 18 inches wide, and would leave some of the organic horizons and top soil in place. The 3.5 miles of hand line and wet line are not expected to have any effect on soil. The mechanical fire lines are expected to be bare for 3 to 5 years before they begin to support grasses.

The areas detrimentally affected by harvest thinning, non-harvest thinning, slash busting, and by decadent stand harvest are expected to be the landings and the main skid trails as they approach the landings. Such areas begin to recover in approximately 5 years, but take a long time to reach full recovery. These areas benefit especially from cultivation techniques such as sub-soiling or scarification.

Table 3. Estimated Detrimental Acres and Productivity Recovery Years After Proposed Action by Activity.

Activity	Detrimental Acres Proposed Action	Detrimental Acres Alternative 2	Detrimental Acres Alternative 3	Detrimental Acres Alternative 4	Recovery Years
Underburning	154	510	177	548	1-3
Mechanical fire lines	16	3	13	6	3-5
HT, NHT, SB, DT*	214	90	116	112	5-100
Pile burning	0	7	0	0	
Total acres	384	610	306	667	

*** Harvest thinning, non-harvest thinning, slash busting, decadent stand treatments.**

Soil Erosion

Road density would remain 3.9 miles per square mile in the Proposed Action because no new roads would be constructed.

One hundred fifty miles of existing Forest Service roads would receive maintenance and reconstruction, in addition to the 29 miles maintained by the State and the Counties.

Reconstruction includes routine maintenance-type work, as well as placing crushed rock to harden road surfaces, shaping the road surface so water easily flows off, and installing drainage systems. The effects of maintenance and reconstruction would be mitigated with BMPs.

It is likely the maintenance and reconstruction would cause an overall reduction in stream sediment and turbidity, which is expected to gradually reverse and return to the present condition 5-10 years after the last blading.

After use, all roads would be graded and stabilized as needed; including the construction or reconstruction of water bars and dips. The closed roads used for project implementation would be re-closed.

Riparian road density would remain at 3.0 miles per square mile. Some of the roads maintained are in riparian areas. This maintenance causes an overall reduction in the amount of fine sediment that enters streams, and doesn't affect bank stability.

Approximately 7130 acres of prescribed burning are proposed to reduce the risk of destructive wildfires. Areas of exposed soil will be small and not continuous, and any erosion resulting from the Proposed Action would be expected to be localized.

The 90 miles of mechanical fire line is not planned for construction in riparian areas. Mechanical fire lines would be mitigated by water bars during construction and by seeding as needed after use. Possible erosion from these fire lines is not expected to reach streams.

The 3.5 miles of hand line and wet line are not expected to have any impacts on soil.

The erosion indicators are summarized in Table 4.

	no action	proposed	alt 2	alt 3	alt 4
road density*	3.9	3.9	3.9	3.9	3.9
riparian road density*	3.0	3.0	3.0	3.0	3.1
maint and reconst**	29	150	134	142	139
mechanical fire lines***	0	16	3	13	6

***Road density is expressed in miles of roads per square miles of analysis area.**
****Miles.**
*****Acres of bare soil.**

Cumulative Effects

Soil Disturbance

There is currently no soil in proposed treatment units in a detrimental condition because of displacement/rutting or soil compaction.

The Proposed Action would result in an estimated 384 acres of detrimental soil (Table 3). When combined with the existing condition, approximately 2.8 percent (384ac/13,923ac) of the treatment units would have soils disturbed enough to reduce their productivity.

Soil Erosion

The 1141 miles of roads in this area are the sum of past road construction. The Proposed Action would not change the road density or the riparian road density. Approximately 151 miles of roads would be maintained or reconstructed, which would reduce erosion and sediment in streams.

The 1141 miles of roads cover approximately 2761 acres (average 20' width). Other contemporary sources of erosion are an estimated 18 acres of exposed soil in cattle trails and range improvements under both ownerships. The total amount of existing bare soil that is subject to erosion is 2779 acres, which is equivalent to 1.486 percent (2779 ac/186,992 ac) of the analysis area. The Proposed Action would increase this area by 16 acres with the construction of mechanical fire lines, which is equivalent to 1.495 percent (2795 ac/186,992 ac) of the analysis area.

Table 5, Cumulative Comparison of Alternatives.

Indicator	No Action	Proposed Action	Alternative 2	Alternative 3	Alternative 4
Soil Disturbance	0	384/13,923 ac, 2.8 %	610/21,402 ac, 2.9%	306/11,486 ac, 2.7%	667/18,266 ac, 3.7%
Soil Erosion Potential*	2779 ac, 1.486%	2795 ac, 1.495%	2782 ac, 1.488%	2792 ac, 1.493%	2785 ac, 1.489%
road density	3.9 mi/sq mi	3.9 mi/sq mi	3.9 mi/sq mi	3.9 mi/sq mi	3.9 mi/sq mi
riparian road density	3.0 mi/sq. mi.	3.0 mi/sq. mi.	3.0 mi/sq. mi.	3.0 mi/sq. mi.	3.0 mi/sq. mi.
road maint and reconst	29 mnt	142 mnt or reconst	125 mnt or reconst	133 mnt or reconst	131 mnt or reconst

***excess significant figures included to right of decimal to show difference between alternatives.**

Alternative 2

Direct and Indirect Affects

Soil Disturbance

Alternative 2 proposes to non-harvest thin and treat the resulting fuels on 237 acres with a single machine making one pass, harvest thin 915 acres with two passes, and harvest thin and non-harvest thin with slash treatment on 2038 acres with three passes. Also, it would remove most standing green timber and snags in decadent and diseased stands (970 acres). The effects on soil disturbance for the machine passes are described in the Proposed Action Alternative.

Sixteen miles of mechanical fire lines and 1 mile of hand line or wet line would be constructed around units before burning; having impacts as described in the Proposed Action. Alternative 2 also proposes to underburn 17,244 acres. It is estimated that 510

acres would be detrimentally impacted by the burning. These effects and their recovery are described in the Proposed Action. The remaining 16,734 acres, not detrimentally affected, would "green up" with grass and shrub growth in a few weeks.

Included in the 17,244 acres of underburn are approximately 7 acres of slash piles on whole-tree removal landings that would also be burned. It is likely that these areas would be detrimentally scorched by the pile burning. They would benefit from cultivation and soil amendments before seeding. The effects of this burning are similar to those described in the Proposed Action Alternative.

Expected increases in detrimental soil conditions for this alternative are shown in Table 3. Increases in detrimental soil conditions are expected to cause simultaneous decreases in vegetative production. Recovery time from the detrimental conditions would be similar to that described in the Proposed Action Alternative.

Soil Erosion

Road density would remain 3.9 miles per square mile in Alternative 2 because no new roads would be constructed.

Road maintenance and reconstruction would be done on 134 miles of existing roads in addition to the 29 miles maintained by the State and the Counties. Road maintenance and reconstruction activities and effects were described under the Proposed Action. After use, all roads would be graded and stabilized as needed. The closed roads used for project implementation would be re-closed. Any risk of sedimentation from these actions would be mitigated by BMPs.

Riparian road density would remain at 3.0 miles per square mile, with the effects the same as the Proposed Action.

Alternative 2 proposes prescribed burning on 17,244 acres to reduce the risk of destructive wildfires. Whole tree removal is proposed on 605 acres. The effects of burning are described in the Proposed Action. Any erosion resulting from Alternative 2 is expected to be localized.

In addition, 16 miles of mechanical fire line and 1 mile of hand line or wet line would be constructed to contain the burns. The mechanical fire line, hand line, and wet line would be constructed and have effects as described in the Proposed Action.

The erosion indicators are summarized in Table 4.

Cumulative Effects

Soil Disturbance

Alternative 2 proposes actions estimated to result in 610 acres of soil in a detrimental condition (Table 2). When combined with the existing condition, approximately 2.9 percent (610/21,402 ac, 2.9%) of the analysis area would have soils disturbed enough to reduce their productivity. See Table 5 above.

Soil Erosion

The 1141 miles of roads in this area are the sum of past road construction. The existing road density is 3.9 miles/square mile of analysis area. Alternative 2 would not change the road density or the riparian road density. Approximately 134 miles of roads would be maintained or reconstructed, reducing erosion and sediment in streams.

The 1141 miles of roads cover approximately 2761 acres (average 20' width). Other contemporary sources of erosion are an estimated 18 acres of exposed soil in cattle trails and range improvements under both ownerships. The total amount of existing bare soil which is subject to erosion is 2779 acres, which is equivalent to 1.486 percent (2779 ac/186,992 ac) of the analysis area. Alternative 2 would increase this area by approximately 3 acres by constructing mechanical fire line, resulting in 2782 acres of bare soil, which is equivalent to 1.488 percent (2782 ac/186,992 ac) of the analysis area (Table 5).

Alternative 3

Direct and Indirect Effects

Soil Disturbance

Alternative 3 proposes to non-harvest thin and treat the resulting fuels on 469 acres with a single machine making one pass, harvest thin 1255 acres with two passes, and harvest thin and non-harvest thin with slash treatment on 2890 acres using three passes. Also, it would remove most standing green timber and snags in decadent and diseased stands on 968 acres. The effects on soil disturbance for the machine passes are described in the Proposed Action Alternative.

Seventy-one miles of mechanical fire lines and 3 miles of hand line or wet line would be constructed around units before burning, with impacts as described in the Proposed Action. Alternative 3 also proposes to underburn 5907 acres. It is estimated that 177 acres would be detrimentally impacted by the burning. These effects and their recovery are described in the Proposed Action. The remaining 5730 acres, not detrimentally affected, would "green up" with grass and shrub growth in a few weeks.

Expected increases in detrimental soil conditions for this alternative are shown in Table 3. Increases in detrimental soil conditions are expected to cause simultaneous decreases in vegetative production. Recovery time from the detrimental conditions was described in the Proposed Action.

Soil Erosion

Road density would remain 3.9 miles per square mile in Alternative 3 because no new roads would be constructed.

Road maintenance and reconstruction would be done on 142 miles of existing roads in addition to the 29 miles maintained by the State and the Counties. Road maintenance, reconstruction activities, and effects, along with post treatment activities, were described under the Proposed Action.

Riparian road density would remain at 3.0 miles per square mile, with effects the same as the Proposed Action.

Alternative 3 proposes prescribed burning on 5907 acres to reduce the risk of destructive wildfires. The effects of burning are described in the Proposed Action and are expected to be localized.

Additionally, 71 miles of mechanical fire line and 3 miles of hand line or wet line would be constructed to contain the burns. The mechanical fire line, hand line, and wet line will be constructed and have effects as described in the Proposed Action.

The erosion indicators are summarized in Table 4.

Cumulative Effects

Soil Disturbance

Alternative 3 proposes actions which are estimated to result in 306 acres of soil in a detrimental condition. When combined with the existing condition, approximately 2.7 percent (306/11,486 ac) of the analysis area would have soils disturbed enough to reduce their productivity. See Table 5 above.

Soil Erosion

The 1141 miles of roads in this area are the sum of past road construction. The existing road density is 3.9 miles/square mile of analysis area. Alternative 3 would not change the road density or the riparian road density. Approximately 142 miles of roads would be maintained or reconstructed, which would reduce erosion and sediment in streams.

Alternative 3 would increase the existing bare soil subject to erosion by approximately 13 acres with construction of mechanical fire line. This would increase the bare soil equivalent to 1.493 percent (2792 ac/186,992 ac) of the analysis area (Table 5).

Alternative 4

Direct and Indirect Effects

Soil Disturbance

Alternative 4 proposes to non-harvest thin and treat the resulting fuels on 237 acres with a single machine making one pass, harvest thin 1255 acres with two passes, and harvest thin and non-harvest thin with slash treatment on 2767 acres with three passes. Also, it would remove most standing green timber and snags in decadent and diseased stands on 968 acres. The effects on soil disturbance for the machine passes are described in the Proposed Action Alternative.

Thirty-five miles of mechanical fire lines and 1 mile of hand line or wet line would be constructed around units before burning. Mechanical fire line, hand line, and wet line would be constructed and have impacts as described in the Proposed Action. Alternative 4 also proposes to underburn 18,266 acres. It is estimated that 548 acres would be detrimentally impacted by the burning. These effects and their recovery are described in the Proposed Action the remaining 17,718 acres which were not detrimentally affected by burning would “green up” with grass and shrub growth in a few weeks.

Expected increases in detrimental soil conditions for this alternative are shown in Table 3. Increases in detrimental soil conditions are expected to cause simultaneous

decreases in vegetative production. Estimated recovery times from the detrimental conditions are shown in Table 3 and were described in the Proposed Action.

Soil Erosion

Mechanical non-commercial thinning is prescribed on 237 acres in riparian areas under this alternative. Project Design Elements and BMPs are expected to prevent erosion as described under the Proposed Action.

Road density would remain 3.9 miles per square mile in Alternative 3 because no new roads would be constructed.

Road maintenance and reconstruction would be done on 140 miles of existing roads in addition to the 29 miles maintained by the State and the Counties. Road maintenance and reconstruction activities and effects were described under the Proposed Action. After use, all roads would be graded and stabilized as needed; including the construction or reconstruction of water bars and dips where needed. Any risk of sedimentation from these actions would be mitigated by Best Management Practices.

Riparian road density would remain at 3.0 miles per square mile, with effects the same as the Proposed Action.

Prescribed burning would occur on 18,266 acres to reduce the risk of destructive wildfires. The effects of burning are described in the Proposed Action. Any erosion resulting from Alternative 4 would be expected to be localized.

In addition, 35 miles of mechanical fire line and 1 mile of hand line or wet line would be constructed to contain the burns. The mechanical fire line, hand line, and wet line would be constructed and have effects as described in the Proposed Action.

The erosion indicators are summarized in Table 4.

Cumulative Effects

Soil Disturbance

Alternative 4 proposes actions which are estimated to result in 667 acres of soil in a detrimental condition. When combined with the existing condition, approximately 3.7 percent (667/18,266 ac) of the analysis area would have soils disturbed enough to reduce their productivity. See Table 5 above.

Soil Erosion

The 1141 miles of roads in this area are the sum of past road construction. The existing road density is 3.9 miles/square mile of analysis area. Alternative 4 would not change the road density or the riparian road density. One hundred forty miles of roads would be maintained or reconstructed, which would reduce erosion and sediment in streams.

Alternative 4 would increase the existing bare soil subject to erosion by approximately 13 acres with construction of mechanical fire line. This would increase the bare soil equivalent to 1.493 percent (2792 ac/186,992 ac) of the analysis area (Table 5).

HYDROLOGY

This section incorporates by reference the Falls Meadowbrook Vegetative Management Water Resources Report (January 15, 2007) contained in the project analysis file at the North Fork John Day Ranger District. Methodologies, assumptions, and limitations of analysis along with other details are contained in the report. The existing condition and predicted effects of the Proposed Action and its alternatives are discussed in this section. Sedimentation and water temperature are also addressed under the Fish Section of this Environmental Assessment.

Scale of Analysis

The scope of this analysis is the North Fork John Day/Potamus Watershed, (HUC 1707020207), and 1709 adjacent acres which are in the Middle Fork John Day Watersheds. This area is part of the North Fork John Day River Sub basin. The watershed analysis area is 186, 992 acres, of which 101,277 acres are managed by the North Fork John Day Ranger District. Analysis of cumulative effects will include Forest Service activities which are believed to be currently affecting the hydrologic aspects of the human environment. Projections of cumulative effects are made for 16 years into the future.

Existing Condition

The Potamus Ecosystem Analysis contains water quality concerns that are related to the high road density in the analysis area. Forest roads, especially native surface roads, are more likely to erode than forest soil because they contain large continuous areas of bare soil, providing efficient locations for collecting and channeling water. Roads tend to be the largest source of sediment in forested watersheds and they tend to produce a small but steady supply of eroded soil.

Roads not maintained erode more than new or recently maintained roads. Periodic road maintenance reduces, but does not eliminate erosion. The indicator for this erosion is road density in the analysis area. Road density is currently 3.9 miles of roads per square mile of analysis area (1141 miles/292.2 miles^2). Road density for the North Fork John Day Ranger District as a whole is 2.6 miles per square mile of district (1889 mi/727.5 miles^2).

Roads built in riparian areas also narrow the effective flood plain, which decreases stream sinuosity and channel length. Since the same amount of water must run through shorter channels; stream velocity increases, resulting in increased stream energy. The increased energy is expended by eroding susceptible stream banks in areas with shallow bedrock, which causes wider, shallower streams which carry more sediment/turbidity than they would if the roads had not been constructed. The indicator for this stream bank erosion is riparian road density. The riparian road density is 3.0 miles of road per square mile of Forest Service managed riparian area (93 miles/30.5 square miles).

The analysis area is in a semi-arid climate zone which has high summer temperatures and low summer precipitation. The low precipitation results in low stream flows during the summer leading to increased stream temperatures in the summer. There is no definitive data regarding the extent of canopy cover in the analysis area before management began. However, it is known that during the managed period, there has been timber harvest, road construction, and foraging by cattle, elk, and deer in riparian areas that has reduced vegetation from the pre-management levels. Timber harvest of the Potamus subwatersheds involved in this project covered between 0 and 52 percent of the riparian areas. Reduced shade from reduced vegetation can cause stream temperatures to increase more than they would if the vegetation was not reduced. The indicator for riparian vegetation which can shade a stream is percent stream canopy cover.

There have been three large wildfires in the analysis area since 1960. The Ditch Creek Fire burned 21,269 acres in 1961, the Mallory Fire burned 4098 acres in 2001, and the Bull Springs 2 Fire burned 458 acres in 2003. Recovery is complete from the Ditch Creek fire. The Mallory Fire burned north of the river and west of Potamus Creek, in range land with timber stringers. The dozer lines were water-barred and seeded after the burn, and the bare ground is recovered. The Bull Springs 2 Fire burned hottest in riparian areas and in heavy timber on the Middle Fork side, because they had the most fuel. The fire was less intense on the Meadowbrook side, because of the generally northerly aspect and flatter ground. Fire effects in this analysis area were low to moderate, resprouting was prompt, and no soil exposure or detrimental soil conditions remain.

Issues

Existing roads in the analysis area are contributing to erosion and sediment delivery to streams. Riparian roads reduce effective stream shade and stream bank stability.

The proposed action requires reconstruction of approximately 9 miles of existing roads and maintenance of approximately 141 miles of existing roads. These actions would be likely to reduce erosion, but also would interfere with passive recovery of riparian vegetation on reconstructed and closed roads in riparian areas. At the scale of the analysis area, the effects of these actions would be un-measurable.

Five streams in the North Fork John Day/Potamus Watershed are listed as water quality limited on the current 303(d) list. Riparian conditions are not optimum, because of excess roads and reduced riparian vegetation.

Indicators

Road density (miles of road per square mile of area) is used as an indicator for soil erosion from roads. Riparian road density (miles of roads per square mile riparian area) is used as an indicator for stream bank erosion, which is one source of stream sediment and turbidity.

Canopy cover (percent of the visible area over a stream covered by vegetation and measured at a certain moment in time) is used as an indicator of stream shading, which is related to stream temperature.

ALTERNATIVES

No Action

Direct and Indirect Effects - Sediment

Under this alternative, miles of road (1141) and acres of exposed soil (2761) would remain the same. There would be an estimated 2779 acres of exposed soil subject to erosion.

Road density in the analysis area would remain at 3.9 miles of road per square mile of analysis area. The 1112 miles of Forest Service open, closed, and seasonal roads would not be maintained or maintained sporadically, and would continue to be used in a deteriorating condition allowing erosion of fine material from the road surface by running water. This erosion adds fine sediment and turbidity to the stream system, which may reduce the beneficial uses of the water. Roads in riparian areas are more likely to introduce sediment into streams, because of their proximity.

Riparian road density would remain at 3.0 miles of road per square mile of analysis area. Existing riparian roads, including open, closed, seasonal, and non-system roads would continue to constrict flood plains in the area. This increases stream bank instability and sediment production above the level it would be if the roads had not been constructed.

Fire prone timber stands line the riparian areas and continue the risk that wildfire would cause erosion that would increase stream sediment and turbidity. For Alternative 1, the soil erosion indicators would not change.

Direct and Indirect Effects - Temperature

The current riparian canopy would continue to allow sunlight to reach streams and raise their temperatures. Passive restoration of the vegetation would eventually produce a canopy, but it would take approximately 100-500 years.

In the meantime, fire-prone timber stands connect the riparian areas and increase the likelihood of wildfire causing reductions in water quality.

Cumulative Effects of No Action Alternative

Since there are no Forest Service actions taken with this alternative, there are no changes to road density, riparian road density, road maintenance, or the riparian canopy. The indicators for these conditions are shown in Table 4. Because there are no actions, there are no effects to accumulate with the effects of past management actions.

Table 4, Water Quality Indicators by Alternative.

	no action	proposed	alt 2	alt 3	alt 4
road density*	3.9	3.9	3.9	3.9	3.9
riparian road density*	3.1	3.1	3.1	3.1	3.1
maint and reconst**	29	150	134	142	139
Mechanical fire lines***	0	16	3	13	6

***Road density is expressed in miles of roads per square miles of analysis area.**
****Miles.**

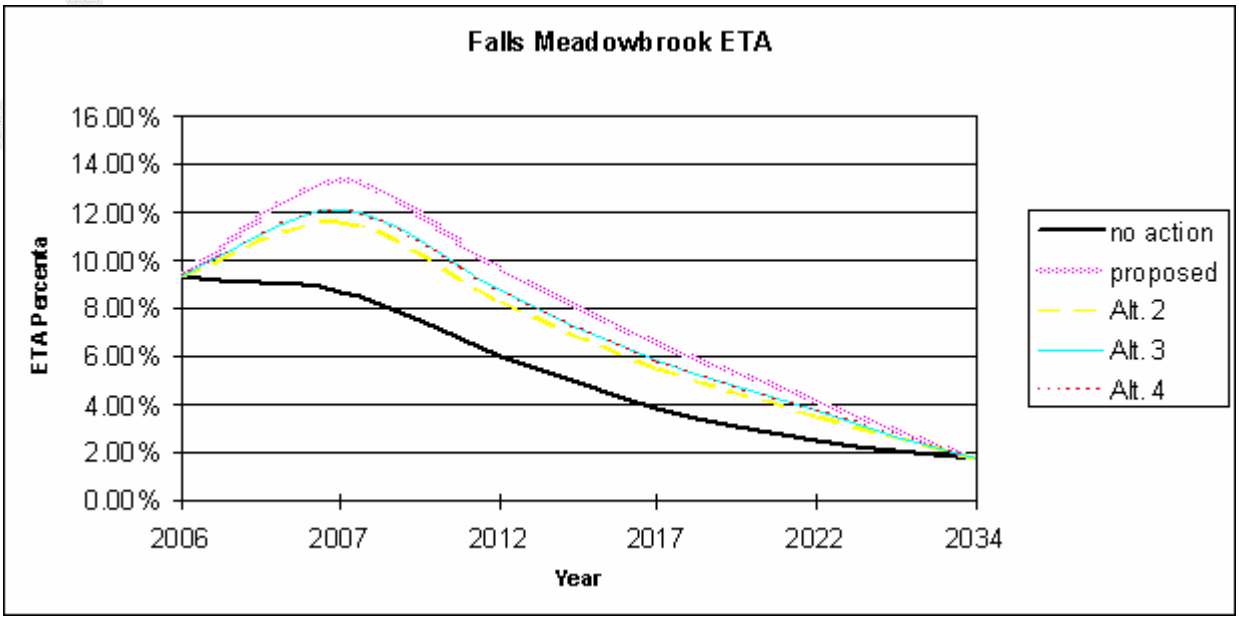
Cumulative Effects Common to All Action Alternatives:

Equivalent Treatment Area

The overall condition of the analysis area was examined with the Equivalent Treatment Area model. It uses past harvest and road construction data to model the current condition and the extent of the proposed harvest and road construction. Results were pro-rated to account for recovery over time and are expressed in acres which have not recovered hydrologically from past treatments.

As of the end of 2006, the Equivalent Treatment Area of Forest Service managed land affected by past harvest, road construction, and defoliation is 5493 acres, or 9.29 percent of the analysis area. The area affected by these conditions is projected into the future in Chart 1. This Equivalent Treatment Area is the background level for this project. Chart 1 also projects the effects of the proposed timber harvest by alternative. The size of the affected area gradually declines as harvest and defoliation recovers; until the year 2034, when only permanent roads affect the area hydrologically. At that time, approximately 1.7 percent of the analysis area would be affected by Forest Service management.

Chart 1, Equivalent Treatment Area (ETA) on Forest Service portion of analysis area.



Note: Time intervals are exaggerated to show detail. ETA percentages are taken to hundredths in order to show differences between alternatives.

Measurable changes in hydrologic parameters such as water yield, peak flows, or low flows as a result of harvest and road construction are unlikely at these levels of Equivalent Treatment Area. The numerous studies of harvest and water yield generally show a range of responses occurring when 20 or more percent of the study area is clearcut and roaded (Sherer, 2000, and Stednick, 1996).

Because the existing and proposed harvest and roaded part of the analysis area, including the private land, is less than 14 percent, and because effects to hydrologic parameters are not documented at less than 20 percent, it is assumed this project would not affect water yield, peak flows, and seasonal low flows. For this reason, the hydrologic parameters will not be further analyzed in this document. Equivalent Treatment Area percentages will be used as a metric to compare the intensity of the alternatives.

Sediment

The road system, past harvest, and past grazing on public and private land is likely to introduce more sediment and turbidity into the streams than there would be without these activities. The sediment and turbidity created by past activities is the background level for this project. This sediment load is proportionally reduced by maintenance on the 29 miles of county and state roads. Forest Plan grazing and harvest practices are allowing recovery on the lands managed by the Forest Service. While stream sediment and turbidity are not optimum, analysis area streams are still beneficially used for anadromous fish spawning and rearing.

Most of the analysis area is grazed by domestic livestock. Grazing issues on Forest Service land were addressed in the Forest Plan. Best Management Practices implemented by that plan maintain and improve stream bank stability and reduce sediment in streams. The extent of similar measures on private land is unknown.

Because of past fire suppression, most timber stands in the analysis area have changed in character to become more susceptible to wildfire. The streams in these stands are at risk of receiving sediment inputs in the event of a large wildfire.

Temperature

On both Forest Service and private land, riparian vegetation has been diminished by past harvest, road construction, and over-grazing by cattle and wildlife in riparian areas. The percent of shade is lower than it would be in the absence of those actions, estimating potential canopy in the 50 to 80 percent range. The existing canopy may be deficient in mature, reproducing populations of certain keystone species, such as black cottonwood, quaking aspen, black hawthorne, red-osier dogwood, mountain alder, willow, and service berry (Forest botanist, 12/21/05). Ponderosa pine is reproducing, but there is a lack of mature trees. Low canopy cover is related to high stream temperatures during the low flow season. It is likely that temperatures in these streams are higher than they would be if the canopy had not been reduced.

Grazing issues on Forest Service land were addressed in the Forest Plan. That plan implemented Best Management Practices, which have been effective at increasing riparian vegetation and shade. It is not known if similar measures have been taken on private land.

Because of the 1995 amendment to the Forest Plan known as PACFISH, timber harvest in riparian areas of Forest Service land has been virtually eliminated, allowing riparian conifer forests on Forest Service land to recover.

Hardwood diversity would be difficult to recover without planting and protecting scarce species along streams. Since conifers do not occupy every habitat niche in riparian

zones, there is a considerable area which will never have a canopy higher than grass and sedge. This area is estimated at 10 to 30 percent of the floodplain. While riparian canopy and stream shade are not at optimum levels, analysis area streams are still used beneficially for anadromous fish spawning and rearing.

Because of past fire suppression, most timber stands in the analysis area have changed in character to become more susceptible to wildfire. There is a risk that riparian canopies would be decreased by large wildfires.

Personal fire wood and hazard tree cutting, mushroom collection, and recreational activities are on-going on the National Forest, and are unlikely to affect water quality in the analysis area.

Proposed Action Alternative

Direct and Indirect Effects

Sediment

The Proposed Action's effects on soil erosion are discussed in detail in the Soil Report. Following the Project Design Elements and the BMPs, it is not expected that the proposed actions would result in soil erosion which could enter streams as sediment.

The Proposed Action would not change road density or riparian road density. It would maintain or reconstruct 151 miles of roads. Since these roads are now in a deteriorated condition, it is expected that the maintenance and reconstruction would cause a decrease in stream sediment and turbidity for 5-10 years, until the roads return to their present level of deterioration.

The Proposed Action proposes harvest thinning, non-harvest thinning, combined harvest and non-harvest thinning, decadent stand harvest, and mechanical and combustion fuel treatments. Mechanical fire lines would cover approximately 16 acres. Estimates based on past monitoring indicate that while these activities would cause increases in detrimental soil conditions and exposed soil, they are not expected to result in increases in stream sediment and turbidity (Soil Report). The water quality indicators are summarized in Table 4.

Future wildfires threaten to expose soil and increase stream sediment. The prescribed burning and mechanical fuel treatments in the Proposed Alternative would reduce the intensity and rate of spread of future wildfires, thus protecting water quality.

Temperature

The riparian canopy would not be affected by harvest or mechanical fuel treatments; because these actions would not take place in riparian areas. Mechanical non-commercial thinning would occur on 469 acres in riparian areas. This thinning is designed to increase the rate of conifer crown development, to cast more shade on streams. In the short term, there would likely be a reduction in riparian shade. However, it is expected this reduction would be un-measurable as trees providing shade to RHCAs with perennial water would not be removed. After approximately 5 to 10 years, more shade would be present than without this treatment. Prescribed fires would not be ignited in riparian areas, but would be allowed to back into them. This is unlikely to affect the canopy and its ability to shade streams. Mechanical fire lines may

occasionally enter riparian areas, but are not likely to measurably affect the percent of canopy cover or cause sediment to enter streams.

Road maintenance and reconstruction would cut small trees and shrubs growing in the rights-of-way. This would slow the recovery of vegetation growing in riparian areas. However, the reduction in vegetation would not measurably change the percent of existing canopy cover.

Cumulative Effects of the Proposed Action

Sediment
The Existing Treatment Area model assumes that the Proposed Action harvest would be completed in one year, and would then recover linearly for 28 years. After 28 years, the units would function hydrologically as full canopy forest. The existing roads would not have any recovery.

The existing condition Equivalent Treatment Area on Forest Service land for the Proposed Action is shown as 9.29 percent of the subwatershed in 2006 on Chart 1. This rises to a high of 13.36 percent in the first year after harvest. The Equivalent Treatment Area gradually declines to the baseline condition of 1.68 percent of the subwatershed after 28 years. The baseline remains at 1.68 percent, which represents the area of the existing roads.

There would be no change to the status of open, closed, and seasonal roads in the area. A total of 151 miles of deteriorating roads would be maintained or reconstructed, reducing background sediment and turbidity levels for 5-10 years, until the roads return to the current level of deterioration.

Temperature
On both Forest Service and private land, the riparian canopy has been diminished in area and diversity by past harvest, road construction, and past over-grazing by cattle and wildlife. The coniferous riparian canopy is recovering on Forest Service land. The non-commercial thinning in riparian areas would accelerate the recovery of the riparian canopy and incrementally reduce stream temperature after approximately 5 to 10 years. Riparian canopy diversity would not change under this alternative.

A few trees and shrubs would be cut during road maintenance in riparian areas under the Proposed Alternative. However, the amount of cutting is so small that the percent of canopy cover would not change.

Clean Water Act
The Proposed Action meets the Clean Water Act standard for maintaining water quality because Best Management Practices are used, and 151miles of deteriorated roads are maintained or reconstructed. It also meets the Clean Water Act goal of improving water quality, because of non-commercial thinning in riparian areas.

Alternative 2

Direct and Indirect Effects
Sediment

The effects of Alternative 2 on soil erosion are discussed in detail in the Soil Report. Following the Project Design Elements and the BMPs, it is not expected that the proposed actions would result in soil erosion which could enter streams as sediment.

Alternative 2 would not change road density or riparian road density. It would maintain or reconstruct 134 miles of roads. Since these roads are now in a deteriorated condition, it is expected that the maintenance and reconstruction would cause a decrease in stream sediment and turbidity for 5-10 years, until the roads return to their present level of deterioration.

Alternative 2 proposes harvest thinning, non-harvest thinning, combined harvest and non-harvest thinning, decadent stand harvest, and mechanical and combustion fuel treatments. Mechanical fire lines would cover approximately 3 acres. Estimates based on past monitoring indicate that while these activities would cause increases in detrimental soil conditions and exposed soil, they are not expected to result in increases in stream sediment and turbidity (Soil Report). The water quality indicators are summarized in Table 4.

Future wildfires threaten to expose soil and increase stream sediment. The prescribed burning and mechanical fuel treatments would reduce the intensity and rate of spread of future wildfires, thus protecting water quality.

Temperature

The riparian canopy would not be affected by harvest, non-commercial thinning, or mechanical fuel treatments; because these actions would not take place in riparian areas. Mechanical non-commercial thinning would occur on 237 acres in riparian areas. This thinning is designed to increase the rate of conifer crown development, in order to cast more shade on streams. In the short term, there would likely be a reduction in riparian shade, but would be un-measurable and the rate of shade improvement would be the same as the Proposed Action. Prescribed fires would not be ignited in riparian areas, but would be allowed to back into them. This is unlikely to affect the canopy and its ability to shade streams. Mechanical fire trails may occasionally enter riparian areas, but are not likely to measurably affect the percent of canopy cover or cause sediment to enter streams.

Road maintenance and reconstruction would cut small trees and shrubs growing in the rights-of-way. This would slow the recovery of vegetation growing in riparian areas. However, the reduction in vegetation would not measurably change the percent of existing canopy cover.

Cumulative Effects

Sediment

The Existing Treatment Area model assumes that Alternative 2 harvest would be completed in one year, and would then recover linearly for 28 years. After 28 years, the units would function hydrologically as full canopy forest. The existing roads would not have any recovery.

The existing condition Equivalent Treatment Area on Forest Service land for Alternative 2 is shown as 9.29 percent of the subwatershed in 2005 on Chart 1. This rises to a high of 11.53 percent in the first year after harvest. The Equivalent Treatment Area gradually

declines to the baseline condition of 1.68 percent of the subwatershed after 28 years. The baseline remains at 1.68 percent, which represents the area of the existing roads.

There would be no change to the status of open, closed, and seasonal roads in the area. A total of 134 miles of deteriorating roads would be maintained or reconstructed, reducing background sediment and turbidity levels for 5-10 years, until the roads return to the current level of deterioration.

Temperature

On both Forest Service and private land, the riparian canopy has been diminished in area and diversity by past harvest, past road construction, and past over-grazing by cattle and wildlife. The coniferous riparian canopy is recovering on Forest Service land. The non-commercial thinning in riparian areas would accelerate the recovery of the riparian canopy and incrementally reduce stream temperature after approximately 5 to 10 years. Riparian canopy diversity would not change under this alternative.

A few trees and shrubs would be cut during road maintenance in riparian areas under Alternative 2. However, the amount of cutting is so small that the percent of canopy cover would not change.

Clean Water Act

Alternative 2 meets the Clean Water Act standard for maintaining water quality because Best Management Practices are used, and 134 miles of deteriorated roads are maintained or reconstructed. It also meets the Clean Water Act goal of improving water quality, because of non-commercial thinning in riparian areas.

Alternative 3

Direct and Indirect Effects

Sediment

The effects of Alternative 3 on soil erosion are discussed in detail in the Soil Report. Following the Project Design Elements and the BMPs, it is not expected that the proposed actions would result in soil erosion which could enter streams as sediment.

Alternative 3 would not change road density or riparian road density. It would maintain or reconstruct 142 miles of roads. Since these roads are now in a deteriorated condition, it is expected that the maintenance and reconstruction would cause a decrease in stream sediment and turbidity for 5-10 years, until the roads return to their present level of deterioration.

Alternative 3 proposes harvest thinning, non-harvest thinning, combined harvest and non-harvest thinning, decadent stand harvest, and mechanical and combustion fuel treatments. Mechanical fire lines would cover approximately 13 acres. Estimates based on past monitoring indicate that while these activities would cause increases in detrimental soil conditions and exposed soil, they are not expected to result in increases in stream sediment and turbidity (Soil Report). The water quality indicators are summarized in Table 4.

Future wildfires threaten to expose soil and increase stream sediment. The prescribed burning and mechanical fuel treatments in this alternative would reduce the intensity and rate of spread of future wildfires, thus protecting water quality.

Temperature

The riparian canopy would not be affected by harvest or mechanical fuel treatments; because these actions would not take place in riparian areas. Mechanical non-commercial thinning would occur on 469 acres in riparian areas. This thinning is designed to increase the rate of conifer crown development, in order to cast more shade on streams. In the short term, there would likely be a reduction in riparian shade, but would be un-measurable and the rate of shade improvement would be the same as the Proposed Action. Prescribed fires would not be ignited in riparian areas, but would be allowed to back into them. This is unlikely to affect the canopy and its ability to shade streams. Mechanical fire trails may occasionally enter riparian areas, but are not likely to measurably affect the percent of canopy cover or cause sediment to enter streams.

Road maintenance and reconstruction would cut small trees and shrubs growing in the rights-of-way. This would slow the recovery of vegetation growing in riparian areas. However, the reduction in vegetation would not measurably change the percent of existing canopy cover.

Cumulative Effects

Sediment

The Existing Treatment Area model assumes that Alternative 3 harvest would be completed in one year, and would then recover linearly for 28 years. After 28 years, the units would function hydrologically as full canopy forest. The existing roads would not have any recovery.

The existing condition Equivalent Treatment Area on Forest Service land for Alternative 3 is shown as 9.29 percent of the subwatershed in 2005 on Chart 1. This rises to a high of 12.12 percent in the first year after harvest. The Equivalent Treatment Area gradually declines to the baseline condition of 1.68 percent of the subwatershed after 28 years. The baseline remains at 1.68 percent, which represents the area of the existing roads.

There would be no change to the status of open, closed, and seasonal roads in the area. A total of 142 miles of deteriorating roads would be maintained or reconstructed, reducing background sediment and turbidity levels for 5-10 years, until the roads return to the current level of deterioration.

Temperature

On both Forest Service and private land, the riparian canopy has been diminished in area and diversity by past harvest, road construction, and over-grazing by cattle and wildlife. The coniferous riparian canopy is recovering on Forest Service land. The non-commercial thinning in riparian areas would accelerate the recovery of the riparian canopy, and incrementally reduce stream temperature after approximately 5 to 10 years. Riparian canopy diversity would not change under this alternative.

A few trees and shrubs would be cut during road maintenance in riparian areas under the Alternative 3. However, the amount of cutting is so small that the percent of canopy cover would not change.

Clean Water Act

Alternative 3 meets the Clean Water Act standard for maintaining water quality because Best Management Practices are used, and 142 miles of deteriorated roads are maintained or reconstructed. It also meets the Clean Water Act goal of improving water quality, because of non-commercial thinning in riparian areas.

Alternative 4

Direct and Indirect Effects

Sediment

The effects of Alternative 4 on soil erosion are discussed in detail in the Soil Report. Because of following the Project Design Elements and the BMPs, it is not expected that the proposed actions would result in soil erosion which could enter streams as sediment.

Alternative 4 would not change road density or riparian road density. It would maintain or reconstruct 140 miles of roads. Since these roads are now in a deteriorated condition, it is expected that the maintenance and reconstruction would cause a decrease in stream sediment and turbidity for 5-10 years, until the roads return to their present level of deterioration.

Alternative 4 proposes harvest thinning, non-harvest thinning, combined harvest and non-harvest thinning, decadent stand harvest, and mechanical and combustion fuel treatments. Mechanical fire lines would cover approximately 6 acres. Estimates based on past monitoring indicate that while these activities would cause increases in detrimental soil conditions and exposed soil, they are not expected to result in increases in stream sediment and turbidity (Soil Report). The water quality indicators are summarized in Table 4.

Future wildfires threaten to expose soil and increase stream sediment. The prescribed burning and mechanical fuel treatments described in the Proposed Alternative would reduce the intensity and rate of spread of future wildfires, thus protecting water quality.

Temperature

The riparian canopy would not be affected by harvest, non-commercial thinning, or mechanical fuel treatments because these actions would not take place in riparian areas. Mechanical non-commercial thinning would occur on 237 acres in riparian areas as described under the Proposed Action. Prescribed fire and mechanical fire lines would have the same effects on temperature as described under the Proposed Action, too.

Road maintenance and reconstruction would also affect temperature as descried for the previous alternatives.

Cumulative Effects

Sediment

The Existing Treatment Area model assumes that Alternative 4 harvest would be completed in one year, and would then recover linearly for 28 years. After 28 years, the units would function hydrologically as full canopy forest. The existing roads would not have any recovery.

The existing condition Equivalent Treatment Area on Forest Service land for Alternative 4 is shown as 9.29 percent of the subwatershed in 2005 on Chart 1. This rises to a high of 12.06 percent in the first year after harvest. The Equivalent Treatment Area gradually declines to the baseline condition of 1.68 percent of the subwatershed after 28 years. The baseline remains at 1.68 percent, which represents the area of the existing roads.

There would be no change to the status of open, closed, and seasonal roads in the area. A total of 140 miles of deteriorating roads would be maintained or reconstructed, reducing background sediment and turbidity levels for 5-10 years, until the roads return to the current level of deterioration.

Temperature
On both Forest Service and private land, the riparian canopy has been diminished in area and diversity by past harvest, past road construction, and past over-grazing by cattle and wildlife. The coniferous riparian canopy is recovering on Forest Service land. The non-commercial thinning in riparian areas would accelerate the recovery of the riparian canopy, and incrementally reduce stream temperature after approximately 5 to 10 years. Riparian canopy diversity would not change under this alternative.

A few trees and shrubs would be cut during road maintenance in riparian areas under Alternative 4. However, the amount of cutting is so small that the percent of canopy cover would not change.

Clean Water Act
Alternative 4 meets the Clean Water Act standard for maintaining water quality because Best Management Practices are used, and 140 miles of deteriorated roads are maintained or reconstructed. It also meets the Clean Water Act goal of improving water quality, because of non-commercial thinning in riparian areas.

FISH

This section incorporates by reference the Falls Meadowbrook Vegetation Management Aquatics Report (January 10, 2007) contained in the project analysis file at the North Fork John Day Ranger District. Methodologies, assumptions, and limitations of analysis along with other details are contained in the report. The existing condition and predicted effects of the Proposed Action and its alternatives are discussed in this section.

Scale of Analysis

The scale used for analysis includes the Potamus fifth field watershed. The Potamus watershed (a tributary to the North Fork John Day River) covers about 159,746 acres, of which 71,767 acres are within the National Forest boundary. This scale was selected because effects from the proposed projects would not be distinguishable at a larger scale.

Streams within the analysis that have the potential for being affected either directly or indirectly are as follows: Potamus, Ellis, Deep, Matlock, Dry Matlock, Scaffold, No Name, Thompson, Stony, Rush, Haden, Hinton, West Fork Meadowbrook, East Fork Meadowbrook, Smith, Bully, Brush, Barnes and Board creeks. Only these streams will be analyzed for this project. Information was integrated in part through GIS mapping to portray spatial relationships among fish species, habitat, and conditions and activities that could affect fish and their habitat.

Current fish distribution (table 2) of salmonids in tributaries is likely similar to historic conditions. ODFW records from Streamnet show no artificial truncation of fish distribution for salmonids in this watershed. Detailed species distribution and habitat use data are presented under the fish distribution section.

Table 2. Steelhead/Redband Distribution among Forest Streams (measured from confluence)

Stream Name	Steelhead Use (mi)	Redband Use (mi)	Chinook Use (mi)
Potamus	14.5	18.4	0.6
Ellis	2.2	2.2	0
Deep	.3	3.6	0
Matlock	4	5.9	0
Matlock, unnamed trib	0	2.8	0
WF Meadowbrook	6.8	8.6	0
Smith	1.5	4.8	0
EF Meadowbrook*	0.6	11.4	0
Bully	0	1.9	0
Hinton**	0	4.9	0

* 30-foot natural falls @RM 0.6 on EF Meadowbrook Creek blocks upstream passage for steelhead, redband.

** 35-foot natural falls @RM 2.6 on Hinton Creek blocks upstream passage.

Aquatic Habitat

Water Temperature:

This topic is also addressed under the Hydrology Section of this Environmental Assessment

Existing Condition

The Falls/Meadowbrook Vegetation Management analysis area contains approximately 392 miles of streams within the forest boundary (table 3). The vast majority of these streams go dry in the summer but many of them still retain fish in pools scattered throughout the stream.

Table 3: Miles of stream within the Falls/Meadowbrook Vegetation Management analysis area within the National Forest boundary.

Subwatershed	Miles of fish-	Miles of	Miles of	Total

	bearing streams (Class 1,2)	perennial, non-fish-bearing streams (Class 3)	intermittent streams (Class 4)	Stream Miles
East Fork Meadowbrook	6.9	12.6	35.7	55.2
Meadowbrook	5	1.4	27.2	33.6
Deerhorn (170702020703)	1.8	3.1	14.7	19.6
Deerhorn (170702020704)	0	0.5	7.3	7.8
Stony/Matlock	10.6	18.6	53.3	82.5
Upper Potamus	27.3	5.0	49.6	81.9
Little Potamus	10.1	11	86.5	107.6
Granite Creek	0	0	2.4	2.4
Rush Creek	0	0	1.5	1.5
Total stream miles on Forest within analysis area				**392.1**

Water temperatures at several locations within the analysis area have been recorded since 1993. Over the period from 1993-2004, the 7-day moving average of maximum daily water temperatures at active sites within the analysis area have varied from 62 to 80 degrees Fahrenheit.

High water temperatures are likely having negative impacts on fish. Temperatures in upper Potamus Creek and Meadowbrook monitoring sites commonly exceed those ideal for the survival and growth of juvenile and adult salmonids. For instance, redband trout/steelhead trout require temperatures in the range of 57^{o}-64^{o} F during migration and rearing (Bell 1986, Beschta 1987). Potamus, has a south-facing aspect, which may contribute to the higher water temperatures. Low elevation (approximately 2,200 feet at the mouth of Potamus) may also contribute to high water temperatures. Portions of upper Potamus and Ellis creeks are dry in the summer months. Shade was also measured in several of these creeks.

Effects of No Action

Direct and Indirect Effects

Because fuels would remain untreated under this alternative, there could be indirect effects to stream temperatures should a large wildfire burn over riparian areas. Loss of shade providing trees adjacent to streams would directly increase stream temperatures. Indirectly, more sediment could increase width-to-depth ratios, which would raise stream temperatures by increasing the surface area exposed to solar radiation.

Effects Common to all Action Alternatives

Direct and Indirect Effects

Removal of some conifers through thinning activities from class 4 RHCAs could result in a small, short-term (1-5 years) increase in exposure of these reaches to solar radiation through the reduction of shade. However, effects would be expected to be un-measurable and would not affect downstream water temperatures because very little shade would be removed and the intermittent streams have ceased flow during the warmest months of the year. No trees providing shade to RHCAs with perennial water would be removed.

Proposed underburning in activity units, while not ignited in riparian areas, could back into class 4 RHCAs and class 3 RHCAs and remove some riparian vegetation that currently provides shade. However, since the backing fire would be used in controlled conditions, vegetation loss near streams is unlikely. Overall, vegetation mortality in riparian areas should be low and vegetation that does burn would be expected to recover quickly. Shrubs and grasses would recover by the following year and seedlings, the size of tree most likely to be affected, would recover in 3-5 years. Existing roads would aid in retaining riparian vegetation in some areas by providing a break in fuels so that the applied fire cannot back into the riparian area. Hazard trees may be cut along haul routes within RHCAs. These trees will be left where they fall in RHCAs. These trees are few and scattered and will not result in a measurable change to water temperature or shade.

Effects Unique to the Proposed Action

Direct and Indirect Effects

Removal of some conifers from 735 acres of class 4 RHCAs could result in an additional small, short-term (1-5 years) increase in exposure of these reaches to solar radiation through the reduction of shade. However, effects would be expected to be un-measurable and would not affect downstream water temperatures because very little shade would be removed and the intermittent streams have ceased flow during the warmest months of the year.

Proposed underburning in activity units, while not ignited in riparian areas, could back into 735 acres of class 4 RHCAs and 1 acre of a class 2 RHCA and remove some riparian vegetation that currently provides shade. However, since the backing fire would be used in controlled conditions, vegetation loss near streams is unlikely. Overall, vegetation mortality in riparian areas should be low and vegetation that does burn would be expected to recover quickly. Large trees providing shade are not expected to be affected by underburning. Additional effects and recovery would be the same as those stated under Effects Common to All Action Alternatives.

Effects Unique to Alternative 2

Removal of conifers through thinning activities in class 4 RHCAs would be the same as already discussed under effects common to all action alternatives.

Proposed underburning in activity units, while not ignited in riparian areas, could back into 2445 acres of RHCAs and remove some riparian vegetation that currently provides shade. However, since the backing fire would be used in controlled conditions, vegetation loss near streams is unlikely. Overall vegetation mortality in riparian areas should be low and vegetation that does burn would be expected to recover quickly. Large trees providing shade are not expected to be affected by underburning. Additional effects and recovery would be the same as those stated under Effects Common to All Action Alternatives.

Effects Unique to Alternative 3

Removal of some conifers through thinning activities from 630 acres of class 4 RHCAs could result in an additional small, short-term (1-5 years) increase in exposure of these reaches to solar radiation through the reduction of shade. However, effects would be expected to be un-measurable and would not affect downstream water temperatures because very little shade would be removed and the intermittent streams have ceased flow during the warmest months of the year.

Effects from proposed underburning are the same as those previously discussed under effects common to all action alternatives. Hazard trees may be cut along an additional half mile of haul routes within RHCAs. These trees will be left where they fall in RHCAs. These trees are few and scattered and will not result in a measurable change to water temperature or shade.

Effects Unique to Alternative 4

Removal of some conifers through thinning activities from 630 acres of class 4 RHCAs over common activities could result in an additional small, short-term (1-5 years) increase in exposure of these reaches to solar radiation through the reduction of shade. However, effects would be expected to be un-measurable and would not affect downstream water temperatures because very little shade would be removed and the intermittent streams have ceased flow during the warmest months of the year.

Proposed underburning in activity units, while not ignited in riparian areas, could back into an additional 1,810 acres of RHCAs over effects common to all actions and remove some riparian vegetation that currently provides shade. However, since the backing fire would be used in controlled conditions, vegetation loss near streams is unlikely. Overall vegetation mortality in riparian areas should be low and vegetation that does burn would be expected to recover quickly. Large trees providing shade are not expected to be affected by underburning. Additional effects and recovery would be the same as those stated under Effects Common to All Action Alternatives.

Cumulative Effects Common to All Action Alternatives

Some past activities; including grazing, road construction and obliteration, fencing of riparian areas, aspen stand restoration, wildfires, and thinning in riparian areas, have all likely affected stream temperatures.

Past management activities that have affected stream temperature included: harvest activities, road construction, grazing, and previous wildfires. Past harvest activities (850

acres) removed some trees that provided shade within Riparian Habitat Conservation Areas. Road construction along or crossing creeks removed all riparian vegetation along the roadbed (104 miles). In some cases this left long stretches of streams without shade. Grazing of riparian areas in the past removed vegetation that was providing shade and also caused higher stream width to depth ratios through bank trampling. This created a larger surface area versus depth increasing the efficiency of solar radiation heating the streams. Grazing has been modified since this time and most past effects to shade are recovering. Previous wildfires (737 acres) were also indiscriminant about burning riparian vegetation, leaving portions of streams without shade.

Other past activities have increased shade and contributed to lower stream temperatures. Non-commercial thinning in Riparian Habitat Conservation Areas, after a brief reduction in shade, encouraged remaining trees and shrubs to grow larger so they provide more shade than the original stand. Fencing of portions of Smith, Bully, West Fork Meadowbrook, Little Indian, Hinton, Thompson, Matlock and Potamus creeks in six of the nine cattle allotments has allowed riparian vegetation to recover, providing more shade to the 6.5 miles of streams. In addition, the construction of 169 upland water sources for cattle has diverted cattle from streams reducing the impact to the riparian vegetation on unfenced stretches of stream. Road obliteration and decommissioning (3 miles) has also occurred in the analysis area. Vegetation is recovering on some of these former roads near streams or at crossings increasing the amount of shade-providing vegetation.

A present activity that can contribute to an increase in stream temperature is grazing. The remaining unfenced portions of stream within the nine cattle allotments in the analysis area continue to be impacted by grazing with a reduction in riparian vegetation at these locations.

Future foreseeable activities proposed for these subwatersheds that would affect stream temperatures include prescribed fire and road decommissioning (34 miles total). Prescribed fire may burn into riparian areas and remove some riparian vegetation that currently provides shade but this will recover and shade will be restored. Road decommissioning in the future, on portions of roads that are near or cross streams will help to restore riparian vegetation increasing the amount of shade.

All activities that reduce stream shade could potentially increase stream temperatures. Currently much of the past reduction in shade is recovering or will continue to recover in the future. Overall, there would still be some roads that contribute to a reduction in shade along some segments of streams. Grazing would still impact riparian vegetation on some streams, but with current management little impact to stream temperatures should be seen. Harvest activities proposed in this project could cumulatively decrease the amount of shade on affected stream reaches in the short term; however, because affected streams are dry in the summer months when water temperatures are the most important there will be no cumulative effect to stream temperatures. Underburning under Alternative 2 could potentially remove trees up to 2,440 acres in RHCAs. It is not likely that many trees will be removed but there is a potential for a reduction in shade along 625 acres of perennial streams.

Sediment/Substrates:

This topic is also addressed under the Hydrology Section of this Environmental Assessment

Existing Condition

Six streams that have the potential to be affected by this project have been surveyed in this watershed since 1990, with multiple surveys for Potamus Creek done in 1994 and 2004. No consistent measurement of fines was made prior to 1991 stream surveys in the analysis area. Substrate embeddedness within the reach was estimated as above or below 35%. These estimates were averaged over the entire reach. During later surveys, Woman pebble count data was collected.

High levels of sediment loading (>35% embeddedness or >20% fines[1]) within the stream can lead to reduced quality of spawning substrate, the smothering of incubating fish eggs, and can indirectly affect eggs and fry by reducing water flow through stream gravels leading to high levels of mortality.

Effects of No Action

Direct and Indirect effects

Because fuels would remain untreated under this alternative, there could be indirect increases in sediment if a large wildfire were to occur within the analysis area due to transport of fine ash, a loss of soil cover, and increased water run-off rates.

Effects Common to all Action Alternatives

Direct and Indirect effects

Alternatives were compared using information about the amount of potential soil disturbance (Table 8), which is indirectly linked with sediment deposition in streams. All action alternatives would involve some level of soil disturbance. All action alternatives would potentially result in at least 1,227 acres of soil disturbance.

Table 8: Potential soil disturbance associated with the Action Alternatives.

	Harvest & Fuels Treatment acres*	Additional Non-commercial thinning & Fuels Treatment acres*	Under-burning Acres*	Acres of tractor fire line	Acres of road reopened	Total Acres of potential soil exposure
Proposed Action	656	24	713	16.4	70.3	1480
Alternative 2	392	24	1724	2.9	48.5	2191
Alternative 3	511	47	591	12.9	65.5	1227
Alternative 4	499	24	1827	6.7	59.4	2416

*Potential soil exposure is based on the assumption that up to 10% of treated acres will

[1] Fines are defined as particles <2mm in diameter.

be exposed to machine operation and up to 10% soil exposure may occur with prescribed burns and fuels treatment.

Reopening currently closed roads would pose some risk to increased sediment runoff. About 17 miles of the roads reopened are native surface roads and could need blading to improve drivability. In addition, a number of these roads include 28 stream crossings. Blading these roads would loosen soil, which could potentially increase the amount of sediment, particularly at the stream crossings. Blading would be limited in Riparian Habitat Conservation Areas to reduce the potential for loose sediment to runoff into streams. Also, mitigation would require installation of cross-ditches to spread water wherever needed, as well as require that use of any low water fords be avoided unless the channel is dry.

Harvest and non-commercial thinning could result in soil exposure because ground-based equipment would be used and debris would be burned following harvest. The only harvest activities that would occur within RHCAs are thinning along some class 4 streams (approximately 630 acres). Thinning would be done where needed as long as no equipment enters the RHCA except on existing roads. However, design criteria and mitigation measures, as stated in Chapter 2,

- limits operation of ground-based equipment to slopes that average 35 percent or less,
- requires pre-approval of skid trails, forwarder trails, and other log transportation routes by the Forest Service to meet the Best Management Practices,
- confines operation of equipment within ephemeral draws to designated crossings containing a layer of debris
- suspends use of ground-based equipment when conditions would otherwise result in excessive soil displacement
- and excludes equipment operation within Riparian Habitat Conservation Areas, unless soil disturbance can be avoided

Included in Chapter 2 – Design Criteria and Mitigation Measures.

would minimize soil disturbance and keep it far enough away from streams so potential sediment from these sources would not negatively impact streams. In general, filter strips on the order of 200 to 300 feet in width are effective in controlling sediment that is not channelized (Belt et al. 1992).

Underburning in activity units could mobilize sediment if soil is exposed by large debris piles that burn hot or if fire moves into the floodplain of a stream channel. However, no ignition would take place within Riparian Habitat Conservation Areas, so the likelihood of sediment production associated with this project would be very low. The duration for this potential effect would be brief (<1 year). Burn intensities would be expected to be low and localized, and re-sprouting of vegetation could occur within two weeks of soil exposure (Agee 1993). There is the potential for 591 acres of soil exposure in RHCAs. Burn prescriptions would be designed though to only burn when heavier fuel and duff moisture are high to limit the spread of fire. All management activities that occur within

RHCAs will not result in greater than 10 percent mineral soil exposure. These mitigations should prevent most sediment from reaching any class 4 channel. Additionally, up to 90 miles of tractor fire control line will be constructed. All tractor line will be outside of RHCAs and will be designed so only an average of 24 inches of bare soil is exposed. These fire lines will be rehabilitated after the burn and will not contribute sediment into streams.

Cumulative effects

Some past activities (grazing, road construction in riparian areas, harvest, and fencing of riparian areas), have likely affected sediment transport to streams. The contribution of activities under all action alternatives to cumulative effects may be the mobilization of sediment but since riparian buffers will remain intact along fish bearing streams and mitigation measures will be in place, there will be no cumulative effect to stream sediment.

The subwatersheds within the analysis area could have experienced an increase in sediment load due to past management activities. Road construction increased the drainage area with several stream crossings that allow sediment to be transported directly to the streams from roads. Past grazing caused bank destabilization, which contributed sediment to streams. Several instream structures were constructed in the 1980s within the analysis area. Some of these structures are failing and are causing bank erosion contributing sediment to the streams. Past activities that have reduced sediment input into streams include: aspen stand restoration, which tends to increase bank stability within these stands; fencing of RHCAs in cattle allotments allowing riparian vegetation to recover providing more structure for increased bank stability and less trampling of the bank; construction of upland water sources for cattle that diverted cattle from streams; and road obliteration and decommissioning. Vegetation has recovered on some of these roads near streams or at crossings reducing the amount of sediment that enters streams.

Present activities that are contributing to an increase in sediment transport to streams include grazing and existing roads. There are still some unfenced areas of stream in cattle allotments that are impacted by grazing. Continued grazing along some unfenced RHCAs still causes isolated bank destabilization at some of these locations. Other activities are the restoration and fencing of aspen stands that help to increase bank stability, thereby reducing the amount of sediment entering streams.

Future foreseeable activities proposed for these subwatersheds that would affect sediment load include road decommissioning, prescribed fire, and grazing. Road decommissioning in the short term may increase the amount of sediment transported directly to streams due to the loosening of soil. However, these roads will be revegetated and in the long term this activity will lead to an overall reduction in the amount of sediment reaching streams. A total of 34 miles of currently closed roads are proposed for decommissioning.

The activities contributing sediment to streams, if left as is, would continue to impact aquatic habitats. Actions were taken in an attempt to reduce the amount of sediment into streams in the past by obliterating roads and fencing streams. Today only grazing on small sections of stream and existing roads are still contributing sediment to streams.

Future riparian fencing and road decommissioning will help to further reduce this sediment input. The current project, while it may cumulatively contribute to sediment mobilization, will not cumulatively add to the amount of sediment in streams due to riparian buffers and the implementation of design criteria and mitigation measures designed to keep sediment from reaching streams.

Effects Unique to the Proposed Action

Direct and Indirect effects:

The proposed action would potentially result in an additional 253 acres of soil disturbance (table 8).

Reopening currently closed roads would pose some risk to increased sediment runoff. An additional 9 miles of roads will be reopened under this alternative with 8 additional miles of native surface roads, which could need blading to improve drivability. Seven stream crossings are associated with these roads. Blading these roads would loosen soil, which could potentially increase the amount of sediment, particularly at the stream crossings and low water fords. Blading would be limited in Riparian Habitat Conservation Areas to reduce the potential for loose sediment to runoff into streams. Also, mitigation would require installation of cross-ditches to spread water wherever needed, as well as require that use of low water fords be avoided unless the channel is dry.

Harvest and non-commercial thinning would occur on an additional 2,635 acres leading to potential soil exposure on 264 additional acres over what was discussed under effects to all action alternatives.

Underburning would occur on an additional 1,223 acres increasing the potential for soil exposure on 122 acres over what was discussed under effects common to all action alternatives. An additional 19 miles of tractor fireline would be constructed under this alternative with the same specification as discussed under effects common to all action alternatives. No sediment will be transported to streams with these additional miles of tractor lines.

Effects Unique to Alternative 2

Direct and Indirect effects:

The proposed action would potentially result in an additional 964 acres of soil disturbance (table 8).

Effects from reopening currently closed roads and the number of stream crossings are the same as discussed under effects common to all action alternatives.

Effects from harvest and non-commercial thinning in this alternative are the same as effects that were already discussed under effects to all action alternatives.

Underburning would occur on an additional 11,336 acres, increasing the potential for soil exposure on 1,134 acres over what was discussed under effects common to all action alternatives. Under this alternative 2,440 acres of RHCAs may be burned leading to potential soil exposure on 244 acres, most of which is within class 4 RHCAs.

Sixty five of those acres are within RHCAs with perennial water. Burning is expected only to reach, on average, to 50% of the width of the riparian buffer. This would keep most exposed soil far enough away from the creek to avoid any sediment entering the stream. Approximately 17.5 miles of tractor fire control line would be constructed. All tractor line will be outside of RHCAs and will be designed so only an average of 24 inches of bare soil is exposed. These firelines will be rehabilitated after the burn and will not contribute sediment into streams.

Effects Unique to Alternative 3

Direct and Indirect effects:

The amount of potential soil exposure from this alternative is the same as discussed under effects common to all action alternatives (table 8).

Reopening currently closed roads would pose some risk to increased sediment runoff. An additional 7 miles of roads over what was already discussed under effects common to all action alternatives will be reopened under this alternative, with 6 additional miles of native surface roads, which could need blading to improve drivability. An additional 4 stream crossings are associated with these roads.

Harvest and non-commercial thinning would occur on an additional 1,418 acres leading to potential soil exposure on 142 additional acres over what was discussed under effects to all action alternatives.

Effects from underburning and the associated fire lines are the same discussed under effects common to all action alternatives.

Effects Unique to Alternative 4

Direct and Indirect effects

This alternative would potentially result in an additional 1189 acres of soil disturbance over what was discussed for effects common to all actions (table 8).

Reopening currently closed roads would pose some risk to increased sediment runoff. An additional 4.5 miles of roads over what was discussed under effects common to all action alternatives will be reopened under this alternative with 4.5 additional miles of native surface roads that could need blading to improve drivability. An additional 4 stream crossings are associated with these roads.

Harvest and non-commercial thinning would occur on an additional 1,067 acres leading to potential soil exposure on 107 additional acres over what was discussed under effects to all action alternatives.

Effects from underburning are the same as those discussed under effects from Alternative 2 except there is an additional 1022 acres. Thirty five miles of tractor fire control line would be constructed under this alternative. All tractor line will be outside of RHCAs and will be designed so that only an average of 24 inches or bare soil is exposed. These firelines will be rehabilitated after the burn and will not contribute sediment into streams.

Pool Frequency and Quality:

Existing Condition

Pool frequency data was collected during stream surveys within the analysis area.

Pool densities are compared to the median pool density of unmanaged streams in the Blue Mountain province. The residual pool depths indicate that streams in the analysis area have habitat available for fish during the low flow period. The proportion of pools having at least one piece of large woody debris is unknown.

Pool frequency is an indication of habitat quantity where pool depth can be a good indicator of habitat quality. Since the number and quality of pools can determine the habitat availability for fish species; data collected indicates limited habitat for resident fish. Potamus, Ellis, Matlock, Smith, East Fork Meadowbrook and West Fork Meadowbrook creeks have numerous man-made structures. Some of these structures are still functioning and are providing deep, slow-water pool habitat and refugia where fish are able to survive summer low water and high water temperatures.

Streams in this watershed are less likely to meet standards for number of pools with decreasing wetted width, regardless of which measure of natural or desired conditions is used for comparison. The smaller the stream, the less it currently resembles either unmanaged stream conditions or PACFISH defaults. Conditions in streams 15-20 feet wide are represented solely by Potamus Creek from the 2004 survey, which occurred during a good water year.

Effects of No Action

Direct and Indirect effects

As discussed in the Sediment/Substrate section, the risk of a large severe wildfire is greater due to untreated fuel loads, resulting in increased sediment deposition in streams due to a loss of ground cover and increased water run-off rates. If an excessive amount of sediment were transported to streams, the sediment could settle in pools and there could be a loss of pool frequency or at least a reduction in pool quality.

Effects Common to all Action Alternatives

Direct and Indirect effects

The only activity that could affect pool frequency is additional hazard tree cutting along closed roads that are reopened near creeks. Hazard trees are already cut along existing open and seasonal roads as needed under normal road maintenance. Hazard trees will be felled along 20 miles of closed roads of which 5.1 miles are located within RHCAs. Felling of conifers into the creek bed in class four channels could increase pool formation, but this would only occur in the spring. On class three channels felling of conifers into the creek bed could increase pool formation. Both the class four and class three streams do not contain fish, so there would be no impact to instream fish habitat. Approximately 2.2 miles of closed road occurs within class two channels, hazard trees felled into these streams could potentially increase pool formation; however, these trees are expected to be few and far between and so there would be no

measurable increase in the number of pools associated with this activity.

Cumulative effects

Some past activities including grazing, restoration of aspen stands, fencing riparian areas, and thinning in riparian areas have all likely affected pool frequency. The contribution to cumulative effects of activities under all action alternatives would be an increase in the amount of potential large wood that could lead to an increase in pool formation. However, these trees will be few and far between and will not show a measurable increase at the reach scale.

Past activities that have affected pool frequency include commercial harvest in RHCAs, road construction, grazing, and installation of instream structures. Commercial harvest in the past led to an overall reduction in potential large wood that could fall into creeks. Because large wood is one of the main contributing factors to pool formation the loss of this potential large wood also led to the loss of potential pools in these creeks. Road construction along creeks or crossing creeks can also lead to a loss of potential large wood, which leads indirectly to a loss in pool formation. Grazing of RHCAs has led to bank destabilization that can in turn input large amounts of sediment into streams causing pools to fill and reducing overall pool quality. Other activities have attempted to increase the number of pools in streams including the installation of instream structures. While these did increase the number of pools per mile over the short term some of these structures have failed and are no longer functioning. Non-commercial thinning in RHCAs in the past has allowed for the growth of larger trees that will become large wood in the future. This activity increased the likelihood of natural pool formation by increasing potential large wood along streams. Grazing is a present activity that could impact pool quality. There are still a few areas along perennial water that can be accessed by cattle causing bank destabilization and sediment input that can lead to a reduction in pool quality.

Future activities that can impact pool and pool quality include road decommissioning, riparian fencing, and fuels treatments. Road decommissioning will reverse the effects of potential large wood loss and in the long term, may increase the chance of natural pool formation by reestablishing potential large wood. Fuels treatments in the analysis area in the future will function much the same as non-commercial thinning, as it will generally remove the understory allowing the remaining trees to grow larger thereby increasing the potential large wood and increasing the chance of natural pool formation.

Effects Unique to the Proposed Action

Direct and Indirect effects

Additional hazard trees will be cut along closed roads that are reopened connected to this management activity. Hazard trees will be felled along 29 miles of closed roads; 5.4 miles of these roads are located within RHCAs.

Effects Unique to Alternative 2

Direct and Indirect effects

Effects to pools are the same as what was already discussed under effects common to all action alternatives.

Effects Unique to Alternative 3

Direct and Indirect effects

Additional hazard trees will be cut along closed roads that are reopened connected to this management activity. Hazard trees will be felled along 27 miles of closed roads; 5.2 miles of these roads are located within RHCAs.

Effects Unique to Alternative 4

Direct and Indirect effects

Additional hazard trees will be cut along 24.5 miles of closed roads that are reopened connected to this management activity. Approximately 5.2 miles of these roads are located within RHCAs.

Large Woody Debris

Existing Condition

Large woody debris data was collected during stream surveys. Of the streams surveyed, Graves Creek, West Fork Meadowbrook, Ditch Creek except reach 1, and reach 3 of both Matlock and Potamus creeks did not meet PacFish standards[2] for large woody debris (20 pieces per mile). The lack of wood in these streams suggests that channel complexity and habitat quality is lower. This, in turn, limits the amount of habitat available for fish and, consequently, population sizes. The lack of large wood can indirectly lead to a reduced food supply, since large wood serves as a foundation for macroinvertebrates, the primary food source for fish.

Effects of No Action

Direct and Indirect effects

Because fuels would remain untreated under this alternative, there could be indirect increases in sediment due to a loss of ground cover and increased water run-off rates. If there is an excessive amount of sediment that is transported to streams, pools could be filled in and there could be a loss of pools or at least a reduction in pool quality. The amount of large wood could decrease along with potential large wood. Width to depth ratios could increase due to excessive amounts of sediment entering the stream.

Effects Common to all Action Alternatives

Direct and Indirect effects

The majority of the activities would occur outside of Riparian Habitat Conservation Areas and so would not impact large wood. Only the falling of hazard trees could impact the recruitment of large wood. Falling conifers into the creek bed would directly increase the large wood component. Hazard trees will be felled along 20 miles of

[2] The component of large wood was not represented in ICBEMP summary values.

closed roads. A little **over 5 miles** of these roads are located within RHCAs. On class three and four channels, though felling of conifers into the creek bed could increase large wood, both of these classes of streams do not contain fish, so there would be no impact to instream fish habitat. Approximately 2.2 miles of closed road occurs within class two channels. Hazard trees felled into these streams could potentially increase the amount of large wood; however, these trees are expected to be few and far between and so there would be no measurable increase in the number of pieces of large wood per mile associated with this activity.

Cumulative effects

Some past activities (grazing, road construction in riparian areas, harvest in RHCAs, restoration of aspen stands, fencing of riparian areas, and thinning in riparian areas), have likely affected large woody debris in the streams. The contribution to cumulative effects of activities under all action alternatives may be an un-measurable increase in the amount of large wood in streams along adjacent closed roads reopened for haul.

Past activities that have affected large wood include commercial harvest in RHCAs and road construction. Commercial harvest led to an overall reduction in potential large wood that can fall into creeks. Road construction along creeks also led to a loss of potential large wood along the roadbed located within RHCAs. Non-commercial thinning in RHCAs in the past has allowed for the growth of larger trees that will become large wood in the future.

Future activities that can impact large wood include road decommissioning, fuels treatments, and hazard tree felling. Road decommissioning will reverse the effects of loss of potential large wood. Fuels treatments in the future will function much the same as non-commercial thinning as it will generally remove the understory allowing the remaining trees to grow larger, increasing the potential large wood.

Effects Unique to the Proposed Action

Direct and Indirect effects

Additional hazard trees will be cut along 29 miles of closed roads that are reopened connected to this management activity; 5.4 miles of these roads are located within RHCAs.

Effects Unique to Alternative 2

Direct and Indirect effects

Effects to large wood from cutting hazard trees are the same as what was already discussed under effects common to all action alternatives.

Effects Unique to Alternative 3

Direct and Indirect effects

Additional hazard trees will be cut along 27 miles of closed roads that are reopened connected to this management activity; 5.2 miles of these roads are located within RHCAs.

Effects Unique to Alternative 4

Direct and Indirect effects

Additional hazard trees will be cut along 24.5 miles of closed roads that are reopened connected to this management activity; 5.2 miles of these roads are located within RHCAs.

Width to Depth Ratios

Existing Condition

Width to depth ratios were calculated for the Potamus watershed stream surveys. Only 10 of the 28 reaches surveyed met the standard of wetted width to maximum pool depth of less than 10. Low width-to-depth ratios indicate narrow deep channels that provide cover and greater habitat availability, an indication of good habitat quality, than do shallower and wider channels.

Effects Unique to No Action

Direct and Indirect effects

Because fuels would remain untreated under this alternative, there could be indirect increases in sediment due to a loss of ground cover and increased water run-off rates after a large wildfire event. If there is an excessive amount of sediment that is transported to streams, pools could be filled in and there could be a loss of pools or at least a reduction in pool quality. The amount of large wood could decrease along with potential large wood. Width to depth ratios could increase due to excessive amounts of sediment entering the stream.

Effects Common to all Action Alternatives

Direct and Indirect effects

No activities would occur that would affect width to depth ratios. Some sediment could reach streams associated with the blading of native surface roads that cross streams, but this would not be of a volume necessary to change width to depth ratios.

Cumulative effects

Width to depth ratios are generally affected by excessive sediment input into streams. While some past activities, primarily grazing have likely affected width-to-depth ratios through bank trampling and excessive sediment input to streams, no cumulative effects would occur from the activities proposed under any of the action alternatives.

Fish Populations

Existing Condition

The John Day River is the largest Columbia River tributary with no major dams or reservoirs acting as passage barriers for migrating salmonids (though dams do occur downstream on the Columbia River). This is part of the reason it supports the largest remaining wild stock of spring Chinook salmon in the Columbia River Basin. The North Fork John Day and its tributaries account for about 70 percent of the salmon production in the John Day Basin. The John Day River Basin once supported substantial runs of both spring and fall Chinook salmon and summer steelhead.

Streams within the analysis area host two species of salmonids - steelhead and redband trout. Both of these species have been identified by the Interior Columbia Basin Ecosystem Management Project (ICBEMP) as key salmonids and important indicators of aquatic integrity. Bull trout and Chinook salmon also migrate through the analysis area in the North Fork John Day River but no spawning or rearing occurs there.

The Forest Service's Pacific Northwest Region has listed Mid-Columbia steelhead, redband trout, and Chinook salmon as sensitive aquatic species present in the analysis area. Another sensitive species that may be in the analysis area is the California floater (a fresh water mussel). Sensitive species are species designated by the Regional Forester for special management consideration to reduce the likelihood of their becoming listed under the Endangered Species Act.

In March 1999, the National Marine Fisheries Service listed mid-Columbia steelhead as Threatened under Endangered Species Act authority (Federal Register 1999). Federally designated fish Species of Concern present in or near the analysis area include interior redband trout.

Steelhead and redband trout are management indicator species for the Umatilla National Forest, representing animals associated with streams/riparian habitat.

Redband (Oncorhynchus mykiss)

Redband trout potentially spawn and rear in all fish bearing streams within the analysis area. Redband trout are only found in Thompson Creek and East Fork Meadowbrook above natural barriers.

Steelhead (Oncorhynchus mykiss)

Steelhead are found in most named streams within the analysis area except East Fork Meadowbrook and its tributaries and Thompson Creek due to natural barriers.

Chinook Salmon (O. tshawytscha)

Mid-Columbia Chinook salmon are found downstream of the project area in the North

Fork John Day River. Juvenile Chinook may use lower Meadowbrook

Other

Pacific lamprey (*Lampetra tridentata*) are known to occur downstream of the project area in the North Fork John Day River and were historically an important tribal food. Although numerical data on Pacific lamprey in the John Day basin are not available, Pacific lamprey throughout the interior Columbia Basin have declined dramatically. Causes for the decline include: loss of suitable habitat, extensive poisonings, and migration barriers created by dams.

Eastern brook trout (*Salvelinus fontinalis*) are exotic to the John Day Basin and have been observed in upper East Fork Meadowbrook Creek.

California floater (*Anodonta californiensis*) a fresh water mussel, has been reported in the Blue Mountains of Washington and Oregon; however, little is known about its life history and distribution. This invertebrate is listed as a Sensitive aquatic species located within the Umatilla National Forest. No surveys of the analysis area have been conducted. The habitat requirements are shallow areas of clean, clear lakes, ponds, and large rivers. They prefer soft silty substrate for burrowing. Some of these characteristics occur within the analysis area along the North Fork John Day River.

Effects of No Action

Direct and Indirect effects

This alternative would not directly affect fish species (redband trout and steelhead) in the analysis area. Because fuels would remain untreated under this alternative, there could be indirect increases in sediment if a large wildfire were to occur within the analysis area due to transport of fine ash, a loss of soil cover, and increased water run-off rates. An increase in sediment could impact spawning habitat downstream.

Effects Common to all Action Alternatives

Direct and Indirect effects

Because most activities would occur outside of Riparian Habitat Conservation Areas, there would be little impact to aquatic habitat and the fish populations these habitats support. The analysis of aquatic habitat discussed above indicates that sediment may affect fish populations. Such sediment could result from the use of heavy machines, blading and use of currently closed roads, and burning of activity-related debris. However, analysis also concluded that mitigation would minimize soil disturbance; that activities would occur away from streams; and intact vegetation between activities and the streams would capture any mobilized sediment. Of biggest concern was the blading of currently closed roads, because blading would remove existing vegetative cover, roads tend to channelize water, and some of the roads to be bladed cross streams so sediment could eventually find its way to stream channels. Increases in fine sediments could decrease reproductive success of fish by filling interstitial spaces between spawning gravel. These road crossings on class 4 channels are well upstream of spawning habitat. Impacts to steelhead and redband trout populations would be minimized by limiting blading in Riparian Habitat Conservation Areas to reduce the

potential for loose sediment to runoff into streams and restricting use of low water fords to times when the channel is dry. Sediment from these road crossing will not reach areas occupied by Mid-Columbia Steelhead.

The amount of large wood may increase associated with hazard tree falling but this increase will not be measurable on the reach scale and will not directly affect fish habitat.

All Action Alternatives are consistent with Forest Plan direction regarding fish. None of the potential combined effects are expected to adversely affect PacFish Riparian Management Objectives, steelhead, or redband trout population viability. Application of PacFish direction would maintain or improve fish habitat conditions in the analysis area. Riparian and stream channel conditions would be expected to improve with future road decommissioning.

These alternatives are also consistent with the Basinwide Salmon Recovery Strategy (All-H Strategy), as it requires following existing management direction in the short-term and following ICBEMP science in the long-term. These alternatives are also consistent with *Wy-Kan-Ush-Mi Wy-Kish-Wit* --- The Columbia River Anadromous Fish Restoration Plan of the Nez Perce, Umatilla, Warm Springs and Yakama Tribes. This restoration plan recommends that federal agencies follow existing land use and water quality laws and regulations – this would include PacFish.

Cumulative effects

Threatened and Endangered species in the analysis area include Mid-Columbia Steelhead and Management Indicator Species include redband trout and steelhead. Most activities discussed under cumulative effects for aquatic habitat have affected fish populations in these streams. Increases in temperature can lead to increased stress to fish and reduction in spawning and rearing success. An increase in sediment yields could potentially add to degradation of aquatic habitat and fish populations by:

a) Increasing suspended sediment, which can have detrimental effects on fish health;

b) filling interstitial spaces, which reduces escape and hiding cover for fish;

c) increasing width/depth ratios, which can increase solar heating of water and also decrease fish hiding and escape cover and fish mobility;

d) decreasing the quality of spawning substrate, which reduces reproductive success;

e) reducing pool volumes, which decreases the amount of hiding, escape and resting habitat available and makes fish more vulnerable to predators.

Increases in sediment can increase stress on fish reducing spawning success, although whether the changes would be biologically significant would depend on many factors, including the amount and particle size of sediment produced, the size of the stream, amount of available refuge, including side channels and tributaries, and the conditions in the stream before the introduction of additional sediment. Fish in streams in good

condition could tolerate more such changes than fish already stressed by poor habitat conditions. The contribution to cumulative effects of all action alternatives would be a potential increase sediment in to streams but the amounts entering class 4 channels would not affect redband trout and steelhead downstream.

Effects Unique to the Proposed Action

Threatened, Endangered, and Management Indicator Species: Threatened and Endangered species in the analysis area include Mid-Columbia Steelhead; Management Indicator Species include redband trout and steelhead.
This alternative would treat 6796 acres, but since these units are not near any fish bearing or perennial streams there would be no additional effects to fish species. Reopening 29 miles of currently closed roads poses some additional risk to increased sediment runoff. Approximately 5.4 miles of road in RHCAs will be reopened under this alternative. This will not likely increase the amount of sediment reaching creeks over what was already discussed under Effects of All Action Alternatives. Effects would otherwise be the same as those discussed under "*Effects Common to All Action Alternatives*".

Effects Unique to Alternative 2

Direct and Indirect effects

Threatened, Endangered, and Management Indicator Species: Threatened and Endangered species in the analysis area include Mid-Columbia Steelhead; Management Indicator Species include redband trout and steelhead.
Effects to fish species from harvest and road activities are the same as already discussed under the effects common to all action alternatives. Additional effects to fish species may occur due to the underburning of 17,244 acres. An additional 11,336 acres may be burned. 2440 of these acres are in RHCAs, of which 65 acres are located along perennial streams. Burning is only expected to reach, on average, 50% of the width of the RHCA. This would keep most exposed soil far enough away from streams to avoid any sedimentation and any effects to fish habitat. All other effects are the same as discussed under effects common to all action alternatives.

Effects Unique to Alternative 3

Threatened, Endangered, and Management Indicator Species: Threatened and Endangered species in the analysis area include Mid-Columbia Steelhead; Management Indicator Species include redband trout and steelhead.
This alternative would treat 5582acres, but since these units are not near any fish bearing or perennial streams there would be no additional affects to fish species. Reopening 27 miles of currently closed roads poses some additional risk to increased sediment runoff. Approximately 5.2 miles of road reopened under this alternative are in RHCAs. This will not likely increase the amount of sediment reaching creeks over what was already discussed under Effects of All Action Alternatives. Effects would otherwise be the same as those discussed under "*Effects Common to All Action Alternatives*".

Effects Unique to Alternative 4

Threatened, Endangered, and Management Indicator Species: Threatened and Endangered species in the analysis area include Mid-Columbia Steelhead; Management Indicator Species include redband trout and steelhead.
This alternative would thin 5227 acres, but since these units are not near any fish bearing or perennial streams there would be no additional affects to fish species. Reopening 24.5 miles of currently closed roads poses some additional risk to increased sediment runoff. Approximately 5.2 miles of road reopened under this alternative are in RHCAs. This will not likely increase the amount of sediment reaching creeks over what was already discussed under Effects of All Action Alternatives. Approximately 18,266 acres may be burned; 2440 acres are in RHCAs. Only sixty five of those acres are located along perennial streams. Burning is expected to reach, on average, 50% of the width of the RHCA. This would keep most exposed soil far enough away from streams to avoid any sedimentation and any effects to fish habitat. Effects would otherwise be the same as those discussed under "*Effects Common to All Action Alternatives*".

Biological Evaluation Determination of Effects and Rationale:

Bull Trout: The Falls Meadowbrook Vegetation Management project Proposed Action, Alternative 2, Alternative 3, and Alternative 4 will have **no effect** to bull trout or its designated critical habitat.

Rationale:
Bull trout migratory habitat and designated critical habitat occur downstream of all activities in this project. There will be no change in any fish habitat component and no direct or indirect effects to bull trout.

Mid-Columbia steelhead: The Falls Meadowbrook Vegetation Management project Proposed Action, Alternative 2, Alternative 3, and Alternative 4 will have **no effect** to Mid-Columbia steelhead, designated critical habitat for steelhead or essential fish habitat for spring Chinook salmon.

Rationale:
Effects of all alternatives on fish habitat are similar among alternatives. The reopening and blading of some native surface roads in Riparian Habitat Conservation Areas would require some soil disturbance near class 4 intermittent creeks. Mitigation measures would minimize the amount of soil that reaches the stream channel and there would be a possibility of a negligible localized increase in sedimentation. These effects would be short lived and there would not be a large enough quantity of sediment to change any habitat parameters. The amounts of sediment will not be sufficient to impact spawning or rearing for steelhead. The greatest potential for sediment to reach streams exists under Alternative 2. However, mitigation measures including burn prescription will minimize soil exposure in RHCAs and prevent any effects to fish habitat downstream.

Redband trout: This vegetation management project will have **no impact** to redband trout.

Rationale:
Effects of all alternatives on fish habitat are similar among alternatives. The reopening

and blading of some native surface roads in Riparian Habitat Conservation Areas would require some soil disturbance near class 4 intermittent creeks. Mitigation measures would minimize the amount of soil that reaches the stream channel and there would be a possibility of a negligible localized increase in sedimentation. These effects would be short lived and there would not be a large enough quantity of sediment to change any habitat parameters. The amounts of sediment will not be sufficient to impact spawning or rearing for redband trout. The greatest potential for sediment to reach streams exists under alternative 2 however, mitigation measures including burn prescription will minimize soil exposure in RHCAs and prevent any effects to fish habitat downstream.

WILDLIFE

See wldlf_Chapter3_07_4_9

RANGE

This section incorporates by reference the Falls Meadowbrook Vegetative Management Range Report (January 23, 2007) contained in the project analysis file at the North Fork John Day Ranger District. Methodologies, assumptions, and limitations of analysis along with other details are contained in the report. The existing condition and predicted effects of the Proposed Action and its alternatives are discussed in this section.

Scale of Analysis

This analysis will focus on the project area in each alternative and how treatments will impact livestock management in each separate unit within the allotments. Some units within allotments may be impacted, while others will not. Criteria used to analyze each alternative are how activities will affect the distribution and management of livestock grazing.

The Falls Meadowbrook Vegetative Management Analysis Area includes portions of the F.G. Whitney C&H Allotment, Matlock C&H Allotment, Western Desolation C&H Allotment, Central Desolation C&H Allotment, and the Indian Creek C&H Allotment. These six allotments are located both inside and outside of the Falls Meadowbrook Vegetative Management Analysis Area. The North Fork and Potamus Allotments are located within the analysis area but have been closed to livestock grazing and will not be further discussed. The Ditch Creek and Slide Creek Allotments are located within the analysis area, however, no proposed activities are located within these allotments. As a result, these allotments will not be discussed.

Existing Conditions

Current Management

FG Whitney Cattle Allotment

The FG Whitney Cattle Allotment is approximately 51,229 acres. There are currently 501 cow/calf pairs permitted on the allotment from June 16th through September 30th at a stocking rate of 29.2 acres/AUM. This allotment is divided into 6 units: Johnson Creek, West Gopher, East Gopher, Five Mile Riparian Pasture, Log Springs, and Wolf Springs. Livestock are rotated among these units during the grazing season.

14,545 acres of the FG Whitney C&H Allotment are located within the Falls Meadowbrook Vegetative Management Analysis Area as 9,038 acres of the West Gopher Unit, 5,469 acres of East Gopher Unit, and 39 acres of the Johnson Unit.

Matlock Cattle Allotment

The Matlock Cattle Allotment is approximately 10,785 acres and is divided into three units: East Matlock, West Matlock, and Kinzua Riparian. 315 cow/calf pairs are permitted on the allotment for approximately 45 days during a grazing season from June 11th through September 30th.[3] Livestock are currently permitted during early season use to promote upland use before the hot season to reduce grazing in and near riparian areas.

There are approximately 5,495 acres of the Matlock C&H Allotment located within the analysis area as 3,643 acres in the West Unit, 497 acres in the East Unit, and 1,355 acres in the Kinzua Unit.

Thompson Flat Allotment

The Thompson Flat C&H Allotment is approximately 6,789 acres. 162 cow/calf pairs are permitted on the allotment from approximately June 6th through September 25th. Livestock are rotated among the North, Middle, and South units during the grazing season.

There are approximately 6,574 acres of the Thompson Flat C&H Allotment within the analysis area, which is about 97% of the allotment. 1,628 acres are located in the North Unit, 2,779 acres are in the South Unit, and 2,167 acres are in the Middle Unit.

Indian Creek Allotment

The Indian Creek C&H Allotment is approximately 82,007 acres and is divided into four units: Battle Creek, Bully Creek, Indian Creek, and Meadows. 888 cow/calf pairs are permitted on this allotment from June16th through September 30th.

There is approximately 10,240 acres of the Indian Creek C&H Allotment within the analysis area: 356 acres in the Indian Creek Unit and 9,212 acres in the Bully Creek Unit. The Meadows and Battle Creek Units are not located within the analysis area.

Central Desolation Allotment

The Central Desolation Unit is approximately 17,007 acres and is divided into five units:

[3] Even though the season of use is from June 11th through September 30th, livestock only graze on USFS lands for 45 days and then move onto private land.

Case, Ridge, Deep Canyon, Outlaw, and Turner. 138 cow/calf pairs are authorized to graze the Outlaw and Turner Units from June 1st through September 30th, and 143 cow/calf pairs are authorized in the Ridge, Case, and Deep Canyon Units from June 1st through September 30th.

There are approximately 5,527 acres of the Central Desolation C&H Allotment located within the analysis area: 688 acres in the Ridge Unit, 3,456 acres in the Deep Canyon Unit, and 1,383 acres in the Case Unit.

Western Desolation Allotment

The Western Desolation C&H Allotment is approximately 13, 623 acres and is divided into three units: Smith, North, and South. 210 yearlings and 216 cow/calf pairs are authorized in the allotment from June 1st through September 30th.

There are approximately 13,475 acres of the Western Desolation C&H Allotment within the analysis area: 5,609 acres in the North Unit, 3,768 acres in the South Unit, and 3,356 acres in the Smith Unit.

Environmental Consequences

Effects Unique to No Action

Livestock grazing distribution on the uplands would stay the same or continue to decrease as stocking in timber stands grows denser and wood continues to accumulate on the ground. Livestock access would stay the same or decrease due to down wood and continuous small regeneration. Forage would also stay the same or continue to decrease due to the reduction of sunlight on the forest floor reducing forest floor vegetation.

Effects of the Action Alternatives

Transitory range is defined in the Forest Plan as "land that is suitable for grazing use of a non-enduring nature over a period of time; often found in the openings created by timber harvesting activities. For Example, on particularly disturbed lands, grass may cover the area for a period of time before being replaced by trees or shrubs not suitable for forage."

Managing forest communities with harvest or prescribed fire will have long term benefits to livestock grazing management within the analysis area by increasing transitory range. As long as mitigation measures are implemented, short term effects to livestock grazing management should not be a concern.

Harvest Activities

All action alternatives would increase the amount of transitory range within the Indian Creek, Western Desolation, Central Desolation, Matlock, FG Whitney, and Thompson Flat Allotments proportional to amount of acres treated in each alternative. By increasing the amount of transitory range, it would be expected that livestock distribution would increase. This would spread utilization more evenly throughout the pastures and reduce soil and vegetation disturbance in areas of concentrated use (water sources, riparian areas).

Though any harvest treatments will increase transitory range to some extent, activities in the Central Desolation, FG Whitney, and Indian Creek Allotments will not likely have substantial changes to livestock distribution due to the small amount of acres treated within the pastures of these allotments as related to the total acres within the pasture. All action alternatives treat approximately 0-5% of the total acres within the pastures in these three allotments.

All of the action alternatives will treat substantial acres within pastures of the Western Desolation, Thompson Flat, and Matlock Allotments. The action alternatives will have the greatest improvements in transitory range in the West and Kinzua Units in the Matlock Allotment (16-27%), the Middle Unit of the Thompson Flat Allotment (13-23%), and the South and Smith Units of the Western Desolation Allotments (12-28%). The commercial thinning and noncommercial thinning will increase the amount of transitory range (forage) and will increase livestock distribution within the pastures of the described allotments proportional to the amount of acres treated in the units. The proposed action and Alternative 3 would create the greatest amount of transitory range (based on acres).

Burning

The Proposed Action and Alternative 3 propose to primarily burn within and around harvest units (7,130 and 5,907 acres respectively), while Alternative 2 and Alternative 4 propose to burn 17,244 acres and 18,266 acres. The proposed burning could reduce the amount of forage in a one to two year period. After the 1-2 year period, the amount and quality of forage would be expected to be higher than the existing condition due to the reduction in competition from small trees and/or shrubs and increase in grass species in forested plant communities. Burning forested communities also increases access for livestock grazing and generally improves distribution within pastures. Burning grassland vegetation will not substantially improve quantity or quality of forage for domestic livestock grazing (primarily due to season of use).

Alternative 2 and Alternative 4 will burn the greatest amount of acres. Adjacent units will not be burned in the same year and implementation is expected to be over a 10 year period. As a result, it is unlikely that major short term changes to livestock grazing management will be needed where a large percentage of a pasture has been burned. Burn plans will also include allotment management input to minimize that amount of acres burned within a specific pasture during one season or changes in livestock management may occur.

NOXIOUS WEEDS

This section incorporates by reference the Falls Meadowbrook Vegetative Management Noxious Weed Report (January 23, 2007) contained in the project analysis file at the North Fork John Day Ranger District. Methodologies, assumptions, and limitations of analysis along with other details are contained in the report. The existing condition and predicted effects of the Proposed Action and its alternatives are discussed in this section.

This analysis is consistent with the Pacific Northwest Region Final Environmental Impact Statement for the Invasive Plant Program, 2005.

The Umatilla National Forest is currently analyzing invasive plants and treatment methods. The existing weed sites discussed in this report are included in the Umatilla National Forest Invasive Plants EIS analysis.

Scale of Analysis

The analysis area for evaluating existing noxious weed populations is consistent with the Falls Meadowbrook Vegetative Management analysis area. Noxious weed sites used in the analysis are only those sites located within the subwatersheds located within the analysis area. This analysis will then focus on those sites located in the specific project areas as well as preventing noxious weed establishment.

Existing Condition

Priority Noxious Weeds

Table 1 shows noxious weeds of concern within the Falls Meadowbrook Vegetative Management analysis area and their associated priority category. Several categories are used to prioritize noxious weed species on the Forest list for treating and inventorying:

1. "Potential Invaders" are noxious weed species that occur on lands adjacent to the Umatilla National Forest but which have not been documented on lands administered by the Forest;
2. "New Invaders" are noxious weed species that occur sporadically on the Umatilla National Forest and which may be controlled by early treatment. This category has been split into two subcategories due to changes in weed populations on the Forest:
    a. “New Invaders” are of limited distribution and can probably be eradicated if early treatment can be implemented.
    b. “New Invaders/Established are those species that are presently controllable but which are approaching “Established” and which are prioritized for early treatment.
3. "Established" species are widespread across the Forest in large populations and containment strategies are used to prevent their further spread.

Table 2: Noxious Weed Species and Priority

Species	Common Name	Priority
Centaurea diffusa	Diffuse knapweed	New Invader/ Established
Centaurea biebersteinii	Spotted knapweed	New Invader/Established
Cynoglossum officinale	Houndstongue	New Invader/Established
Hypericum perforatum	St. Johnswort	Established
Cirsium arvense	Canada thistle	Established
Cirsium vulgare	Bull thistle	Established
Linaria vulgaris	Yellow Toadflax	New Invader
Potentilla recta	Sulfur Cinquefoil	New Invader/Established
Taeniatherum caput-medusae	Medusa-head	New Invader
Centaurea solstitialis	Yellow starthistle	Potential Invader

Current Weed Populations

Table 2 describes existing noxious weed sites within the analysis area and located on National Forest Land. There are only approximately 667 acres of inventoried noxious weed infestations on USFS ownership in the over 150,000 acre analysis area (.44%). The existing infestations in the analysis area are relatively small and densities are low. The overall risk in the analysis area of noxious weed spread from existing populations is low as compared to other areas of the District and Forest.

Table 3: Current Weed Presence

Species Code	Common Name	Number of Sites	Avg. Plants/Acre	Acres
CEBI2	Spotted Knapweed	1	31	2
CEDI3	Diffuse Knapweed	6	1	73
CYOF	Houndstongue	16	71	434
LIVU2	Yellow Toadflax	1	8	2
PORE5	Sulfur Cinquefoil	8	Many	85
TACA8	Medusahead	1	Many	1
HYPE	St. Johnswort	*	*	*
CIAR4	Canada Thistle	*	*	*
CIVU	Bull Thistle	*	*	*

*These species are not intensively inventoried. They are considered widespread. Biologicals, if available, are considered established.

Most of the noxious weed sites identified can be found along road corridors. From these points of initial infestation, weed species become opportunistic invading suitable microhabitats adjacent to the initial infestation site or in areas where soil disturbance occurs. Most of the noxious weed species of the Umatilla National Forest thrive in open full sunlight in disturbed soils where native species have been diminished or displaced (conditions commonly associated with roads). Conversely, a few noxious weed species will tolerate shade (most notably houndstongue, and to a lesser extent, spotted knapweed) and can invade understory habitat. Most of the noxious weed species found in the analysis area are easily spread by vehicle traffic making road corridor weed sites of high concern.

Spotted and Diffuse knapweed

The 7 spotted and diffuse knapweed sites are primarily found along roads in the analysis area and are relatively small. Spotted and diffuse knapweed are spread by animals, wind, and vehicles and are extremely competitive. Due to the low populations of knapweed and the current control practices being implemented, knapweed is a low concern in the analysis area. Preventing vehicles from spreading knapweed seed into the project area and analysis area would decrease the potential spread and establishment of knapweed.

Houndstongue

Houndstongue is the most widespread noxious weed in the analysis area (434 gross acres). Houndstongue seed is spread by clothing, vehicles, animals, and water and is highly invasive where soils and plant associations have been disturbed. The primary vector for seed spread is livestock and big game in the analysis area. Successful herbicide and manual treatments are occurring on most of these sites. Minimizing ground disturbance, removing seed before activities occur, and preventing vehicles from spreading seed can reduce spread and/or establishment of houndstongue. Houndstongue is commonly found in clear cuts, old landings, and along roads but can also be found in heavy canopy timber stands. Houndstongue should be considered throughout this analysis to avoid spread and establishment.

Sulfur cinquefoil

Sulfur cinquefoil was first inventoried on the District in 2002. At present, no action is being taken on the 85 acres of sulfur cinquefoil. Known sites are being monitored and new sites are being inventoried. Livestock, wildlife, and vehicles can spread sulfur cinquefoil, however, research has shown that seed dispersal is usually within three feet of the adult plant. Monitoring known sites in the analysis area has shown that sulfur cinquefoil prefers open canopy stands or grasslands where past soil disturbance has occurred. Minimizing ground disturbance can prevent establishment and spread of sulfur cinquefoil.

Other Broadleaf species

Three low priority “established” weeds—Canada thistle, bull thistle, and St. Johnswort—are fairly widespread within the analysis area and are so extensive Forest-wide that they are not generally inventoried. St. Johnswort and bull thistle are less invasive and/or persistent than the high priority weeds and generally give way to or do not out-compete desirable vegetation. It can be assumed that these three weed species can be

found throughout the analysis area.

Low priority weed species, such as Canada thistle, bull thistle, and St. Johnswort, also readily establish where soil and plant associations have been disturbed. Biological control agents are present on Canada thistle and St. Johnswort in the analysis area; however, success is not known at this time.

Effects Unique to No Action

Direct and Indirect Effects

If the no action alternative was selected, no activities would be implemented. Existing native vegetation would continue to stabilize soil and consume resources (i.e. nutrients, water, and space), which would help reduce invasion by noxious weed species.

Effects Common to All Action Alternatives

Direct and Indirect Effects

Low priority weed species that are not inventoried would continue to be found throughout the analysis area and would not be a high priority for treatment.

Areas where the soil surface is disturbed can become established by noxious weed species. The harvest activities in each action alternative may cause soil disturbance that could cause weeds to become established in the project area. As the amount of acres treated increases, the potential for weeds to become established increases. Prevention/mitigation measures that will be implemented to reduce soil disturbance, which therefore reduce the risk of noxious weed establishment and spread, will be applied to all action alternatives.

Existing high priority sites will have seed sources removed prior to implementation of the project chosen. This is considered reasonable and the workload and cost is expected to be low due to the small size of the existing sites and low plant densities at the site. This will substantially reduce the potential for activities associated with this project to effect existing infestations. Those species that reproduce by vegetative means (such as rhizomes) will not be treated manually so these species pose a higher risk of potential spread.

Monitoring similar projects on the Forest found that equipment only caused less than 5% soil compaction and/or displaced soil. With 5% or less of the proposed harvest areas to be disturbed by heavy equipment and the additional mitigation to minimize soil disturbance described in Chapter 2 (landings, skid trails), the risk of noxious weed establishment and spread due to ground disturbance caused by harvest activities is expected to be low.

Monitoring on the district has found that weeds often become established due to vehicles and equipment spreading seed. All equipment associated with this project will be required to be washed prior to entering National Forest land, which reduces the potential for noxious weed seed to be transported onto the project site. It also reduces the potential establishment of noxious weeds in areas where soil disturbance may occur. Rock pits used for this project were considered in this analysis. Though high

priority noxious weed species are found at rock pits within the analysis area, they have not been found at the rock sources that were identified to be used in this project.

Fire can increase the potential of noxious weed establishment and spread by reducing the competitiveness of existing plant communities to defend against exotic species and by disturbing the soil surface and allowing the potential for noxious weeds to become established . Monitoring has found that similar burning resulted in detrimental soil effects (scorching) to only 3% or less of the burned area. The USDA Forest Service Guide to Noxious Weed Prevention Practices recommends removing or avoiding noxious weed seed sources prior to prescribing fire to prevent new infestations and the spread of existing weed sites. The existing high priority sites will be treated using manual and/or chemical control methods, where appropriate, to remove seed sources prior to implementing the burning operation. The potential for these existing noxious weed infestations to spread as a result of burning activities is low due to the existing mitigation and project design resulting in small amounts of soil disturbance.

Cumulative effects

Past road construction and maintenance, recreation, grazing, timber harvest and other soil disturbance have provided environments for noxious weed species to become established within the analysis area, though it has resulted in relatively few acres of infestations of high priority noxious weeds as compared to other areas on the District and Forest. See Appendix XX of the Falls Meadowbrook Vegetative Management EA for a complete list of past, present, and future projects that could cumulatively interact with the action alternative treatments.

Livestock, wildlife, and vehicles not associated with project would continue to be a vector for weed seeds to be spread within the analysis area.

The cumulative effects of all action alternatives on the establishment and spread of high priority noxious weeds is expected to be low due to the mitigation proposed to be implemented and due to the current conditions in and adjacent to proposed activities.

The cumulative effects of all action alternatives on the establishment and spread of low priority noxious weeds is greater than that of high priority noxious weeds, due to the lack of treatment on those species. Low priority noxious weeds are those species that are considered widespread throughout the forest and generally are less competitive. Low priority noxious weeds within the analysis area (bull thistle, Canada thistle, and St. Johnswort) are generally less persistent than high priority weeds and are out competed by forest canopy and competing understory vegetation, resulting in a reduction of these weed species in higher seral stage plant associations. The proposed activity methods and mitigation would minimize ground disturbance, which would allow the existing competing vegetation to reduce the spread and establishment of low priority weeds.

Effects Unique to the Proposed Action

Direct and Indirect Effects

There are 8 inventoried noxious weed infestations totaling 26 acres within the 6,796 acres of proposed commercial and noncommercial harvests. These sites are generally

small with low densities of plants.

Three knapweed sites are located within proposed treatment units. These sites are primarily found along roads where previous disturbance has occurred, are small in size, and densities are extremely low. The proposed action in and around these sites is not a high concern due to the small size, few plants, and current treatment methods.

There are two sulfur cinquefoil sites that total approximately 2 acres in size and are associated with road right of ways. Between the two sites there were less than 30 individual plants when last inventoried. Proposed activities around these sites are a low risk due to the small size of the infestation.

Three houndstongue sites totaling 13 acres and high densities of plants are in the proposed action. These houndstongue sites are currently being treated manually (clipping and bagging seeds) and/or with herbicide to reduce densities and seed. Ground disturbing activities can increase the density and potential spread of these sites. The mitigation in place (see effects common to all alternatives) will result in a low risk of the proposed activities spreading these existing infestations.

90 miles of fireline construction is proposed to burn activity fuels and to reduce fuel loading. Fireline construction normally removes all vegetation down to mineral soil to control prescribed fires. Invasive species have the potential to become established within the fire lines.

Effects Unique to the Alternative 2

Direct and Indirect Effects

Alternative 2 proposes to harvest approximately 4,158 acres. There are only 5 inventoried noxious weed infestations within the proposed units totaling approximately 23 acres. All of these infestations were considered in the proposed action. Due to the small size of these infestations, low densities, and mitigation measures, there is a low risk that these sites will spread due to the proposed activities.

Alternative 2 reduces the amount of fireline construction by burning within existing roads. The result is an increase in the amount of units proposed to be burned. This alternative has the lowest amount of tractor line construction than all other action alternatives reducing the amount of soil disturbance where weeds could become established.

Within the 17,244 acres proposed to be burned there are 19 inventoried noxious weed infestations totaling 198 acres. Most of these sites are relatively small in size with low densities. The potential for these existing noxious weed infestations to spread as a result of burning activities is low due to mitigation, project design, and the existing size of the infestations.

Effects Unique to the Alternative 3

Direct and Indirect Effects

Alternative 3 proposes to harvest approximately 5,582 acres. There are 6 inventoried noxious weed infestations totaling 21 acres within these proposed units. These 6 sites are the same as those described in Alternative 2 with the addition of one houndstongue

infestation that covers 1 acre in size with low densities of individual plants. Proposed treatments around this small houndstongue site are not a high concern due to the small size of the infestation and mitigation measures.

The amount of proposed burning in Alternative 3 is 1,223 acres less than the proposed action. Alternative 3 proposes to burn 11,337 acres less than Alternative 2 by increasing the amount of fireline construction by 55 miles.

Fireline construction normally removes all vegetation down to mineral soil to control prescribed fires. This alternative would cause a substantially higher amount of ground disturbance than Alternative 2 but less than the Proposed Action. Alternative 3 would require the most amount of mitigation (surveying, inventorying, and monitoring). This alternative has a higher risk of noxious weed establishment and spread, primarily due to the amount of fireline construction, than Alternative 2 but a lower risk than the Proposed Action.

Effects Unique to the Alternative 4

Direct and Indirect Effects

Alternative 4 includes all the harvest units in Alternative 3 with the exception of two units totaling 355 acres. The result is a total of 5,227 acres of harvest treatments and 18,266 acres of prescribed burning. A total of 35 miles of tractor lines would be constructed for the burning operation.

Existing infestations of weeds within harvest units is the same as Alternative 3. As a result, the effects to existing noxious weed infestations within harvest treatments would be the same as Alternative 3.

Existing infestations of weeds within the prescribed fire treatments is the same as Alternative 2. As a result, the effects of prescribed fire to existing infestations are the same as Alternative 2.

35 miles of tractor line construction would be required to perform the prescribe fire treatments. Construction fire line normally involves disturbing the ground surface to mineral soil, resulting in the potential of weed establishment.

THREATENED, ENDANGERED, SENSITIVE PLANT SPECIES

This section incorporates by reference the Falls Meadowbrook Vegetative Management Biological Evaluation for Plants (February 28, 2006; amended February 2007) contained in the project analysis file at the North Fork John Day Ranger District. Methodologies, assumptions, and limitations of analysis along with other details are contained in the report. The existing

condition and predicted effects of the Proposed Action and its alternatives are discussed in this section.

Scale of Analysis

The analysis area for evaluating existing threatened, endangered, or sensitive (TES) plant populations is consistent with the Falls Meadowbrook Vegetative Management analysis area. TES sites used in the analysis are only those sites located within the analysis area.

Biological Evaluation of Sensitive Plant Species:

Complete species surveys have been conducted in the project area and adjacent subwatersheds.

Examination of the Umatilla National Forest sensitive plant coverage in GIS shows ten subpopulations of the sensitive vascular plant species *Eleocharis bolanderi* (Bolander's spikerush) within the project area, and two of those subpopulations within proposed harvest units. Habitat of this spikerush is associated with local hydrology so plants are most often found along the edges of intermittent channels in headwater regions of streams on gently sloping ground. The plant needs full light, but thrives on poor soils, so can occur both in dry forest openings and in biscuit-mound or scab grasslands. In these locations along channels it is largely protected from timber and fuels management projects by PACFISH buffers. However, the two populations that occur within units on this project are associated with roadside hydrology or subtle swales that are not buffered by PACFISH, so they need to be avoided during harvest operations. There is one population beside FS Road 5316-175, and a second on the east side of the 5316-130 road (see attached map).

MITIGATION: These two small populations can be flagged and avoided during project activities. As long as mechanical damage to the plants is avoided and the local hydrology that supports them is not altered, the plants will not be affected.

Five of the ten subpopulations are within proposed burn units. The effects of fire on Bolander's spikerush are unknown. However, because it is a species native to grasslands that historically had a fire return interval as short as 25 years (ICBMP 1997), it is likely well adapted to fire. During this project, monitoring of the effects of burning on these five subpopulations could contribute to knowledge of the resiliency of the species and its response to fire. **Avoidance of burning the subpopulations is not required.**

There is no known habitat within the project area units for any non-vascular plant species that is currently on the Region 6 Regional Forester's Sensitive species list.

Provided the above mitigation is included in this project, it will not impact any currently-listed Region 6 sensitive plant species.

Biological Assessment for *Silene spaldingii*:

Silene spaldingii is **Federally Listed** as **Threatened** and known to occur on the Umatilla and Wallowa-Whitman National Forests. . *Silene spaldingii* occurs primarily in

open grasslands with deep Palousian soils. This project will have No Effect on *Silene spaldingii*

This project complies with present Federal regulations pertaining to the management of Threatened, Endangered, and Sensitive plant species.

FUELS, FIRE, AND AIR QUALITY

This section incorporates by reference the Falls Meadowbrook Vegetative Management Fire/Fuels Affected Environment Report (February 7, 2007) contained in the project analysis file at the North Fork John Day Ranger District. Methodologies, assumptions, and limitations of analysis along with other details are contained in the report. The existing condition and predicted effects of the Proposed Action and its alternatives are discussed in this section.

Scale of Analysis

Analysis of fuel conditions and associated fire behavior was conducted at the subwatershed level for the Falls/Meadowbrook Vegetative Management Area, which includes East Fork Meadow, Meadow Brook, Deerhorn(3), Deerhorn(4), Stony /Matlock, Upper Potamus, Little Potamus, Granite Creek, and Rush Creek Sub-watersheds. Fuel loading developed for this analysis is specific to the identified unit and areas within the analysis area. The private property within the sub-watersheds was not included in this analysis.

Air quality was analyzed at a much broader scale. The Oregon Department of Environmental Quality has identified sensitive areas and "Special Protection Zones" for the State of Oregon as directed by the Clean Air Act. Section 169 of the Clean Air Act also provided protections from visibility impairment for Class I Airsheds, above designated Wilderness areas. The proposed treatment units are 40 air miles from the nearest Class I Airshed designated Wilderness. Class II Airsheds covers all other areas. Wilderness areas with Class II Airshed areas are not directly protected under the Oregon Visibility Protections Program (OAR 340-20-047, Section 5.2).

Existing Condition

The sub watersheds within the analysis area have experienced 285 fires between the years 1970 and 2004. Ignitions sources for the Falls/Meadowbrook are all listed in the database as lightening caused, this however is believed to be from a problem in the database or an entry error in the database.

Table 4: Fire Occurrence within the Falls/Meadowbrooke Analysis Area from 1970 to 2004.

Size	# Fires
Class A (0-.25 acres):	219
Class B (.25-10 acres):	60
Class C (10-99 acres):	5
Class D (100-299 acres):	0
Class E (300-999 acres):	0
Class F (1,000-4,999 acres):	1
Class G (5,000 + acres):	0
Total:	**285**

The Falls/Meadowbrook analysis area shows signs of past fuels treatment, primarily through burning associated with timber sales. Natural fuel underburning has occurred within the analysis area, including Parallel(500 acres), and Bone Point(4341 acres) Underburns for natural fuels. Prescribed burning was also done For Gopher(486 acres) pile burn and underburning, Indian Creek(3124 acres) and Indianberry(246 acres) projects.

Fire Regime

Fire regime is the frequency of fire occurrence coupled with typical fire intensity for a given forest stand type. It is a static site condition that does not change in time or scale. Current stand conditions and their associated fuel complexes are the result of a number of influences including historic fire activity, fire suppression within the past 100 years, timber harvest, reforestation, thinning, and livestock grazing. The four dominant fire regimes found within the analysis area are described below. Acreages given below have been rounded to the nearest full acre. Private ground acreage within the sub-watersheds have not been included.

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.

Fuel Condition Class

Condition classes are used to describe the current condition of the analysis area with respect to historical fire return. These are defined as the degree of departure from the historic fire regimes resulting in alterations of key ecosystem components such as species composition, structural stage, stand age, canopy closure, and fuel loading. One or more of the following activities may have caused this departure: fire exclusion, timber harvesting, regeneration activities following harvest, livestock grazing,

introduction and establishment of exotic plant species, insects and disease (introduced or native), or other past management activities.

Each fire regime has a condition class. Areas in Condition Class 1 (26,498 acres of the analysis area) exhibit conditions that mimic what would historically be expected on the site. Areas in Condition Class 2 (33,817 acres of the analysis area) are beginning to trend away from their historic norm, primarily through increased stocking levels, in-growth of mid and late seral species, and increased fuel loading. Areas in Condition Class 3 (11,433 acres of the analysis area) have moved further away from what would be expected historically.

Much of the Condition Class 2 within the Falls/Meadowbrook analysis area is contained in the low intensity, Fire Regime I. This supports the concern expressed in the Potamus Ecosystem Analysis that areas historically dominated by a low intensity fire regime are lacking the single-storied stand structure, early seral species composition that would exist under a natural disturbance regime. Overall, most of the analysis area outside the private property is in Condition classes 1 and 2, with a limited portion trending toward Condition Class 3.

Fuel Profile

The fuel profile consists of the amount of fuel present (fuel load), fuel type/composition, structure, and arrangement (horizontal and vertical). Fuel models have been developed to characterize the mix of these components.

Fuel loading in the Falls/Meadowbrook area is generally trending to higher tons per acre than would be normal under historical fire disturbance patterns due to suppression of fires that would have consumed fuels.

Fire Behavior

Fuel conditions, fuel arrangements, topography and associated potential fire behavior vary across the Falls/Meadowbrook analysis area. This is the case for horizontal fuel profiles (surface) and for vertical fuel profiles (ladder fuels). Generally, areas with lighter fuel loadings experience short duration, low to high intensity fires—areas dominated by grass (fuel models 1, 2 and 3) burn intensely, but burn out quickly. Fires spread very slowly in the case of the short needle timber areas (fuel model 8) or very rapidly in the case of the grass fuels. Areas with heavy fuel accumulation burn with higher intensities for longer periods of time with moderate rates of spread (fuel model 10).

Stands are overstocked by smaller-sized trees that present continuous vertical fuel continuity, which can contribute to the initiation of a crown fire. In addition, fuel loads in lodgepole and mixed conifer (Fire Regime III and IV) can have sufficient surface fuels that fire intensity would be high enough to initiate crown fire without ladder fuels. Research has shown that high tree density causes forest stands to be more vulnerable to crown fire initiation at any age, and that it also extends the duration of a stand's exposure (by 20 to 30 years) to crown fire hazard (Keyes and O'Hara 2002).

In addition to the overstocking, species composition is changing to species that are less fire tolerant and more susceptible to mortality by fire, either by cambium layer damage or combustion of the tree's crown.

Air Quality

The airshed over and around theFalls/Meadowbrook analysis area currently meets air quality standards for Class II Airsheds (Oregon Smoke Management Annual Report, 2001).

Special Protection Zones are areas established around cities that are not meeting the federal Clean Air Act standards for PM-10 and PM-2.5[4]. The closest Special Protection Zone to the analysis area is La Grande, Oregon, with a distance of approximately 52 air miles from the project area. The zone boundary is approximately a 20-mile radius around the city of La Grande. Pendleton, Oregon, a sensitive area, is approximately 53 air miles away. The closest Class I Airshed-designated Wilderness Areas are the Strawberry Mountain Wilderness, approximately 40 air miles away, near John Day, Oregon, and the Eagle Cap Wilderness about 70 air miles away, east of La Grande, Oregon.

Table 4. PM10 and PM2.5 emissions by alternative in total tons produced. Expected emissions created by current conditions of acres proposed

	Current Conditions/ Mechanical treatment units only area	Current Conditions/ Mechanical plus underburning area	Proposed Action	Alternative 2	Alternative 3	Alternative 4
PM 10 tons Produced	2504	5097	3302	4758	2774	5229
PM 2.5 tons Produced	2122	4320	2811	4045	2352	4433
PM 10 tonnages includes PM 2.5 as a subset, i.e. the proposed action produces 3302 tons total particulate emissions which contain 2811 tons of PM 2.5, plus 491 tons of particles between 2.5 micrometers and 10 micrometers in size.						

Any prescribed burning operations within the project areas would comply with the State of Oregon's Smoke Management Implementation Plan, and would be implemented within guidelines of the Smoke Management Program. The State would implement restrictions on burning when wind predictions indicate smoke could be carried into sensitive areas. A listing of additional requirements is available in the Oregon Smoke Management Plan.

This project will comply with the all requirements of the Clean Air Act and be conducted in accordance with the operational guidelines agreed to by the USDA Forest Service

[4] PM 10 refers to particulate matter that is 10 micrometers and smaller in size; PM 2.5 is particulate matter 2.5 micrometers and smaller in size.

and the Oregon Department of Environmental Quality.

Effects Common to All Action Alternatives

Direct and Indirect Effects

None of the alternatives would change the fire regimes within the Falls/Meadowbrook analysis area. Fire regimes are static site conditions that do not change in a time or scale related to this analysis.

Stands currently in Condition Class 1 would be maintained as Condition Class 1. Treatments would prevent trending towards higher condition classes by maintaining stocking levels and stand structure within a normal range of variance for the associated fire regime/stand type.

Treatment of stands classified as Condition Class 2 or 3 would change to condition class 1 at the completion of combined Mechanical and Prescribed burning treatments. Areas being underburned only may not change condition classes as readily due to variability in burning patterns. Expected results after treatment are summarized in table 6. This conclusion is supported by monitoring of the Owens Hazardous Fuels Reduction project, which began mechanical fuels reduction in 2003. The fuels conditions treated by the Owens project are similar to the conditions found in the Falls/Meadowbrook proposed treatment units.

Table 6: Predicted Condition Class after Treatments by alternative

Condition Class	Current Conditions acres (% of Area)	Proposed Action Acres (% of Area)	Alternative 2 Acres (% of Area)	Alternative 3 Acres (% of Area)	Alternative 4 Acres (%of Area)
1	26,498 (37%)	31,931 (45%)	38,260 (53%)	30,907 (43%)	35,520 (50%)
2	33,817 (47%)	30,224 (42%)	24,290 (34%)	30,980 (43%)	28,758 (40%)
3	11,433 (16%)	9,593 (13%)	9,198 (13%)	9,861 (14%)	7,470 (10%)

Prescribed burning may include pile burning (decks, hand piles or machine piles), underburning, or jackpot burning as necessary to best dispose of residual fuel loading after other treatments. Pile burning would be utilized to dispose of any piles or decks of residual material that could not be removed for utilization. Pile burning would be done in the late fall or early winter when weather conditions allowed for safe burning conditions. Prescribed burning of treatment units will be used where practical and needed to further reduce fuel loads to the desired condition of 12 tons per acre or less, depending upon Forest Plan management area requirements. Prescribed burning would be done with prescription parameters that will effectively reduce fuel loads while minimizing detrimental effects on residual tree stands.

Horizontal and vertical fuel continuities would be disrupted within treatment units. Where vertical continuity is broken, fire would be forced into surface fuels where it could be more easily and safely suppressed. Breaks in horizontal continuity would slow fire and reduce its intensity, providing an area for suppression to be effective. Crown fire potential would be reduced due to changes in fuel continuity (both horizontally and vertically) and the reduction of fire intensity due to lower fuel loads.

Fire danger would be temporarily increased due to heavier suface fuel loadings created by the proposed activities in all action alternatives. The increase in potential fire activity would be of short duration (1-5 years), until all treatments and associated prescribed burning is completed. In the longer term (20-30 years after treatment) fire danger will be decreased.

All action alternatives would have a prescribed fire component that would create emissions; possibly having an effect on public health. All action alternatives could remove material from 4 inches in diameter and larger through utilization of material as hog fuel, chips, or sawlogs, reducing the amount of anticipated emissions. To minimize emissions, prescribed burning would take place under conditions favorable to effective mixing and dispersal of the smoke created to the greatest extent possible. The effects associated with prescribed burning would be of short duration and have little impact on Class I Airsheds due to the remoteness of the project area from those areas. Some local communities may be affected for short periods of time due to smoke settling in valleys in evenings and overnight.

Prescribed burning would require construction of containment lines to prevent the spread of fire beyond treatment areas. Wherever possible existing roads would be used to minimize the amount of fireline constructed. Units with common boundaries will be combined into larger units when practical for burning and line construction. In areas where fireline must be constructed, the fireline will be sufficient to stop the spread of the fire, while minimizing soil disturbance. Where practical and appropriate, tractor line will be used. These lines clear a trail approximately 18 inches wide, down to mineral soil. Any areas that are considered sensitive will have hand line constructed or, if feasible, use the technique of wet lining.

All action alternatives will treat areas within the Wildland Urban Interface (WUI). The WUI areas for this analysis are communities and houses covered by recognized Community Wildfire Protection Plans within the project boundaries.

Treatments within WUI areas will generally reduce the risk from wild fires by reducing fuel loadings and associated fire behavior, making suppression of wildfires easier. There may be some short term increase in the risk to WUI areas until all treatments are completed.

Effects Unique to No Action

Direct and Indirect Effects

Under this alternative, both horizontal and vertical fuel continuities would increase. Predominately open Ponderosa Pine stands (Fire Regime I) would continue to accumulate fuels and experience an increase in understory stocking of both ponderosa pine and other, less fire-resistance species. While currently at low risk for catastrophic

fire, these stands would eventually develop fuel conditions that would increase the potential for high intensity, difficult to control fires. In those areas of Fire Regime I where the understories have already seen in-growth of seedlings and saplings, and/or understory fuels are above historic norms, the stands would continue to be at risk for moderate to high intensity midsummer wildfires.

Stands in Fire Regimes III and V would also continue to accumulate fuels and changes stocking levels, which would continue to further increase the potential for crown fire that is already higher in these fire regimes (see figure 6, and table 3 on page 20 for crown fire potential). Fire suppression would be more difficult due to the addition of the vertical fire component and increased fire intensities. Direct attack by hand crews is generally limited to a 4 foot flame length, and many of these stands would exhibit higher flame lengths (see appendix A). Such flame lengths would require indirect attack methods or the use of heavy equipment, both of which have the potential to increase the effects caused by the fire and/or its suppression.

Increased fuel loads also pose higher levels of risk to firefighting personnel and to the public who use forestlands. With higher horizontal and vertical fuel continuities and fuel loading, fire behavior would become less predictable due to increases in spotting and crown fire activity.

Currently within the analysis area it is estimated that the area within the proposed units would produce approximately 2,504 tons PM 10 containing 2,122 tons of PM 2.5 of particulate matter if burned with currently existing fuel loads within Mechanical treatment designated areas only (See air quality section for current conditions and comparison of emissions by alternative).

Effects Unique to the Proposed Action

This alternative treats 6793 acres within the analysis area. Prescribed burning will create approximately 3302 tons of PM 10, including 2811 tons PM 2.5. There would be an estimated 37 miles of existing roads used as fireline and create up to 90 miles of tractor fireline and 3 miles hand fireline.

Fuel arrangements in treated areas would be altered, providing more area of lower fire intensities. This would allow for easier, safer suppression of wildfires and also continued application of prescribed burning to maintain healthy stand conditions.

Cumulative effects

This action would overlap 856 acres of ground previously treated by a prescribed fire, within the last ten years. This overlap would further reduce fuel loads and help in obtaining or maintaining the desired fuel loads as stated in the forest plan. This would also maintain fire regimes already in a condition class 1 and convert more acres to a lower condition class, and maintaining lower fuel loads and associated lessened fire severity.

Previous prescribed fire activities were adjacent to the area of treatment for this action. The proposed actions of this assessment would connect several areas where activities have already occurred and would increase the continuity of reduced fuel loads and fire severity.

There would be 2735 acres treated within Wildland Urban Interface areas.

Effects Unique to Alternative 2

Direct and Indirect effects

This alternative treats 4,158 acres mechanically, and 17,244 acres with prescribed fire.

Fuel arrangements in treated areas would be altered, providing more area of lower fire intensities. This would allow for easier, safer suppression of wildfires and also continued application of prescribed burning to maintain healthy stand conditions.

Activities in this alternative would produce more emissions from prescribed burning activities due to the increase in acres treated by underburning. There would be an increase of 1456 tons of particulates compared to the proposed alternative. There would be 4758 tons of PM 10 containing 4045 tons of PM 2.5.

An estimated 97 miles of existing roads will be utilized as firelines under this alternative. Approximately 16 miles of tractor fire line and 1 mile of hand line would be created. Three miles of fire edge would be wet line. As a measure to reduce fireline, several units and some small sections of units, totaling 605 acres, would have material removed using whole tree removal requirements. Removing the entire tree, including as much limb wood as possible would reduce fuel loads within the units and move the fuels to piles at landing/decking areas. This would remove the need to burn within the unit, except for burning the landing piles.

There are three more management areas associated with this alternative due to the additional acres for underburning. The management areas include C1 Dedicated Old Growth(10 acres), C2 Dedicated Old Growth(1 acre), and C8 Grass Tree Mosaic(31 acres). All of these management areas allow prescribed burning to maintain the desired condition of 12 tons or less of fuel per acre in the 0 to 3 inch fuel size classes.

Approximately 6018 acres within Wildland Urban Interface areas would be treated by this alternative. 1724 Acres would be treated mechanically and an additional 4294 acres would be treated with prescribed fire.

Cumulative effects

This action would overlap 5291 acres of ground previously treated by a prescribed fire, within the last ten years. This overlap would further reduce fuel loads and help in obtaining or maintaining the desired fuel loads as stated in the forest plan. This would also maintain fire regimes already in a condition class 1 and convert more acres to a lower condition class, and maintaining lower fuel loads and associated lessened fire severity. 790 acres of the 5291 overlapping acres would be treated with a mechanical activity prior to prescribed burning.

Previous prescribed fire activities also where adjacent to the area of treatment for this action. The proposed actions of this assessment would connect several areas where activities have already occurred and would increase the continuity of reduced fuel loads and fire severity.

Effects Unique to Alternative 3

Direct and Indirect effects

This alternative would treat 1217 fewer acres than the proposed alternative. The decrease in acres treated would leave acres untreated that would trend to a higher condition class rating and continue a risk of higher intensity wild fires.

Fuel arrangements in treated areas would be altered, providing more area of lower fire intensities. This would allow for easier, safer suppression of wildfires and also continued application of prescribed burning to maintain healthy stand conditions.

Fire lines in this alternative would consist of 31 miles of existing roads, an estimated 71 miles of tractor fire lines, and1 mile of hand lines to be constructed. Wetline, in areas where feasible, may be 3 miles long.

Activities in this alternative would produce more emissions due to the increase in acres treated. There would be a decrease of emissions due to decreased acres treated producing 2774 tons PM 10 with 2352 tons PM 2.5.

There would be 2203 acres treated by this alternative that fall within Wildland Urban Interface areas.

Cumulative effects

This action would overlap 852 acres of ground previously treated by a prescribed fire, within the last ten years. This overlap would further reduce fuel loads and help in obtaining or maintaining the desired fuel loads as stated in the forest plan. This would also maintain fire regimes already in a condition class 1 and convert more acres to a lower condition class, and maintain lower fuel loads and associated lessened fire severity.

Previous prescribed fire activities also where adjacent to the area of treatment for this action. The proposed actions of this assessment would connect several areas where activities have already occurred and would increase the continuity of reduced fuel loads and fire severity.

Effects Unique to Alternative 4

Direct and Indirect effects:

This alternative treats 18,226 acres. A combination of mechanical methods and prescribed fire would treat 5225 acres, and 13,041 acres would be treated with prescribed fire only. Approximately 967 acres of prescribed fire is required for site preparation prior to reforestation planting. The smoke emissions for the required prescribed burning are included in the totals below.

Activities in this alternative would produce more emissions due to the increase in acres treated. The acres treated would produce 5229 tons PM 10 with 4433 tons PM 2.5.

The decrease in acres treated by mechanical methods would leave acres untreated that would trend to a higher condition class rating and continue a risk of higher intensity wild fires.

Fuel arrangements in treated areas would be altered to allow for more area where lower

fire intensities would allow for easier, safer suppression of wildfires or easier prescribed burning for maintaining healthy stand conditions.

Fire lines in this alternative would consist of an estimated 35 miles of tractor fire lines, and 1 mile of hand lines to be constructed. Wetline in areas where feasible would be 3 miles long.

There would be 6127 acres treated by this alternative that fall within Wildland Urban Interface areas. 1849 Acres would be treated mechanically and an additional 4278 acres of prescribed fire.

RECREATION

SCALE OF ANALYSIS

The scale of analysis for recreation resources is the boundary of the Falls-Meadowbrook analysis area.

RECREATION OPPORTUNITY SPECTRUM

Existing Recreation Uses and Conditions

Each Forest Plan Management Area that could be affected by the Falls-Meadowbrook proposed projects is assigned a class under the Recreation Opportunity Spectrum (ROS), based on the extent the natural environment has been modified, the type of facilities provided, the degree of outdoor skills needed to enjoy the area, and the relative density of recreation use.

Table 5: ROS Classes within the Hidaway Allotment

Management Area	ROS Class
A3	**Roaded Natural**
C3, C4, E2	**Roaded Modified**
C5	**Roaded Natural to Roaded Modified**

Roaded Natural – Area is characterized by predominantly natural-appearing environments with moderate evidence of the sights and sounds of humans. Resource modification and utilization practices are evident, but harmonize with the natural environment. Conventional motorized use is allowed and incorporated into construction standards and design of facilities.

Roaded Modified – A considerably modified natural-appearing environment characterizes the area with considerable evidence of the sights and sounds of humans. Resource modification and utilization practices are evident and seldom harmonize with

the natural environment. Conventional motorized use is provided for in construction standards and design of facilities.

Effects Common to All Alternatives

Direct, Indirect and Cumulative Effects:

None of the proposed activities or their alternatives would change the ROS class as described in the Forest Plan.

CAMPING

Existing Conditions

There is XX developed campground and XX inventoried dispersed camping sites within the analysis area (see **Error! Reference source not found.**).

Dispersed camping has traditionally been a popular activity in the area, particularly during the big game hunting seasons.

TRAILS AND DISPERSED RECREATION

Existing Condition

There are a number of popular dispersed recreation activities in the area besides camping:

hiking
horse riding
All Terrain Vehicle (ATV) riding
mushroom picking
firewood gathering
hunting
fishing
sight seeing

VISUAL QUALITY

Existing Condition

There are XX acres of Forest Plan Management Area A3 – Viewshed 1 in the Falls Meadowbrook analysis area (along Forest Road 53). This road is also designated nationally and by the state as the Blue Mountain Scenic Byway. The Forest Plan states that A3 is to be managed as a natural appearing landscape (Forest Plan 4-99), with

Visual quality objectives as retention in the foreground and partial retention in the middle ground.

ROADLESS AND UNROADED AREAS

Existing Conditions

One Inventoried Roadless Area—#14041 Potamus—occurs within the Falls Meadowbrook analysis area. The Forest Plan Final Environmental Impact Statement Appendix C, pages C-176 to C-183, describes this area in detail. In part Appendix C states:

> *"The primary attractions within the Potamus Roadless Area are the scenic canyon land viewed primarily from Potamus Point on the eastern edge and the Little Potamus Creek waterfall accessed from Forest Road 2106070. Its primary attributes are its contributions (1) as part of the Monument big game winter range, (2) of a large number of acres of riparian habitat for anadromous fish, and (3) to old growth wildlife habitat (62 percent of its timbered sites)…Due to its shape and the way the Potamus areas lies, the opportunities for a feeling of solitude, the spirit of adventure and awareness, serenity, and self-reliance do not really exist within this area. Roads and timber harvest activities to the west, activities to the north, and east present nonconforming sights and sounds to the entire roadless area."* (Forest Plan C-179)

Oregon Natural Resources Council (now Oregon Wild) submitted a comment letter dated December 14, 2005 that expressed concerns regarding protection of roadless values. With their letter, they submitted a map of what they call the Potamus and Upper Potamus Roadless Areas. These are not official inventoried roadless areas, yet they are directly adjacent to the existing Potamus Inventoried Roadless Area mentioned above (see Figure XX). The effects discussed below would also apply to the unroaded areas identified by Oregon Natural Resources Council.

Environmental Consequences

No Action

Treated acres within Potamus Canyon and areas identified by ONRC

Discussion of predicted effects on roadless character and eligibility for wilderness designation

Proposed Action

Treated acres within Potamus Canyon and areas identified by ONRC

Discussion of predicted effects on roadless character and eligibility for wilderness designation

Alternative 2

Treated acres within Potamus Canyon and areas identified by ONRC

Discussion of predicted effects on roadless character and eligibility for wilderness designation

Alternative 3

Treated acres within Potamus Canyon and areas identified by ONRC

Discussion of predicted effects on roadless character and eligibility for wilderness designation

CULTURAL RESOURCES

Approximately 85 percent of the potential treatment area was surveyed the summer of 2006. Final surveys are scheduled as soon as the area is open in the spring/summer of 2007. All surveys, reports, consultations, and concurrences will be complete prior to the issuance of a final environmental assessment and decision notice.

TREATY RIGHTS

Existing Conditions

Xxxxxxxxxxxxx

Environmental Consequences

No Action

Discussion of how proposed activities could affect treaty rights (fish, wildlife, and cultural plant habitat)

Proposed Action

Discussion of how proposed activities could affect treaty rights (fish, wildlife, and cultural plant habitat)

Alternative 2

Discussion of how proposed activities could affect treaty rights (fish, wildlife, and cultural plant habitat)

Alternative 3

Discussion of how proposed activities could affect treaty rights (fish, wildlife, and cultural plant habitat)

ACCESS

This section incorporates by reference the Falls Meadowbrook Vegetative Management Transportation/Access Report contained in the project analysis file at the North Fork John Day Ranger District. Methodologies, assumptions, and limitations of analysis along with other details are contained in the report. The existing condition and predicted effects of the Proposed Action and its alternatives are discussed in this section.

Existing Conditions

There are 410 miles of road in the planning area. Forty three percent or 177 miles are in Maintenance Level I, meaning they are closed to motorized traffic. Although some of the remaining 53% or 233 miles may be closed seasonally for resource protection, winter range, or to meet other wildlife habitat needs, for the most part they are open for motorized use. Roads in Maintenance Level (ML) I are considered "in storage" putting them at the bottom of priority maintenance. Measures are taken to stabilize drainage. Commercial users are required to perform maintenance to accommodate their use.

Many of the roads in the planning area are ML 2 roads and were constructed under past timber sales. Maintenance such as brushing, is scheduled on a five to ten year rotation with the bulk of the maintenance performed by commercial users to accommodate their use. While these roads are generally open to use, they may be allowed to close with brush or slides.

A few of the roads are in ML 3 or 4 (Roads 3980, 5320 and 5327). These roads are joint use roads, usually aggregate surfaced, with a shorter maintenance cycle for blading and brushing.

Road 53 (Western Route, just north of the Falls section) is a double lane paved road, part of the Blue Mountain Scenic Byway, and is considered a forest highway.

Environmental Consequences

No Action

Number of improved road closure devices

Discussion of effectiveness of control measures

Common to All Action Alternatives

All proposed activities will be accomplished using approximately 142 miles of the

existing and authorized 410 miles of road in the planning area. No new road construction would occur. Under the Proposed Action approximately 30 miles (or 35%) of closed roads would be temporarily re-opened to allow access to the project. These roads would be re-closed by the Contractor following the completion of activities. Methods of closure will be identified under Post Haul Maintenance requirements and could include entrance scarification, installing berms and re-closing of existing barricades or gates. Post haul work on closed and Contractor Use Only roads also may include stabilizing drainage with water bars. Approximately 34 miles of existing closed roads were determined to have no further access needs and in the future, may be considered for decommissioning. Additionally approximately 111 miles of open roads would be needed for access to conduct proposed activities. Approximately 9 miles (Roads 3969000, 3900900 and 3963030) will need reconstruction to accommodate haul. Reconstruction items include removing log culverts, installing rolling and drainage dips, placing subgrade reinforcement, reconstruction of road template through entrenched segments and developing additional turnouts for safety. Existing forest material sources or commercial sources will provide the subgrade reinforcement.

Supplement 7730-2005-1 to Chapter 30 of FSM 7700 Transportation system states that "danger trees will be managed for safe use of the transportation system by all users…" In this supplement, strategies for danger tree management on roads includes assessment for danger trees in conjunction with other work, such as timber sales. Danger trees will be identified along the haul routes and project use roads and be part of the maintenance appraisal or may be treated as included timber.

Commercial and other contractors will be allowed to close Maintenance Level 1 and most Maintenance Level 2 spur roads to public use during contact activities. All Maintenance level 3 roads such as Rd 3969 will be kept open and signed appropriately for joint use. All contractors will be required to install and maintain signs meeting Manual of Uniform Traffic Control Devises (MUTCD) standards.

Snowplowing may be authorized by Road Use Permit and require Contractor to abide by Best Management Practices on portions of roads accessing units outside of Big Game Winter Range, specifically Forest Roads 53, 5316 (only the portion outside of Big Game Winter Range), 5320, 5327, and any spurs from these roads.

Roads unsuitable for haul in the Project Area include:

1. Rd 3963105, From Hwy 395 to Unit 26: Requires extensive reconstruction and consultation.
2. Rd 3900700/ 3900725, From Hwy 395 to Sec 16: Requires extensive reconstruction due to overly steep grades.
3. Rd 3963032, From Rd 3963036 to Hinton Creek: Two creek crossings without culverts; requires extensive reconstruction and consultation.
4. Other unsuitable haul roads may be shown on project maps as necessary.

Haul or contractor use will not be allowed on these segments of road.

Falls-Meadowbrook Road Analysis	Total Miles	ClosedRoads - ML 1		OpenRoads - ML 2-5		Reconstruction & Estimated Cost		Miles of Road Currently closed & identified for full decommissioning	
Miles in Analysis Area	410	232	57%	178	43%	9	$ 119,309.08	34	15%
Proposed Action	142	31		111		9	$ 119,309.08		
Alternative 1	113	25		88		9	$ 119,309.08		
Alternative 2	125	21		104		9	$ 119,309.08		
Alternative 3	133	26		107		9	$ 119,309.08		
Alternative 4	131	24		107		9	$ 119,309.08		

Percents are based on total miles in the analysis area.

HUMAN HEALTH AND SAFETY

Existing Conditions

Xxxxxxxxxxxxx

Environmental Consequences

No Action

Estimates of smoke emissions (measured as pm10 and pm2)

Proximity to adjacent communities and airsheds

Predicted safety of proposed fire ignition and control methods

Estimated tons of fuel remaining after proposed treatments

Proposed Action

Estimates of smoke emissions (measured as pm10 and pm2)

Proximity to adjacent communities and airsheds

Predicted safety of proposed fire ignition and control methods

Estimated tons of fuel remaining after proposed treatments

Alternative 2

Estimates of smoke emissions (measured as pm10 and pm2)

Proximity to adjacent communities and airsheds

Predicted safety of proposed fire ignition and control methods

Estimated tons of fuel remaining after proposed treatments

Alternative 3

Estimates of smoke emissions (measured as pm10 and pm2)

Proximity to adjacent communities and airsheds

Predicted safety of proposed fire ignition and control methods

Estimated tons of fuel remaining after proposed treatments

ECONOMICS/SOCIAL

This section incorporates by reference the Falls Meadowbrook Vegetative Management Economic Report contained in the project analysis file at the North Fork John Day Ranger District. Methodologies, assumptions, and limitations of analysis along with other details are contained in the report. The existing condition and predicted effects of the Proposed Action and its alternatives are discussed in this section.

Scale of Analysis

The impact zone for the Umatilla National Forest consists of Grant, Morrow, Umatilla, Union, Wallowa, and Wheeler counties in Oregon, and Asotin, Garfield, Columbia, and Walla Walla counties in Washington. These counties are included within the Pendleton and Spokane Bureau of Economic Analysis regions. The Umatilla National Forest, Land and Resource Management Plan, Final Environmental Impact Statement, Appendix B (Page B-46), also provides further detailed description of the main social and economic characteristics of the area.

Viability of Harvest **This project is to reduce risks and improve HRV – a commercial product is a bonus.**

Existing Condition

The viability of harvest is dependent upon the market prices for raw wood fiber (both sawtimber and non-sawtimber) 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, 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. A particle board mill in La Grande uses the chip

by-products of the La Grande sawmill for its raw materials. Local markets also more directly exist for the non-sawtimber component of this project. "Clean white" chips are also shipped down the Columbia River from the Port of Boardman where they enter global markets, primarily for paper production. The non-sawtimber portion of the commercial harvest was assumed to be of the "clean white" variety.

Employment and Income

Existing Condition

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. Several communities such as Heppner, Ukiah, Fossil, Canyon City, and Enterprise are geographically isolated from the closest larger cities such as Pendleton, Walla Walla, and La Grande (Reyna et al. 1998). This isolation limits options for local workforces. Refer to the *Umatilla National Forest, Land and Resource Management Plan, Final Environmental Impact Statement*, Appendix B for further detailed description of the main social and economic characteristics of the area (USDA 1990). Annual timber-related employment supported by timber harvested from the Umatilla National Forest for the years 1995 to 1997 averaged 394 jobs.

Economic Efficiency

Existing Condition

Volumes, costs, and revenues from both the commercial and non-commercial units were analyzed for cost effectiveness. The derivation of the commercial unit data is described in the *Harvest Viability* section of this report. The cost of harvest of the volume from the non-commercial acres for each alternative is proposed to be funded by the federal stewardship program[5]. Non-sawtimber volumes from non-commercial thinning units were based on preliminary cruise data and estimated at 500 ccf (approximately 10 tons at 40 pounds per ccf) per acre. The cost of removing material from non-commercial units was estimated at $500 per acre (or $1 per ccf).

It is possible that some or all of the non-commercial volumes removed from the non-commercial units could be sold to local chip markets and used as the "offset" against the cost of services received in the non-commercial units. The non-commercial units

[5] Section 323 of the Consolidated Appropriations Resolution of 2003 (Public Law 108-7) grants the Forest Service authority to enter into stewardship contracting projects with private persons or public or private entities to perform services to achieve land management goals for the National Forests that meet local and rural community needs. The value of timber or other forest products removed may be used as an offset against any services received (Federal Register, Vol. 68, No. 124, p. 38285, June 27, 2003).

were assumed to produce lower quality chips. There is a buyer of low quality chips in Heppner, Oregon where they could be used in for the production of electricity and ethanol. The price paid in local chip markets was estimated to average $300 per acre or $30 per ton ($0.60 per Ccf).

Summay

No Action Alternative

The No Action alternative would not harvest any timber, so would not affect harvest viability.

This alternative would not harvest any timber and therefore, would not support direct, indirect, and induced employment, or increased income to local economies.

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, which 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.

Ongoing costs associated with management of the area, including the continuation of economic losses in stand values from recurring forest health problems, would continue.

All Action Alternatives

This economic analysis ranked each alternative 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. All four alternatives are viable timber offerings. The Proposed action rates highest in harvest viability as measured by volume and third as measured by Present Net Value/acre and highest in jobs. Alternative 2 would rank least in terms of harvest viability, present net value/acre and jobs. Alternative 3 would rank second in harvest viability, highest in terms of present net value/acre and second in terms of jobs. Alternative 4 would rank third in harvest viability, second in terms of present net value/acre and third in terms on jobs.

Table 6: Summary of Economic Measurement Criteria Estimates for All Alternatives

	No Action	Alternative			
		Proposed Action	2	3	4
Commercial Unit Area (Acres)	0	5,095	3,118	4,182	3,919
Total Commercial Volume (ccf)	0	14,775	9,044	12,128	11,366
Total Timber Value at Predicted High Bid Rate	0	$777,570	$430,228	$617,396	$570,913
Local Employment* (jobs)	0	70	42	57	53
Total Potential Income	0	$2,037,359	$1,247,710	$1,673,178	$1,568,052
Discounted Revenue	0	$718,907	$397,770	$570,817	$527,841
Discounted Costs	0	$657,788	$402,627	$481,732	$451,456
Present Net Value	0	$61,120	-$4,857	$89,085	$76,385
Present Net Value per Acre	0	$12	-$2	$21	$19

*The employment estimate does not include employment derived from non-commercial units.

COMPLIANCE WITH OTHER LAWS, REGULATIONS, AND POLICIES

This section describes how the action alternatives comply with applicable State and Federal laws, regulations, and policies.

National Historic Preservation Act

Before project implementation, State Historic Preservation Office consultation will be completed under the Programmatic Agreement among the United States Department of Agriculture, Forest Service, Pacific Northwest Region (Region 6), The Advisory Council on Historic Preservation, and the Oregon State Historic Preservation Officer regarding Cultural Resource Management on National Forests in the State of Oregon, dated March 10, 1995. Identified sites will be protected from all project activities associated with the Falls/Meadowbrook Vegetative Management project. Should additional sites be found during ground disturbing activities, contract provisions will provide protection and the Zone Archaeologist will be immediately notified.

Endangered Species Act and Regional Forester's Sensitive Species

The Endangered Species Act requires protection of all species listed as "threatened" or "endangered" by federal regulating agencies (Fish and Wildlife Service and National Marine Fisheries Service). Biological Evaluations for "Endangered, Threatened, and Sensitive" plant, wildlife, and fish species have been completed. Determinations were made that none of the proposed projects would adversely affect, contribute to a trend toward Federal listing, nor cause a loss of viability to the listed plant and animal populations or species. Details regarding the actual species found within the Falls/Meadowbrook Vegetative Management analysis area and the potential effects of proposed activities on those species and their habitat are contained under the Wildlife Habitat, Fish Habitat, and Non-Forest Vegetation sections of this EA.

Inventoried Roadless Areas and Wilderness

There are no inventoried roadless areas or wilderness in the Western Route analysis area.

Clean Air Act

This section incorporates by reference the Falls/Meadowbrook Vegetative Management Fire/Fuels Report contained in the project analysis file at the North Fork John Day Ranger District. Methodologies, assumptions, and limitations of analysis and other details are contained in the report and the affected environment and predicted effects of the Proposed Action and its alternatives are discussed in Fire/Fuels/Air Quality section.

Clean Water Act

This section incorporates by reference the Falls/Meadowbrook Vegetative Management

Water Resources Report contained in the project analysis file at the North Fork John Day Ranger District.

General designated beneficial uses, as defined by the State of Oregon for the John Day River Basin, include: public and private domestic water supply, industrial water supply, irrigation, livestock watering, fish and aquatic life, wildlife and hunting, fishing, boating, water contact recreation, and aesthetic quality. **Error! Reference source not found.** lists the water quality criteria associated with these general beneficial uses. Revised rules for specific designated fish uses, recently approved by Environmental Protection Agency (March 2, 2004) identify salmon and trout rearing and migration in the Western Route vicinity within the John Day Basin.

Beneficial uses potentially affected by the Western Route proposed actions are: Salmonid Fish Rearing, Salmonid Fish Spawning, and Resident Fish and Aquatic Life. Water quality criteria potentially affected by the proposed actions are: temperature and sedimentation.

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Water Rights and Use

This section incorporates by reference the Falls/Meadowbrook Vegetative Management Water Resources Report contained in the project analysis file at the North Fork John Day Ranger District.

There are approximately 193 livestock ponds in the analysis area. The majority are small upland developments that store snowmelt runoff. Water use of ponds associated with live stream channels are under permit by the State Water Resources Department.

Executive Orders 13186: Neotropical Migratory Birds

This section incorporates by reference the Falls/Meadowbrook Vegetative Management Wildlife Report contained in the project analysis file at the North Fork John Day Ranger District.

Activities under all action alternatives would be designed using the *Conservation Strategy for Landbirds in the Northern Rocky Mountains of Eastern Oregon and Washington* (Altman 2000), and therefore would be consistent with Executive Order 13186. See Wildlife Habitat, Species of Concern section for further discussion of effects on neotropical migratory birds.

Executive Orders 11988 and 11990: Floodplains and Wetlands

This section incorporates by reference the Falls/Meadowbrook Vegetative Management Water Resources Report contained in the project analysis file at the North Fork John Day Ranger District.

Executive Order 11988 requires government agencies to take actions that reduce the risk of loss due to floods, to minimize the impact of floods on human health and welfare, and to restore and preserve the natural and beneficial values served by floodplains. Proposed treatments would not occur within 100-year floodplains due to mitigation

measures detailed in Chapter 2 (see Riparian Habitat Conservation Area measures).

Executive Order 11990 requires that government agencies take action to minimize the destruction, loss or degradation of wetlands, and to preserve and enhance the natural and beneficial values of wetlands. Streamside riparian areas, seeps, springs, and other wet habitats exist within the analysis area. These areas would be avoided according to Riparian Habitat Conservation Area boundaries defined in PACFISH and mitigation measures identified in Chapter 2.

As a result, the proposed treatments would be consistent with Executive Orders 11988 and 11990.

Executive Order 12898: Environmental Justice

This section incorporates by reference the Falls/Meadowbrook Vegetative Management Economic Report contained in the project analysis file at the North Fork John Day Ranger District.

Executive Order 12898 requires that federal agencies adopt strategies to address environmental justice concerns within the context of agency operations. With implementation of any of these alternatives, there would be no disproportionately high and adverse human health or environmental effects on minority or low-income populations. The actions would occur in a remote area and nearby communities would mainly be affected by economic impacts as related to contractors implementing harvest, thinning, fuels treatment, and burning activities. Racial and cultural minority groups are often prevalent in the work forces that would implement prescribed fire, tree planting, or thinning activities. Contracts contain clauses that address worker safety.

National Forest Management Act

All proposed harvest units are planned on suitable land, and will be capable of re-stocking within 5 years of harvest by either natural or artificial means. All units were considered for potential uneven-aged management. Proposed commercial and non-commercial thinning would increase the rate of growth of remaining trees and would favor species or age classes that are most valuable for wildlife. The resultant reduced stress on residual trees would make treated stands less susceptible to pest-caused damage. Mitigation has been identified to protect site productivity, soils, and water quality.

The prescribed burning of natural and activity fuels would reduce long-lasting hazards from wildfire, while air quality would be maintained at a level that would meet or exceed applicable Federal, State, and local standards. All proposed activities would provide sufficient habitat to maintain viable populations of fish and wildlife and critical habitat for threatened or endangered species would be protected.

Proposed activities are designed to accelerate development of forest habitats that are currently deficient within the analysis area, enhancing the diversity of plant and animal communities in the long-term. See discussions under the applicable resource sections above for further support that proposed activities would comply with the seven requirements associated with vegetative manipulation (36 CFR 219.27(b)), riparian

areas (36 CFR 219.27(e)), and soil and water (36 CFR 219.27(f)).

Forest Plan Consistency

The Umatilla National Forest produced the Forest Plan in accordance with the National Forest Management Act of 1976. This plan provides guidelines for all natural resource management activities and establishes management standards.

Current Forest Plan direction identifies fuel standards by management area across the forest. Proposed activities would move treated units toward the Forest Plan standard of an average of 8 or 12 tons per acre in the 0-3-inch size class (depending on management area). These treatments alone would not likely reach the Forest Plan identified averages due to the current volume of fuels, however, the proposed treatments would combine with future activities to reach these levels.

The vegetative manipulation (commercial and non-commercial thinning) associated with the Falls/Meadowbrook Vegetation Management project is consistent with the Umatilla National Forest Land and Resource Management Plan FEIS and Record of Decision (see Silviculture Report for details).

Forest Plan Amendment #11 (Eastside Screens) incorporated additional wildlife habitat measures. To address this amendment, patterns of stand structure by biophysical environment have been compared to the Historic Range of Variability (HRV) for the analysis area. The amount and distribution of dry forest in the Old Forest Single Stratum structural stage is currently deficit as compared the historic range of variability. Late and old structural stage stands would be maintained and enhanced as a result of planned activities in the analysis area. No green trees greater than or equal to 21 inches dbh would be removed by timber harvest. Snags, green tree replacements, and down logs would be maintained as recommended in the District letter based on this Forest Plan Amendment.

The Umatilla Forest Plan was amended in 1995 to incorporate PACFISH. PACFISH defines Riparian Habitat Conservation Areas surrounding streams and other riparian features, and identifies associated Riparian Management Objectives. Within the Falls/Meadowbrook analysis area, Riparian Habitat Conservation Area boundaries extend 300 feet from fish bearing streams, 150 feet from perennial, non-fish bearing streams, and 150 feet from wetlands larger than one acre, and 100 feet from intermittent streams or wetlands smaller than one acre. The project is consistent with the Forest Plan and amendments for water resources and riparian management because applicable standards and guidelines would be met, best management practices would be mandatory as part of project implementation, and monitoring of conditions and trends would continue.

Other Jurisdictions

There are a number of other agencies responsible for management of resources within the Falls/Meadowbrook analysis area. The Oregon Department of Fish and Wildlife is responsible for management of fish and wildlife populations, whereas the Forest Service manages the habitat for these animals. The Oregon Department of Fish and Wildlife

has been contacted regarding this analysis.

The Environmental Protection Agency is responsible for enforcement of environmental quality standards, such as those established for water resources, while the Oregon Department of Environmental Quality sets standards, identifies nonpoint sources of water pollution, and determines which waters do not meet the goals of the Clean Water Act. The Environmental Protection Agency has certified the Oregon Forest Practices Act as Best Management Practices. Oregon State compared Forest Service practices used to control or prevent non-point sources of water pollution with the Oregon Forest Practices Act and concluded that Forest Service practices meet or exceed State requirements. These are periodically reviewed as practices change. The Forest Service and Oregon Department of Environmental Quality have signed a Memorandum of Understanding (2/12/79 and 12/7/82) outlining this. The Oregon Department of Environmental Quality listed Fivemile Creek as water quality limited for 2002.

Oregon Department of Environmental Quality and the Oregon Department of Forestry are responsible for regulating all prescribed burning operations. The USDA Forest Service Region 6 has a Memorandum of Understanding with Oregon Department of Environmental Quality, Oregon Department of Forestry, and the USDI Bureau of Land Management regarding limits on emissions, as well as reporting procedures. All burning will comply with the State of Oregon's Smoke Management Implementation Plan and, for greater specificity, the memorandum of understanding mentioned above.

Before project implementation, State Historic Preservation Office consultation will be completed under the Programmatic Agreement dated March 10, 1995.

Energy Requirements and Conservation Potential

Some form of energy would be necessary for proposed projects requiring use of mechanized equipment: Non-commercial thinning would involve small machines, while projects such as road repair could require heavy machinery for a small amount of time. Both possibilities would result in minor energy requirements. Alternatives that harvest trees would create supplies of firewood as a by-product, which would contribute to the local supply of energy for home space heating.

Prime Farmland, Rangeland, and Forestland

No prime farmland, rangeland, or forestland occurs within the analysis area.

Consumers, Minority Groups, and Women

Effects on civil rights, including those of minorities and women, would be minimal. Activities associated with the action alternatives would be governed by Forest Service contracts, which are awarded to qualified purchasers regardless of race, color, sex, religion, etc. Such contracts also contain nondiscrimination requirements. While the activities identified here would create jobs and the timber harvest would provide consumer goods, no quantitative output, lack of output, or timing of output associated with these projects would affect the civil rights, privileges, or status quo of consumers, minority groups, and women.

Unavoidable Adverse Effects

Implementation of any of the alternatives, including the No Action alternative, would inevitably result in some adverse environmental effects. The severity of the effects would be minimized by adhering to the direction in the management prescriptions and Standards and Guidelines in Chapter IV of the Forest Plan and additional mitigation proposed in Chapter 2 of this document. These adverse environmental effects are discussed at length under each resource section.

Short-term Use and Long-Term Productivity

Short-term uses are generally those that determine the present quality of life for the public. In the Pacific Northwest, this typically includes: timber harvest, livestock grazing, recreation, transportation, utility corridors, and wildlife habitat. Long-term productivity refers to the land's capability to support sound ecosystems producing a continuous supply of resources and values for future generations.

Irreversible and Irretrievable Effects

An **"Irreversible"** commitment of resources refers to a loss of future options with nonrenewable resources. An **"Irretrievable"** commitment of resources refers to loss of opportunity due to a particular choice of resource uses.

No new construction of temporary or permanent roads is planned. Log landings would produce irretrievable changes in the natural appearance of the landscape. Rock used to surface roads would be an irreversible commitment of mineral resources.

The soil and water protection measures identified in the Forest Plan Standards and Guidelines, standard operating procedures in Chapter 2, and Best Management Practices in Appendix B are designed to avoid or minimize the potential for irreversible losses from the proposed management practices.

Concerning threatened and endangered plant, wildlife, and fish species, a determination has been made that the proposed actions will not result in irreversible or irretrievable commitment of resources that foreclose formulation or implementation of reasonable or prudent alternatives.

Environmental Consequences Unique to No Action:

There would be an irretrievable loss of growth within the untreated, overstocked forest. Potentially, the ability to protect forest within the analysis area from catastrophic fire could be irretrievably lost, as well.

There would be an irreversible loss of timber value due to poor tree grow related to crowded conditions and insects and disease. This is particularly true for aspen stands.

Environmental Consequences

Common to All Action Alternatives:

Tree removal would result in an irretrievable loss of the value of removed trees for wildlife habitat, soil productivity, and other values. Log landings would produce irreversible changes in the natural appearance of the landscape. The visual effect of log landings would be somewhat reduced by mitigation designed to reduce soil compaction and erosion (i.e. seeding). Little irreversible loss of soil should occur due to extensive mitigation associated with timber harvest and prescribed fire.

There would be an irretrievable loss of growth and fuels reduction within untreated, overstocked forest outside of treatment units.

CHAPTER 3 – ENVIRONMENTAL CONSEQUENCES

WILDLIFE

Scale of Analysis

For this evaluation and analysis, the "analysis area" refers to National Forest lands within the Potamus watershed.

The scale of analysis differs based on the species and habitats being considered as follows:

- Late and old growth habitat→ Potamus watershed including connectivity with habitats outside the watershed.
- Snags and downed wood habitat → Potamus watershed, split between dry upland and moist upland forest potential vegetation groups.
- Rocky Mountain elk → varies based on Forest Plan direction:
  - E2 Management Areas → only the portion of E2 that lies within the Potamus watershed.
  - C4 Management Areas → only the portion of C4 that lies within the Potamus watershed.
  - C3 Management Area (Big Game Winter Range) → by individual winter range area regardless of watershed boundary (i.e. Monument, Bone Point, and Desolation)
- Endangered, Threatened, and Sensitive species, Species of Interest, and Neotropical Migratory Birds → potential habitat in the Potamus watershed.

Potential habitat was identified using the vegetation database within the corporate GIS database for the North Fork John Day and Heppner Ranger Districts. For late and old structure habitat, stands with the highest canopy closure and later successional stages were queried to create a connectivity map that could be displayed with treatment units to assess effects on connectivity. For other habitats, vegetation data based on the habitat preferences of selected species was intersected with the Falls Meadowbrook analysis area and proposed treatment units.

Dead standing tree and downed wood data was collected on 188 forested CVS plots/points in the Potamus watershed, with 147 plot/points in the dry upland, 46

plot/points in the moist upland, and 18 plot/points in the cold upland forest potential vegetation groups. CVS data is used in the analysis to estimate snag and downwood densities at the watershed scale for comparison with Forest Plan standards and the Decayed Wood Advisor (Mellen et al. 2007). CVS estimates used in this analysis are not statistically valid at the project scale or for a specific site within the watershed. However, estimates derived from CVS inventories are appropriate at the watershed scale (or larger), providing statistically valid estimates for the watershed.

Late & Old Habitat

Designated Old Growth Habitat

Affected Environment

The Forest Plan designated specific areas to be managed as old growth habitat (Map XX--Management Area C1-Dedicated Old Growth and Management Area C2-Managed Old Growth). These management areas are distributed across the Forest so there is one area for every 12,000-13,000 acres of capable old growth habitat. Area size and distribution vary depending on the vegetation type and Forest wildlife indicator species for which the area was designated (USDA 1990). There are approximately eight C1 areas in the Potamus watershed totaling 2,549 acres. There are also six C2 areas totaling 511 acres.

Dedicated and managed old growth stands are not well distributed across the Potamus watershed; they are clumped together in the northern and central portions of the analysis area. These stands represent both dry upland forest and moist upland forest types. Five of the existing C1 areas are classified as pileated woodpecker “suitable”, indicating that habitat conditions within these stands could currently support pileated woodpeckers. The three remaining C1 areas are listed as “capable” habitats—they do not currently support pileated woodpecker feeding or nesting, but could do so in the future. Four of the six C2 areas are classified as suitable for the northern three-toed woodpecker, with the remaining areas capable of providing habitat in the future.

Environmental Consequences

Common to All Alternatives

Direct and Indirect Effects

No treatments are proposed within the C1 or C2 management areas so the current composition, structure, and function of C1 and C2 would be maintained under all of the alternatives. One proposed treatment unit (“Y”) abuts an designated old growth area, but treatment of this unit would not alter the structure or composition of the designated habitat. Additionally, the proposed commercial thinning within unit Y would

maintain or promote the development of future late and old structure habitat.

Late and Old Structure Habitat Outside Designated Stands

Affected Environment

Based on the GIS database, there are 3,960 acres of late and old structure habitat within the analysis area (Table W-03). A number of wildlife species present on the Umatilla National Forest require late and old structure habitat including: pileated woodpecker, white-headed woodpecker, Lewis' woodpecker, pine marten, northern goshawk, Cooper's hawk, sharp-shinned hawk, flammulated owl, great gray owl, Vaux's swift, Townsend's warbler, Hammond's flycatcher, and others.

Table W-03. Existing late and old structure habitat in the Falls Meadowbrook analysis area.

Late and Old Structure Type	Acres
Old Forest Single Stratum	2,219
Old Forest Multi-Strata	1,741
TOTAL HABITAT	**3,960**

The wildlife standards in the Regional Forester's Forest Plan Amendment #2 (1995) require the evaluation of late and old structural stages relative to the historic range of variability. For the purpose of this standard, late and old structural stages include old forest multi-strata and old forest single-stratum stands. The vegetation section of this EA (pages XX-XX) discusses the existing and historic range of variability in detail.

Under the Regional Forester's Amendment #2, harvest can occur in late and old structural stages that are above or within their historic range of variability to:

- maintain or enhance late and old structure habitat within a particular potential vegetation group (in this analysis area—dry upland forest, cold upland forest, or moist upland forest)
- or move one type of late old structure habitat into another that is below its historic range of variability

In the Falls Meadowbrook area, old forest single-stratum structure is above its historic range of variability in the moist upland forest and within its historic range of variability in the cold upland forest. Old forest multi-strata structure is only within its historic range of variability in the dry upland forest.

Environmental Consequences

No Action

Direct and Indirect Effects:

In the short term, late and old structure habitat would maintain its current quality and extent in the analysis area. Indirectly, the amount of late and old structure would change over time given existing management direction (including fire suppression). The amount of old forest single stratum stands would continue to decrease by growing into a multi-strata structure. Stand densities in both single and multi-strata structures would increase, stressing large old trees and making stands increasingly susceptible to high-severity wildfires, insects, or disease outbreaks. This poses a particular concern for dry upland forest because the hot, dry environment at those elevations would delay return of forest cover after a major disturbance, converting affected stands to open shrubland/grassland. This would result in fewer late and old structure stands in the dry upland forest type. Eventually, single stratum old forest structure in moist and cold upland forests would likely also fall below their historic ranges of variability due to stress from overcrowding.

Common to All Action Alternatives

Direct and Indirect Effects:

The effects of treating late and old structure habitat would be the same for All Action Alternatives; however, the extent (acres) would differ between the Proposed Action and its alternatives (Table XX).

Table 1

Late/Old Structure Class	Potential Vegetation Group	Acres Proposed for Treatment	
		Proposed Action	Alts. 2, 3, & 4
Old Forest Single Stratum*	Dry Upland Forest	162	0
	Moist Upland Forest	57	50
	Cold Upland Forest	8	8
Old Forest Multi Strata *	Dry Upland Forest	307	232
	Moist Upland Forest	0	0
	Cold Upland Forest	0	0
Total		**534**	**290**

* Indicates structural stage/potential vegetation group combinations below historic range of variability.

Based on the vegetation conclusions contained on page XX, treatments would promote or enhance late and old structure habitat features in the

short and long term. The smaller competing trees and those uncharacteristic of the potential vegetation group would be removed, retaining the largest trees in these stands. While canopy closure would be reduced to some degree, growth rates of residual trees (including growth of canopy) would increase due to less competition. Treatments in dry upland forest stands with old forest multi-strata structure would promote creation of old forest single-strata structure and change species compositions from mixed conifer types to those dominated by ponderosa pine and western larch. This would move that habitat type closer to its historic range of variability. In moist upland and cold upland forest types, commercial thinning would focus on reducing stand density and promoting fire resilience of residual stands. Replanting regeneration units would create a healthy understory composed of site-appropriate tree species.

Mechanical fuels treatment could occur in proposed treatment units if they are non-viable as part of the timber sale. Overstory composition and structure would not be affected by these treatments and snags and downed wood would meet Forest Plan standards.

Debris resulting from treatments would be burned under all four action alternatives (primarily pile burning and some landscape underburning). changes in overstory tree composition or structure.. With low intensity, fire effects on snags and downed wood would be minimal and Forest Plan standards would be met after vegetation and fuels treatments. Vegetation treatments and subsequent burning would reduce the risk of wildfire and insect or disease outbreaks in treated late and old structure habitat.

Species adapted to late and old structure, single-strata dry upland forest (white-headed woodpecker, flammulated owl, Lewis' woodpecker) would benefit in the mid and long term through the restoration of potential habitat.

Cumulative Effects

The number of acres within the analysis area in the cold upland forest potential vegetation group is 11,328. For moist upland forest and dry upland forest, the acres are 10,678 and 56,329 respectively. Table XX shows the cumulative effects on late/old structure in these potential vegetation groups.

Table 2 Cumulative effects of Past, Present, Reasonably Foreseeable Future Actions and the Action Alternatives

Late/Old Structure Class	Potential Vegetation Group	Amount of analysis area	Existing Cond. (Past actions)	Present and Foreseeable Future Actions	Cum. Effects	
					Proposed Action	Alts. 2, 3, & 4
Old Forest Single Stratum*	Dry Upland Forest	%	2%		2%	2%
		Acres	1,100		1,262	1,100
	Moist Upland Forest	%	8%		9%	8%
		Acres	900		957	950
	Cold Upland Forest	%	4%		4%	4%
		Acres	500		508	508
Old Forest Multi Strata *	Dry Upland Forest	%	3%			
		Acres	200		307	232
	Moist Upland Forest	%	2%		2%	2%
		Acres	200		200	200
	Cold Upland Forest	%	1%		1%	1%
		Acres	100		100	100

* Indicates structural stage/potential vegetation group combinations below historic range of variability.

Past actions and events in the Falls Meadowbrook analysis area that affected the quality, amount, and distribution of late and old structure habitat include commercial timber harvest, wildfire, and firewood cutting (Table XX). Past harvest and fire affected the structure, composition, and distribution of late and old structure stands. Large trees were removed as were snags and downed wood (reducing their density and size). Firewood cutting further removed snags and down wood adjacent to open forest roads. These activities and events have contributed to the existing condition of late and old structure habitat in the analysis area.

Present and reasonably foreseeable future activities that would affect late and old structure habitat include firewood cutting. This activity would have the same effects as those described under the past activities section.

When the expected effects of this alternative are combined with the residual and expected effects of past, present, and reasonably foreseeable future actions in the analysis area, there would be no adverse impact on late and old structure habitat. Treatment would promote the maintenance or enhancement of late and old structure habitat features

and move stands toward late and old structural stages that are currently below HRV.

Unique to Proposed Action

Direct and Indirect Effects

Proposed treatment units 40, 43, 47, 48, 49, and AG_s2 occur in old forest single-stratum habitat in dry upland forest, which is currently below its historic range of variability in the analysis area. A site-specific Forest Plan amendment would be required to treat these acres. Treatment of all late old structure stands (including those currently below historic range of variability) would promote or enhance late and old structure habitat features in the short and long term.

Common to Alternatives 2, 3, and 4

Direct and Indirect Effects

Under these alternatives, there would be no treatment of late old structure habitat that is currently below the historic range of variability. Therefore, a site-specific Forest Plan Amendment would not be needed.

Connectivity

Affected Environment

The Regional Forester's Amendment #2 also requires late and old structural stands and designated old growth areas to be connected to each other across the landscape. For this standard, connective habitat does not need to meet the description of suitable habitat for a particular species. Instead it must provide "free movement" between late and old structural stands and old growth areas for wildlife species associated with such conditions. Connectivity corridor stands are described as having:

- 2 or more different connections among late old structure stands and designated old growth habitats to form a contiguous network
- medium (9 to 14.9 inches dbh[1]) to large trees ($\geq$ 14.9 inches dbh) are common
- a canopy closure in the top 1/3 of site potential
- at least 400 feet wide at its narrowest point (unless current vegetative structure cannot provide this and other connections are not available)

The Regional Forester's Amendment #2 allows treatment within connectivity habitat as long as all these criteria are met and if some amount of understory (if any occurs) remains in patches or scattered.

[1] Dbh is the diameter of a tree taken at breast height.

Currently, connectivity in the Potamus watershed meets standards in the Regional Forester's Amendment #2. The least connected areas generally occur where stand densities have been reduced by recent (< 15 years) insect and disease outbreaks. Such stands have low value as connective habitat. In particular, dedicated old growth area #1672 is separated from late and old structure stands to the east by natural openings and stands that have an overstory canopy closure at or below 30% due to insects and disease. In this case, a stand in the stand initiation structural stage with 40% canopy closure provides the *second* connection between these habitats.

Portions of the analysis area, particularly at mid and lower elevations near the center of the watershed, are composed of grasslands and shrublands. Such areas include contiguous grasslands, grasslands interspersed with timber, juniper/shrub woodland, grassy stringers of trees associated with draws, and other non-forest habitat features. As a result, these areas have a naturally low potential to provide connectivity to adjacent or distant stands.

Environmental Consequences

No Action

Direct and Indirect Effects

In the short term, late and old structure stands and designated old growth would remain connected across the landscape. Indirectly, connectivity would change over time. Growth would continue to create dense multi-layered stands under existing management direction (including fire suppression). This would increase the susceptibility of connective corridors to wildfire and insect and disease outbreaks. The potential for loss of connection would increase, as already evidenced in stands affected by recent insect and disease outbreaks. This would limit "free movement" of old growth-dependent species both within and outside the analysis area.

Common to All Action Alternatives

Direct and Indirect Effects

All treated connectivity habitat under any of the action alternatives would meet the Regional Forester's Amendment #2 standards after treatment. Commercial thinning and regeneration harvest would reduce the density of live trees in some connective corridors. In regeneration harvest units (where pre-treatment canopy closure is low due to insect and disease agents) sufficient adjacent connectivity habitat is present to maintain at least two connections between late and old structure and designated old growth. The largest trees would be retained under all treatments, which would maintain or encourage the development of late and old structure habitat to provide connectivity into the future.

Non-commercial thinning would have no impact on the quality of connectivity habitat because overstory composition and structure would not be affected. Patches of understory vegetation would be maintained in non-commercially thinned units to provide hiding cover for wildlife.

Controlled burning and mechanical fuel treatments would not change overstory composition or structure in connectivity habitat. Where burning is used, patches of unburned understory would remain due to the low fire intensity. Mechanical fuel treatments would retain patches of small diameter trees ranging from ¼ to ½ acre.

Downed wood used by some late and old structure-associated species would be minimally affected by vegetative treatments and burning. Forest Plan standards would be met upon completion.

Roads used for harvest would not change the composition or structure of connective habitat in the project area. Maintenance and reconstruction of some roads could require removal of some vegetation; however, this activity would not affect overstory composition or structure.

Cumulative Effects

Past activities and events in the Falls Meadowbrook analysis area that affected connectivity of late and old structure and old growth include timber harvest (33,639 acres), associated road construction, and wildfire (738 acres). Past harvest activities removed trees greater than 12 inches dbh, reduced canopy closure, created openings, and fragmented large, continuous blocks of forested habitat. Wildfire also fragmented habitat, although due to the small size of individual wildfires in the analysis area it is unlikely that connectivity has been appreciably reduced as a result. These past activities and events have resulted in the existing condition of connectivity habitat in the analysis area.

There are no present or reasonably foreseeable future activities in the analysis area that would impact connectivity habitat.

When the expected effects of the proposed action or its alternatives are combined with effects of past, present, and future actions, the cumulative effects would still meet Forest Plan standards. Although connectivity habitat would be treated (and the canopy density and understory hiding cover temporarily reduced as a result), it would still allow for the “free movement” between late and old structure and old growth habitats. In the long term, treatments would help offset effects of past actions by promoting the maintenance or enhancement of late and old structure habitat features and moving late and old structure towards the historic range of variability.

DEAD WOOD HABITAT

Snags

Affected Environment

Overall, existing snag[2] densities exceed Forest Plan standards and guidelines for each potential vegetation group and each size class group in the Potamus watershed (see Table W-08). However, as identified in the Forest Plan (USDA 1990, p4-57), snag densities are to be maintained "… for each logical harvest size unit (or no larger than 40 acres units)." While snag densities may appear to be above standards and guidelines across the watershed; densities at the stand level will vary widely from zero snags per acre to as many as 64 snags per acre (DecAID 2007).

Table W-08. Forest Plan standards (USDA 1996) and existing snag densities in the Falls Meadowbrook analysis area.

Forest Plan Standards (amended)		**Potamus Watershed**	
Working Group	**Density**	**Potential Veg. Group**	**Existing Density**
Ponderosa pine	0.75 snags/ac. ≥10" dbh 1.36 snags/ac. ≥12" dbh 0.14 snags/ac. ≥20" dbh **2.25 snags/ac. Total**	**Dry Upland Forest**	7 snags/ac. ≥10" dbh 5 snags/ac. ≥12" dbh 1 snags/ac. ≥20" dbh
South Assoc. (Mixed conifer)	0.75 snags/ac. ≥10" dbh 1.36 snags/ac. ≥12" dbh 0.14 snags/ac. ≥20" dbh **2.25 snags/ac. Total**		
Cool Grand Fir/ North Assoc. (Grand fir)	0.30 snags/ac. ≥10" dbh 1.36 snags/ac. ≥12" dbh 0.14 snags/ac. ≥20" dbh **1.80 snags/ac. Total**	**Moist Upland Forest**	19 snags/ac. ≥10" dbh 14 snags/ac. ≥12" dbh 3 snags/ac. ≥20" dbh

[2] Snag = dead standing tree

Forest Plan Standards (amended)		Potamus Watershed	
Working Group	**Density**	**Potential Veg. Group**	**Existing Density**
Lodgepole pine	1.21 snags/ac. ≥10" dbh 0.59 snags/ac. ≥12" dbh **1.8 snags/ac. Total**	**Cold Upland Forest**	2 snags/ac. ≥10" dbh 2 snags/ac. ≥12" dbh 1 snags/ac. ≥20" dbh

Decayed Wood Advisor (DecAID)

Since 2003, the Decayed Wood Advisor (DecAID) by Mellen et al. (2007) has become available for deadwood analysis. DecAID is a statistical summary of empirical data from published research on wildlife and deadwood habitat. Refer to the Wildlife Specialist's Report for full discussion of DecAID, data available from DecAID, and how DecAID data is interpreted.

Three of the DecAID wildlife habitat types occur in the Falls Meadowbrook analysis area. They include lodgepole pine forest, eastside mixed-conifer forest (Blue Mountains), and ponderosa pine/douglas-fir forest. The dominant vegetative coverage in the watershed is ponderosa pine (dry upland potential vegetation group). All structural condition classes occur in the watershed, but the most prevalent structure is the small/medium class. Dead standing tree densities relative to DecAID and the Potamus watershed are found in Table W-09.

Table W-09. DecAID tolerance levels and current snag densities on National Forest land in the Falls Meadowbrook analysis area.

DecAID Habitat Types	Potential Veg. Group	Structural Condition	DecAID Tolerance Levels for Snag Density (snags/acre)*					
			30%		50%		80%	
			≥10" dbh	≥ 20" dbh	≥ 10" dbh	≥ 20" dbh	≥10" dbh	≥ 20" dbh
Eastside Mixed Conifer Forest – Blue Mtns	Moist Upland Forest	Large	14.9	3.5	30.1	7.8	49.3	18.4
		Small/Med	14.9	3.5	30.1	7.8	49.3	18.4
		Open	ND	ND	ND	4.8	ND	ND
Ponderosa Pine/ Douglas-fir Forest	Dry Upland Forest	Large	.3	.5	1.7	1.8	3.7	3.8
		Small/Med	.3	.5	1.7	1.8	3.7	3.8
		Open	.3	.2	1.7	1.3	3.7	2.8

*Shading indicates where existing snag densities meet DecAID tolerance levels for a given habitat type and structural condition. ND denotes points where no data was available in the DecAID advisor.

The white-headed woodpecker cumulative species data in DecAID is represented by the Ponderosa pine/Douglas-fir forest type; pileated woodpecker cumulative species data is represented by the Eastside Mixed Conifer Forest-Blue Mountains habitat type. Based on their habitat preferences, these species best represent these habitat types.

Moist Upland Forest

Current dead standing tree densities are between the 30% and 50% tolerance levels (for those structural stages where data is available) in the greater than 10-inch group for pileated woodpecker nesting and roosting habitat and fall short of the 30% tolerance level in the greater than or equal to 20-inch diameter class. Because of the random distribution of snags across the landscape, some areas will exceed the 80 percent tolerance levels for pileated woodpecker in the 10-inch and 20-inch diameter classes.

The distribution of snags in unharvested plots is used as a surrogate to represent a potential "historic" distribution of snags for the Eastside mixed conifer forest type and/or moist upland forests types in the watershed. In the greater than 10-inch class; there is currently more than 3 times as much area (49%) that occurs without snags than the amount of area in unharvested (historic) plots with no snags (15%)(Mellen et al. 2007. Additionally, there are significantly fewer snags currently in the 0-6, 6-12, 12-18, and 18-24 snag per acre groupings when compared to unharvested plots. In addition, the highest snag densities (48-54, 54-60, and >60 snag/ac) currently occur on approximately 17 percent of the analysis area while these densities occurred on about 4 percent of the area on unharvested plots. This is likely due to past insect infestations that created numerous snags in portions of the analysis area. Overall, snag densities in the greater than 10-inch diameter group in the moist upland forest type are distorted at both ends of the distribution curve for the Potamus watershed.

Currently in the greater than 20 inch diameter group, 67% of the plots in the analysis area have zero snags; in unharvested (historic) plots, only 31% of the analysis area (watershed) had no snags (31%) without snags in the greater than or equal to 20 inch dbh group. Also, there is at least a 50 percent decrease in the 0-2, 2-4, and 6-8 snags per acre groupings between the existing and historic condition. The highest snag densities (>18 snag/ac) are currently present on 9 percent of the area while these densities occur on about 1 percent of unharvested plots. Overall, snag densities in the greater than 20-inch diameter group in the moist upland forest type have the greatest difference (between the existing and reference conditions) at the upper end of the distribution curve for the Potamus watershed.

Dry Upland Forest

Current dead standing tree densities exceed the 80% tolerance level for the white-headed woodpecker for nesting and roosting habitat in the greater than or equal to 10-inch diameter class. In the greater than or equal to 20-inch diameter class, snag densities in the watershed are greater than the 30 percent tolerance level but fall short of the 50 percent tolerance levels across the watershed. Because of the random distribution of snags across the landscape, some areas will exceed the 80 percent tolerance levels for white-headed woodpecker in the 10-inch and 20-inch diameter classes.

The current amount of area with zero snags (61%) is relatively close to the amount of area for unharvested (historic) plots with no snags (54%), in the greater than 10-inch diameter class. Increases in area by 50 percent or more (between the existing condition and the historic condition) occur in most of the snag density groupings (4-8, 8-12, 12-16, 20-24, 24-28, 28-32, and greater than 36 snags/ac). The only current decrease in area for the watershed occurs in the 0-4-snags/ac groups, with a 29 percent decrease from the reference (unharvested) condition.

The amount of area in the watershed that currently has zero snags (83%) in the greater than 20-inch group and the amount of area with zero snags for unharvested (historic) plots (71%), are similar. Increases in area, by 50% or more between the reference condition and the existing condition occur in the 4-6 and 6-8 snag/acre groupings. Decreases occur in the 0-2 and 2-4 snags/acre groupings.

Environmental Consequences

No Action

Direct and Indirect Effects

In the absence of large scale disturbance, snags would continue to occupy the project area at current densities and size classes for the next three years. In the mid and long term (3 to 20+ years), existing snags would decay and fall to the ground, increasing downed wood in the analysis area. Snag densities have the potential to increase in the analysis area through naturally occurring (background) mortality and mortality caused by insect/disease outbreaks and wildfire. Mortality caused by insects and disease would be patchy, creating small to moderately sized “islands” with high snag densities. These islands would provide habitat for primary cavity excavators (black-backed woodpecker, Lewis’ woodpecker, etc.) and other wildlife that require pulses of high density snags. High severity wildfire would affect a much larger and more contiguous area than insect and disease outbreaks. Initially, snag densities would increase with fire-caused mortality.

A potential increase in snag density in the watershed could increase and maintain snag densities above the 80 percent tolerance level for the white-

headed woodpecker in the greater than 10-inch and greater than 20-inch group. Snag densities would also approach or exceed the 80 percent tolerance level for the pileated woodpecker in the greater than 10-inch and greater than 20-inch groups following a disturbance of this type. Primary cavity excavators requiring high densities of snags and post-fire environments would find ample habitat in the 10 to 15 years following a high severity wildfire. Eventually, snag densities would fall below pre-fire conditions, and remain low until the regenerating stand is able to produce green trees and snags large enough to be used by cavity excavators and other wildlife. This could take as long as 80 to 100 years, or longer if a series of disturbance events occurs.

Common to All Action Alternatives

Direct and Indirect Effects

Any felling of snags within commercial and commercial/non-commercial thinning units would be incidental because these activities would target green trees for removal. Only snags that pose hazards for workers within units and along haul routes would be felled. Where this occurs, potential primary cavity excavator roosting and nesting habitat would be lost to provide for safety.

Insects and disease have caused heavy overstory mortality within units targeted for regeneration harvest. Diseased green trees (mistletoe, root rot, etc.) and snags would be targeted for removal to create a healthy green stand in these units. Primary cavity excavator habitat would be reduced in regeneration harvest units; however, snag densities would meet Forest Plan standards following treatment. Table XX shows the acres of regeneration harvest by alternative. The Proposed Action would treat the most acres with regeneration harvest, and correspondingly have the greatest impact on snags.

Table XX. Acres of regeneration harvest by alternative.

	Proposed Action	**Alternative 2**	**Alternatives 3 and 4**
Acres of Regeneration Harvest	1,587	959	967

Non-commercial thinning would not affect dead standing trees; therefore, there would be no change in existing primary cavity excavator habitat in these units.

Loss of snags from the burning of thinning and harvest debris is expected to be minimal because burns would be low in intensity. Burning would mostly likely reduce small diameter snags and those in later stages of decay, with some large snags lost where there are large accumulations of debris nearby. Burning has the potential to create snags though direct and delayed fire mortality; this would

compensate for the few snags that are lost during burning activities. Snag densities are expected to remain above Forest Plan standards after burning occurs.

Mechanical fuels treatment would affect snags in a similar manner as that described for commercial and commercial/non-commercial thinning units. The exception to this would be in regeneration harvest units that are found to be non-viable. Forest Plan standards for snags would be met in all cases.

Given the assumption that 10 percent of existing snags would be felled to provide for safety in treatment units and that snag densities would be reduced in regeneration harvest units (densities would approximately equal Forest Plan standards), snag densities at the watershed scale would be affected. Effects on snag densities in the dry and moist upland forest Potential Vegetation Groups for each action alternative are displayed in Table XX.

Table XX. Existing and post-harvest snag densities in the dry and moist upland forest potential vegetation group.

			Proposed Action	Alternative 2	Alternative 3	Alternative 4
Affected Acres*			6,556	3,921	5,111	4,998
Snag Density – Dry Upland Forest	**≥ 10" dbh**	**Current**	7.0			
		Post Harvest	6.8	6.9	6.9	6.9
	≥ 20" dbh	**Current**	1.0			
		Post Harvest	1.0	1.0	1.0	1.0
Snag Density – Moist Upland Forest	**≥ 10" dbh**	**Current**	19.0			
		Post Harvest	18.5	18.6	18.6	18.5
	≥ 20" dbh	**Current**	3.0			
		Post Harvest	2.9	2.9	2.9	2.9

*Includes commercial, commercial/non-commercial, and regeneration harvest

Given the expected changes displayed in Table XX, the analysis area would continue to exceed the 80 percent tolerance level in the ≥10-inch group and be between the 30% and 50% tolerance levels for the ≥20-inch group for the white-headed wood pecker (representing Dry Upland Forest habitat) and continue to lie between the 30% and 50% tolerance levels in the ≥10-inch group and below the 30% tolerance level for the ≥20-inch

group for the pileated woodpecker (representing Moist Upland Forest habitat) for all action alternatives, when compared to the cumulative species curves in DecAID.

Cumulative Effects

Harvest, salvage, and woodcutting has reduced snag densities in the past, to current levels (see Table XX). At this time, there are no ongoing or reasonably foreseeable future actions that would further affect snags. Refer to the Wildlife Specialist's Report for past, present, and reasonably foreseeable future actions that have residual, ongoing, or expected effects on snag densities and wildlife dependent on this habitat feature.

The action alternatives would all add to the cumulative reduction in snag densities in the analysis area (see Table XX). At the stand scale, habitat (nesting, foraging, and roosting) for primary cavity excavating birds would be reduced; however, snag densities would continue to meet Forest Plan standards even in regeneration harvest units following treatment. By meeting these standards, habitat for these species will be maintained at levels that will insure their viability. Snag densities at the watershed scale would be consistent with the Forest Plan, and would provide sufficient habitat for primary cavity excavating birds and other snag-dependent wildlife.

Snag Replacement Trees

Affected Environment

Snag replacement trees ("green" trees) were analyzed to determine the potential for recruitment of dead tree habitat overtime across the landscape. For this analysis, current vegetation survey data was used to provide information on potential replacement trees in the analysis area.

Refer to the Wildlife Specialist's Report to view Forest Plan standards and existing green tree replacement densities in the watershed. Overall, snag replacement tree densities exceed Forest Plan objectives for each potential vegetation group and size class group in the analysis area.

Environmental Consequences

No Action

Direct and Indirect Effects

Within the next three years, snag replacement trees (live/green) would continue to occupy the project area at or near current densities and size classes, exceeding Forest Plan objectives. In the mid and long term (3 to 20+ years), green tree replacements would decrease in response to disease and insect outbreaks. In the absence of fire, disease and insect

outbreaks would affect dense multi-strata stands. Although green tree replacements may decrease in the future due to mortality, it is unlikely that green tree replacement levels would fall below Forest Plan objectives. In the long term, mortality of overstory trees would increase standing and downed fuel loads, increasing the risk of high severity wildfire. Wildfire of this type would change the composition and structure of forested stands in the analysis area. Depending on the intensity and severity of the fire, this would reduce or even eliminate green replacement trees currently occupying the site. After a severe fire event, it would take in excess of 80-100 years to regain sufficient quantities of replacement trees, in all size classes, to meet the Forest Plan objectives.

Common to All Action Alternatives

Direct and Indirect Effects

Proposed harvest activities (commercial and non-commercial thinning) would directly and indirectly affect green trees in the project area. Commercial and non-commercial thinning and regeneration harvest would reduce the density of green trees in treatment units; however, all treated stands would be fully stocked after treatment. Under all Action Alternatives, green tree objectives would be met following treatment. Regeneration harvest would occur in stands that have been or that are currently being affected by disease agents and insects. These agents have resulted in reduced levels of green tree replacements. Regeneration harvest would remove diseased green trees in these stands to promote the health of the residual stand. If green tree replacements are already below goals in these stands, no green trees will be removed from these stands to maintain sufficient snag replacement trees; in some stands, infected green trees would be retained to meet these objectives.

Low intensity underburns would reduce fuels (slash) created from harvest and thinning activities, and reduce understory vegetation. Prescribed fire could cause mortality of understory trees; however, overstory composition would be largely unaffected by low intensity underburning. Occassional torching of individual trees or small grous of trees may occur during burning; the effect of this on green tree replacements would be minor. Green tree replacements would remain above objectives after landscape and activity fuels burning.

Mechanical fuels treatment would affect understory vegetation; small diameter understory trees would be thinned to promote stand health and vigor and appropriate species composition. Green tree replacement objectives would be met in all mechanical fuels treatment units.

Cumulative Effects

Refer to the Wildlife Specialist's Report for past, present, and reasonably foreseeable future activities, actions, and events that have residual,

ongoing, or expected effects on green replacement tree objectives within the analysis area.

When the expected effects of these alternatives are combined with the residual effects of past activities, actions, and events, there would be no cumulative reduction of green tree replacements below Forest Plan objectives. Green trees would be harvested under all four action alternatives; however, green tree replacements would meet or exceed green tree replacement objectives under all Action Alternatives after treatment. By meeting green tree replacement objectives in treated stands, sufficient trees would be available to provide future standing dead wood (snag) habitat at levels that would be consistent with the Forest Plan, as amended.

Downed Wood

Affected Environment

Dead downwood is dependent on disturbances creating snags and snags subsequently falling to the ground. Downwood will remain on site until it "naturally" decomposes, burned in a wildfire, or is physically or mechanically removed. These actions may result in a reduction of downwood, until snag fall occurs again on the site. Generally, downwood occurs as scattered pieces, clusters, and/or piles of logs and/or limbs within the affected area. For this analysis current vegetation survey (CVS) data was used to provide information on downwood in the Potamus analysis area and across the watershed.

The Forest's amended guidelines for downwood densities and densities for the Falls Meadowbrook analysis area are found in the Wildlife Specialist's Report. Generally, downwood densities are low across the watershed. The exception is the dry upland forest type, where downwood density is greater than the Forest Plan standard. Downwood density is below the Forest Plan standard at the watershed scale in the moist upland forest type; however, it should not be assumed that all moist forest habitats are deficient in downed wood. Within this potential vegetation group, individual stands span the entire spectrum of having no downed wood to having densities well in excess of the Forest Plan standard. The moist upland forest potential vegetation group is well above Forest Plan standards for snag densities (14 snags/ac. ≥12" dbh); in the future, these snags will fall to the ground, increasing downed wood densities near or above the Forest Plan standard. Downwood density in the cold upland forest type is slightly below the minimum standard for the Forest Plan, which may be the result of a limited number of CVS plots in the watershed to accurately assess density for cold forest types.

Environmental Consequences

No Action

Direct and Indirect Effects

Over the next three to five years, dead downed wood would continue to occupy the watershed at or near the current density in the dry upland, moist upland, and cold upland forest potential vegetation groups. Over the next three to 10 years, falling snags would be the primary source of downed wood habitat, potentially increasing downed wood densities. Downed wood densities in the dry upland forest PVG would increase even further above Forest Plan standards, and densities in the moist upland forest PVG would approach or exceed Forest Plan standards. In the long term, stands would continue to develop into multi-layered stands, resulting in competition for resources and stress. Potential increases in the incidence of insects and disease would cause additional mortality in these stands, increasing potential standing and downed wood. This accumulation would increase fuel loading and the risk of wildfire (see Fuels section). Large scale, high severity wildfire could reduce downed wood densities below Forest Plan standards immediately following the fire. Downed wood would eventually increase as snags created by a fire of this type begin to fall. After a series of continued disturbances on the site, downed wood densities would likely fall below the Forest Plan standard because of the diminished source of green trees and snags. Replacing the downed wood component after a series of disturbance events could take up to 80 years to develop replacement trees greater than 12 inches dbh.

Common to All Action Alternatives

Direct and Indirect Effects

Proposed commercial and non-commercial thinning and regeneration harvest would not have a direct effect on downed wood, because downed wood would not be harvested or removed from treatment units. Indirectly, dead wood may be affected by harvest operations (skidding, skid trails, landings, etc.), where existing down logs may be moved, cut into pieces, or broken apart. However, vegetative treatments would not be expected to reduce downed wood densities in the affected area. Pieces of downed wood meeting these standards (>12" small end diameter and >6 feet long) would remain on site as singles, groups, or piles. Downed wood densities would continue to exceed Forest Plan standards in the dry upland forest PVG and be below standards in the moist and cold PVGs.

Treatment of debris created by harvest would affect downed wood retained after harvest. All fuels created during treatment (tops, limbs, etc.) would be scattered within units (no piling). Low intensity underburns would consume fine surface fuels (slash) created by treatment activities.

It is expected that some portion of the existing downed wood in treatment units would be partially or completely consumed by underburning. Generally, smaller logs less than 12 inches dbh and logs in later stages of decay would be more susceptible to consumption during burning (Stephens and Moghaddas 2005). Larger logs would generally be unaffected or would only be charred by underburning due to high moisture levels during the period when burning would occur. Burning would occur in the spring or fall when relative humidity and fuel moistures are higher; underburns would be designed to target small diameter material generally less than 6 inches in diameter and burn at a low intensity. Impacts to species that use downed wood for foraging, denning, or other activities would generally be minor. Downed wood densities may slightly decrease in response to treatment activities and burning. The dry upland forest potential vegetation group would experience the highest reduction in downed woody material due to the climate in these areas; however, densities would continue to meet standards following treatment. This indicates that sufficient downed wood will be present in treated dry upland forest stands to maintain bird and small mammal populations in the future. Downed wood densities in the moist and cold upland forest potential vegetation groups are currently below Forest Plan standards at the watershed scale. Proposed burning would minimally affect downed wood densities in these habitats due fuel moisture content when burning occurs; small diameter fine fuels would be reduced in these areas. Charring of downed wood within burn units would temporarily reduce the quality of foraging habitat for some insectivorous birds by reducing insect populations and hardening logs used for foraging.

Generally, the greater the acres of burning, the greater the potential impact on downed wood. Refer to Table XX for a summary of proposed burning under each action alternative by potential vegetation group. Alternatives 2 and 4 would burn the most acres within the analysis area when compared to the other action alternatives.

Table XX. Summary of proposed landscape and harvest debris burning by alternative and potential vegetation group.

	Potential Vegetation Group					
Action Alternative	**Dry Upland Forest (ac)**	**Moist Upland Forest (ac)**	**Cold Upland Forest (ac)**	**Non-Forest Habitat (ac)**	**Outside Potamus Watershed (ac)**	**Total Burning (ac)**
Proposed Action	5,714	833	160	243	180	7,130
Alternative 2	12,332	1,846	271	2,615	180	17,244
Alternative	4,652	774	160	218	103	5,907

3						
Alternative 4	13,073	1,955	345	2,713	180	18,266

Underburns would also be expected to create snags within the burn area through immediate and delayed fire mortality. Snags created by burning would eventually fall to the ground, compensating for those that may be consumed during this activity.

Mechanical fuels treatment may occur in proposed treatment units. Mechanical fuels treatment would affect understory vegetation and downed wood. This activity would remove downed wood from treatment units or chipped/masticate downed wood within treatment units. Although this activity would reduce downed wood in treatment units, Forest Plan standards for downed wood would be met in these units following this activity.

Cumulative Effects

Refer to the Wildlife Specialist's Report for past, present, and reasonably foreseeable future activities, actions, and events that have residual, ongoing, or expected effects on downed wood densities and wildlife dependent on this habitat feature within the analysis area.

When the expected effects of these alternatives are combined with the residual and expected effects of past, present, and reasonably foreseeable future actions, activities, and events in the analysis area, there would be a cumulative reduction in downed wood habitat. This reduction would occur in response to landscape and treatment-debris burning and mechanical fuels treatment. The reductions in downed woody material would not adversely impact habitat for wildlife that use this habitat type for foraing, denning, or other purposes. Sufficient downed wood would be present to provide habitat for primary cavity excavators, pine marten, and other wildlife. At the watershed scale, downed wood densities are expected to remain above Forest Plan standards in the dry upland forest potential vegetation group following treatment; densities in the moist upland forest would remain below standards following treatment. At the stand scale, downed wood densities would be consistent with direction if the Forest Plan.

Unique to Alternative 2

Direct and Indirect Effects

The environmental effects of vegetative treatments under this alternative would be to the same as those described under All Action Alternatives. This alternative would include approximately 605 acres of whole tree yarding. Slash would be piled and burned at landings where whole tree

yarding occurs. Treatment debris would not be scattered throughout these 605 acres; correspondingly, there would be no landscape or activity fuels burning on these acres.

Cumulative Effects

The cumulative effects of this alternative would be the same as those described under *Common to All Action Alternatives.* Reductions in tractor fireline and addition of whole tree yarding would not significantly change the potential impacts on downed wood due to the fact that burning and tractor line construction would have minimal impacts on downed wood under all alternatives.

MANAGEMENT INDICATOR SPECIES

The Forest Plan designates Management Indicator Species to represent larger groups of animals associated with the major habitat types on the Forest. Habitat conditions for management indicator species, as well as for all other wildlife species on the Forest must be managed to maintain viable populations (USDA 1990, p. 2-9). MIS species for the Forest are presented in Table W-24.

Table W-24. Wildlife Management Indicator Species on the Umatilla National Forest (USDA 1990, p2-9).

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

Rocky Mountain elk, pileated woodpecker, and a number of primary cavity excavators are known to occur in the analysis area. The northern three-toed woodpecker and the pine marten have been observed infrequently in the analysis area. Effects on the Rocky Mountain elk and its habitat will be analyzed in the *Rocky Mountain elk* section.

Rocky Mountain Elk

Affected Environment

The Potamus watershed is primarily in the eastern portion of the Heppner Wildlife Management Unit (Heppner Unit) of the Oregon Department of Fish and Wildlife (ODFW). In addition, about 20 percent of the watershed (the southeast corner) occurs in the Desolation Wildlife Management Unit (Desolation Unit).

Table 3 Elk Population Data from Oregon Department of Fish & Wildlife for the Heppner and Desolation Wildlife Management Units for the years 1990-2004

Measure		Heppner Unit	Desolation Unit
Amount of public land in ODFW unit (%)		32% (mostly National Forest)	87% (mostly National Forest)
ODFW Management Objectives	**Population**	2,800	1,300
	Bull to 100 cows ratio	10	
Population levels (taken from ODFW big game hunting statistics)		1990-2002: relatively stable & above mgt. objective 2003-2004: declined below mgt. objective.	1990-2003: relatively stable & at mgt. objective 2004: declined below mgt. objective
Calves per 100 cows	**High (year)**	47 (1991)	52 (1997)
	Low (year)	18 (2004)	17 (2003)
Bulls per 100 cows		9	near mgt objective of 10

Recent declines in the elk population, and in particular the decrease in calf-cow ratios, are becoming a management concern in these units and northeast Oregon in general. Increasing populations of cougars and bears (and subsequent increases in predation on calves) are widely thought to be the reason for the decrease. Additional concerns include changes in habitat conditions that affect winter survival of calves and pregnant cows.

Preferred habitat for elk consists of a mix of forest and non-forest habitat types with a variety of forest structures to provide cover and forage for summer or winter use (USDA 1990, FEIS 2007). The analysis area contains both summer and winter habitats. Summer range (forest habitat) occurs throughout the area at mid and high elevations. Winter range (grassland/grass-tree mosaic—Management Area C3) occurs at lower elevations in the central and northern portion of the watershed down to the North Fork John Day River. Three winter ranges (Monument, Bone Point, and Desolation) overlap about 30 percent of the analysis area. Monument and XX extend beyond the Potamus watershed.

The Umatilla Forest Plan establishes standards and guidelines for elk habitat (Table W-25). The big game habitat effectiveness index (HEI) is used to predict the influence of forest management on elk and other big game species. The model is biologically based using the distribution of cover and forage, cover quality, and road density factors to help indicate how effective an area will be in supporting big game (Forest Plan, Appendix C). It was intended to be a relative measure of effectiveness and does not consider many factors (such as weather, predation, disease, hunting, harvest, etc) that would influence the “actual number” of elk found on an area (Forest Plan EIS, page IV-71).

Table W-25. A comparison of standards and existing conditions for Rocky Mountain elk habitat in the Falls Meadowbrook analysis area. (Shaded fields indicate values currently below Forest Plan standards.)

Management Area	Forest Plan Standards			Falls Meadowbrook HEI Analysis			
	HEI	Satisfactory Cover	Total Cover	HEI	Satisfactory Cover	Total Cover	Open Road Density (mi/mi^2)
C3–Monument Winter Range	No less than 70	10% (Minimum) 15-20% (Desirable)	30%	69	10.2%	42.5%	0.5
C3–Bone Point Winter Range				68	8.3%	53.4%	0.5
C3–Desolation Winter Range				63	22.2%	60%	0.8
C4 (Desolation)	No less than 60	15% (Minimum) 20% (Desirable)	30%	63	30.6%	64.7%	1.5
E2 (East Potamus)	No less than 45	10% (Minimum) 15-20% (Desirable)	30%	55	11.2%	60.7%	2.5

As displayed, existing habitat effectiveness values in the Monument, Bone Point, and Desolation winter ranges are not consistent with Forest Plan standard. Acheivement of the standard in these winter ranges could be naturally limited by the large amount of grassland (forage), which restricts cover potential. This would also constrain the shape and distribution of cover and forage in the area, which could result in a low HEI value. HEI has also been decreased by past management activities, insects, disease, and wildfire. Road densities in the winter ranges are low and not likely a contributing factor.

Environmental Consequences

No Action

Direct and Indirect Effects

In the short term, the amount of satisfactory cover, total cover, and HEI in the C3, C4, and E2 management areas would remain the same. Over time, forest stands would continue to grow and develop a multistoried structure, increasing the amount of total cover in the C3, C4, and E2 management areas. In the Bone Point winter range, marginal cover would

continue to develop into satisfactory cover, eventually meeting the Forest Plan standard. In the other winter ranges and the C4 and E2 management areas, satisfactory cover would remain above Forest Plan standards. HEI in the Desolation and Monument winter ranges and the C4 and E2 management areas would likely remain the same or decrease slightly because patches of forage created by old clear cuts and natural openings would become cover, reducing the distribution of cover and forage across the landscape. HEI in the Bone Point winter range would stay the same or increase slightly as cover (particularly satisfactory) develops.

An increase in cover and multi-layer condition would increase the risk of high severity wildland fires and insect or disease outbreaks in the analysis area. A disturbance event similar to the Tower Fire (1996) or Bull Springs 2 Fire (2003) is possible given that the Falls Meadowbrook analysis area has similar vegetative conditions. A fire of this type would result in a reduction of total cover and satisfactory cover in the analysis area, and a marked increase in foraging habitat. HEI would also decrease due to an increased abundance of forage habitat and the lack of cover habitat.

Open road densities during the winter and spring use period are not expected to change in the short or long term.

Common to All Action Alternatives

Direct and Indirect Effects

Cover habitat would be treated by all four action alternatives.

In C4, all habitat components would remain above Forest Plan standards under all the action alternatives. Satisfactory cover (30.6%) would remain static. All the action alternatives would decrease total cover by 2.6%, which would increase HEI from the existing value of 63 to 64.

In the C4 Desolation and E2 East Potamus management areas, all Forest Plan big game standards would be met after treatment. In addition, there would be no loss of satisfactory cover in the C4 management area.

In the C3 management area (Monument, Bone Point, and Desolation winter ranges), total cover standards would be met in all three winter ranges.

Satisfactory cover would remain below standard in the Bone Point winter range; but there would be no loss of satisfactory cover. The Monument and Desolation winter ranges would both meet standards for satisfactory cover after treatment. In meeting the cover related management direction for elk in C3, the Monument and Desolation winter ranges will continue to provide sufficient cover habitat (total, satisfactory, and marginal) as well as continue to contribute to the elk population management objectives of the

State of Oregon. The Bone Point winter range, although below standards for satisfactory habitat, also provides sufficient cover habitat, and will contribute towards State Management Objectives. As such, it follows that recreational hunting opportunities (State issued permits) will continue in the Monument, Desolation, and Bone Point winter ranges.

HEI would remain below standards in all three winter ranges; these values would not decrease below the existing condition of 69, 68, and 63 in the Monument, Bone Point, and Desolation winter ranges, respectively, following treatment.

Use of these open and closed system roads within the analysis area would increase road-related disturbance. Elk may avoid some areas during treatment and road use. It is unlikely this level of road use would cause elk to move out of the analysis area. Instead, they would shift their use to adjacent areas where disturbance is minimal.

Landscape burning would consume small diameter fuels created by treatment activities and temporarily remove grasses and understory vegetation. Burning would occur in the spring or fall depending on weather and fuel characteristics. Prescribed underburns are planned to improve the quality and quantity of forage in the analysis area. Cover conditions would not be altered. Burns would be low intensity underburns that would only affect ground fuels and understory vegetation. A prescribed fire of this intensity would not affect overstory vegetation.

Mechanical fuels treatment would target small diameter understory vegetation; essentially, mechanical treatment would non-commercially thin vegetation within treatment units. Because mechanical thinning would only affect understory vegetation, it would have less impact on big game satisfactory and marginal cover habitat than either commercial thinning or regeneration harvest, maintaining current cover habitat. Mechanical fuels treatment would increase sight distances into treated stands, reducing hiding cover and making elk more visible to hunters.

Cumulative Effects

Past activities and events in the analysis area and the entire Monument Winter Range that affected elk habitat in the analysis area include timber harvest (33,639 acres), road construction, road closures (Access and Travel Management), private land harvest, the Rimrock Ecosystem Restoration Project (2,052 acres harvest and thinning), Bologna Basin (approx 1,000 acres thinning), and livestock grazing. Timber harvest has affected forest structure and composition, reducing the amount of cover habitat. Timber harvest has also fragmented habitat, creating a mosaic of forested stands and man-made openings. Conversely, the amount of foraging habitat for big game has increased in response to past harvest. Road construction associated with timber harvest increased road densities

and disturbance within the analysis area, making elk more vulnerable. Elk tend to select for habitats further away from open roads. More recently, road closures associated with access and travel management activities on the south end of the Umatilla National Forest have reduced road densities. Road densities in the Monument (.47 miles/sq. mile), Bone Point (.48 miles/sq. mile), and Desolation (.79 miles/sq. mile) winter ranges are currently quite low. An unknown amount of harvest activity has occurred in the past adjacent to the Monument, Bone Point, and Desolation winter ranges. Private land harvesting has fragmented habitat, creating forage for big game where cover once existed. The Rimrock Ecosystem Restoration Project and the Bologna Basin Salvage and Thinning Project occurred in the Monument winter range. Both of these projects reduced cover for big game species within the winter range. Historic livestock grazing (sheep and cattle) negatively impacted range condition and reduced forage for big game through direct competition. Grazing altered the structure and composition of habitat through repeated overgrazing of rangelands. Past activities have resulted in the current condition of elk habitat in the analysis area and the entire Monument, Bone Point, and Desolation winter ranges.

Present actions and events that affect elk and elk habitat include cattle grazing and the Sunflower Bacon Vegetation Management Project. Current grazing in the area is not adversely affecting rangeland condition or adversely affecting wild ungulate (deer and elk) populations. Changes in systems, season of use, stocking, and species grazed (cattle) have accounted for improved range condition. Livestock grazing still has the potential to compete with big game for forage habitat, particularly when forage is scarce (late summer/early fall). Current allotment management plans balance livestock utilization with big game management objectives, resulting in a shared utilization of the forage resource. The Sunflower Bacon Project would occur, in part, in the Monument winter range. This project would commercially harvest 2,057 acres, with the majority in the Monument winter range. This project would reduce elk cover (requiring a Forest Plan amendment for the Monument winter range), but would maintain a high level of habitat effectiveness in the Monument winter range.

Reasonably foreseeable future activities, actions, and events that have the potential to affect elk and elk habitat include cattle grazing. This activity would have the same effects as those discussed previously in the present activities section.

When the expected effects of these alternatives are combined with the residual and expected effects of past, present, and future actions, activities, and events in the analysis area, there would be no adverse impact on elk or elk habitat. The proposed activities under these alternatives would reduce cover habitat in the analysis area (and the winter ranges); however, HEI would not be reduced below the existing

values in the C4, E2, or C3 management areas. Treatment activities would maintain a high level of big game habitat effectiveness in the analysis area (and all three big game winter ranges).

Proposed Action

Direct and Indirect Effects

The effects of this alternative on elk and elk habitat would be the same as those described under All Action Alternatives; however, the extent (acres) of treatment would vary. Table W-26 shows post-treatment satisfactory cover, total cover, and HEI by management area.

Table W-26. Post-treatment satisfactory cover, total cover, and HEI by management area under the Proposed Action.

Management Area (HEI Analysis Area)	Habitat Parameter		
	Satisfactory Cover (%)	**Total Cover (%)**	**HEI**
C3 Monument Winter Range	10.2	42.4	69*
C3 Bone Point Winter Range	8.3*	50.5	69**
C3 Desolation Winter Range	21	59.3	63*
C4 Desolation	30.6	62.1	64***
E2 East Potamus	10.4	52.4	55

*Gray shading indicates values below Forest Plan standards that remained the same after treatment under the Proposed Action.

**Green shading indicates a value below standards that increased under the Proposed Action.

***Orange shading indicates a value above standards that increased under the Proposed Action

In the C4 Desolation and E2 East Potamus management areas, all cover-related and HEI standards would be met after treatment. There would be no loss of satisfactory habitat in the C4 management area. In the E2 management area, satisfactory cover would be reduced by .8% (113 acres). Marginal cover would be reduced 2.6% (131 acres) and 7.5% (963 acres) in the C4 and E2 management areas, respectively. HEI in the C4 management area increased 1 point to 64 in response to treatment activities.

In the C3 management area (Monument, Bone Point, and Desolation winter ranges) total cover standards were met in all 3 winter ranges. In the Bone Point winter range, satisfactory cover remained below standards at 8.3; no loss of satisfactory cover. The Monument and Desolation winter ranges both met standards for satisfactory cover after treatment. HEI standards were not met in any of the winter ranges after treatment; however, HEI remained the same as the existing condition in the Monument and Desolation winter ranges and increased 1 point to 69 after treatment in the Bone Point winter range (Table W-26).

The proposed activities could temporarily increase the vulnerability of calves to predation due to reduced ground cover resulting from machinery use (crushing low vegetation and structure) and burning (consumption of vegetation and brush). This vegetation would recover in the years following burning and machinery use.

All cover related values displayed in Table W-26 (except for satisfactory cover in the Bone Point winter range) are consistent with Forest Plan standards. In meeting the cover related management direction for elk in the C3 management area, the Monument and Desolation winter ranges will continue to provide sufficient cover habitat (total, satisfactory, and marginal) as well as continue to contribute to the elk population management objectives of the State of Oregon. The Bone Point winter range, although below standards for satisfactory habitat also provides sufficient cover habitat, and will contribute towards the Management Objectives of the state. As such, it follows that recreational hunting opportunities (State issued permits) will continue in the Monument, Desolation, and Bone Point winter ranges. An HEI value of 69 (Monument and Bone Point), while not 70, provides a high level of potential habitat effectiveness and maintains elk populations in the management area near management objectives. An HEI value of 63 in Desolation also provides a high level of potential habitat effectiveness.

A Forest Plan amendment would be required under this alternative to treat habitat in the C3 management area (Monument, Bone Point, and Desolation), where HEI values are currently below Forest Plan standards. Although HEI does not decrease below existing values in any of these winter ranges (it actually increases in the Bone Point winter range under this alternative), the variables used to calculate HEI would be affected. The amount and type of cover and the distribution of this cover habitat across the landscape would be affected, making it necessary to amend the Forest Plan to implement the proposed activities. Achieving a habitat effectiveness index of no less than 70 was not a purpose and need for action for this specific project. In addition, future projects that are intended to improve habitat effectiveness index are not precluded, nor is the attainment of an HEI value of 70 prevented. The direct and indirect effect of the amendment is that elk habitat would remain essentially unchanged from current conditions at the winter range scale.

Use of the open and closed system roads within the analysis area would have the same effects as those described under All Action Alternatives. Approximately 29 miles of closed road would be used during treatment activities. Elk may avoid some areas during treatment and road use.

Landscape burning and mechanical fuels treatment activities would have the same effects as those described under All Action Alternatives. Approximately 7,130 acres would be underburned. Forage for lactating cows and calves would improve for several years after burning in individual burn blocks; burning over a number of years would provide high quality forage in the analysis area in the mid term.

Cumulative Effects

The cumulative effects under this alternative would be similar to those described under All Action Alternatives. The past, present, and reasonably foreseeable future activities considered under this alternative are the same as those described under All Action Alternatives. When the expected effects of this alternative are combined with the residual and expected effects of past, present, and future actions, activities, and events in the analysis area, there would be no adverse impact on elk or elk habitat. The proposed activities under this alternative would reduce cover habitat in the analysis area (and the winter ranges); however, HEI would not be reduced below the existing values in the C4, E2, or C3 management areas. In fact, HEI would increase in the Bone Point winter range and in the C4 Desolation area under this alternative. Treatment activities would maintain a high level of big game habitat effectiveness in the analysis area (and all three big game winter ranges).

Alternative 2

Direct and Indirect Effects

The effects of this alternative would be the same as those described under All Action Alternatives; however, the extent (acres) would vary. Commercial and commercial/non-commercial thinning, and regeneration harvest activities would affect approximately 3,921 acres. An additional 237 acres would be non-commercially thinned only. Table W-27 shows post-treatment satisfactory cover, total cover, and HEI by management area for Alternative 2.

Table W-27. Post-treatment satisfactory cover, total cover, and HEI by management area under Alternative 2.

Management Area (HEI Analysis Area)	Habitat Parameter		
	Satisfactory Cover (%)	Total Cover (%)	HEI
C3 Monument Winter Range	10.2	42.4	69*

C3 Bone Point Winter Range	8.3*	51.8	68*
C3 Desolation Winter Range	21.7	59.7	63*
C4 Desolation	30.6	62.1	64**
E2 East Potamus	10.6	54	55

*Gray shading indicates values below Forest Plan standards that remained the same after treatment under Alternative 2.

**Orange shading indicates a value above standards that increased under Alternative 2.

In the C4 Desolation and E2 East Potamus management areas, all cover-related and HEI standards would be met after treatment. There would be no loss of satisfactory habitat in the C4 management area. In the E2 management area, satisfactory cover would be reduced by .6% (83 acres). Marginal cover would decrease 2.6% (131 acres) and 6.1% (786 acres) in the C4 and E2 management areas, respectively. HEI in the C4 management area increased 1 point to 64 in response to treatment activities.

In the C3 management area (Monument, Bone Point, and Desolation winter ranges), total cover standards were met in all 3 winter ranges. In the Bone Point winter range, satisfactory cover remained below standards at 8.3; however, there was no loss of satisfactory cover in this winter range. The Monument and Desolation winter ranges both met standards for satisfactory cover after treatment. HEI remained the same as the existing condition in all three winter ranges.

The proposed activities could temporarily increase the vulnerability of calves to predation due to reduced ground cover resulting from machinery use (crushing low vegetation and structure) and burning (consumption of vegetation and brush). This vegetation would recover in the years following burning and machinery use.

All cover related values displayed in Table W-27 (except for satisfactory cover in the Bone Point winter range) are consistent with Forest Plan standards and therefore contribute to the elk population management objectives of the State of Oregon, as described under the Proposed Action. HEI of 69 (Monument) and 68 (Bone Point), while not 70, provides a high level of potential habitat effectiveness and maintains elk populations in the management area near management objectives. An HEI value of 63 (Desolation) also provides a high level of potential habitat effectiveness.

A Forest Plan amendment would be required under this alternative also, to treat habitat in the C3 management area (Monument, Bone Point, and Desolation), where HEI values are currently below Forest Plan standards. Although HEI does not decrease below existing values in any of these winter ranges, the variables used to calculate HEI would be affected. The amount and type of cover and the distribution of this cover habitat across the landscape would be affected by this alternative, making it necessary to amend the Forest Plan to implement the proposed activities. Achieving a habitat effectiveness index of no less than 70 was not a purpose and need for action for this specific project. In addition, future projects that are intended to improve habitat effectiveness index are not precluded, nor is the attainment of an HEI value of 70 prevented. The direct and indirect effect of the amendment is that elk habitat would remain essentially unchanged from current conditions at the winter range scale.

Use of these open and closed system roads within the analysis area would have the same effects as those described under All Action Alternatives. Approximately 20 miles of closed roads would be used during treatment activities.

Landscape burning and mechanical fuels treatment activities would have the same effects as those described under All Action Alternatives. Approximately 17,244 acres would be underburned. Forage for lactating cows and calves would improve for several years following burning in individual burn blocks; burning over a number of years would provide high quality forage in the analysis area in the mid term.

Cumulative Effects

The cumulative effects under this alternative would be similar to those described under All Action Alternatives. The past, present, and reasonably foreseeable future activities considered are the same as those described under All Action Alternatives. When the expected effects of this alternative are combined with the residual and expected effects of past, present, and future actions, activities, and events in the analysis area, there would be no adverse impact on elk or elk habitat. The proposed activities under this alternative would reduce cover habitat in the analysis area (and the winter ranges); however, HEI would not be reduced below the existing values in the C4, E2, or C3 management areas. In fact, HEI would increase in the C4 Desolation area under this alternative. Treatment activities would maintain a high level of big game habitat effectiveness in the analysis area (and all three big game winter ranges).

Alternative 3

Direct and Indirect Effects

The effects of this alternative would be the same as those described under All Action Alternatives; however, the extent (acres) of treatment would vary by alternative. Commercial and commercial/non-commercial thinning

and regeneration harvest activities would affect approximately 5,111 acres in the project area. An additional 468 acres would be non-commercially thinned only. Table W-28 shows post-treatment satisfactory cover, total cover, and HEI by management area for Alternative 3.

Table W-28. Post-treatment satisfactory cover, total cover, and HEI by management area under Alternative 3.

Management Area (HEI Analysis Area)	Habitat Parameter		
	Satisfactory Cover (%)	Total Cover (%)	HEI
C3 Monument Winter Range	10.2	42.5	69*
C3 Bone Point Winter Range	8.3*	53.2	68*
C3 Desolation Winter Range	22.2	60	63*
C4 Desolation	30.6	62.1	64**
E2 East Potamus	10.4	52.6	55

*Gray shading indicates values below Forest Plan standards that remained the same after treatment under Alternative 3.

**Orange shading indicates a value above standards that increased under Alternative 3.

In the C4 Desolation and E2 East Potamus management areas, all cover-related and HEI standards would be met after treatment. There would be no loss of satisfactory habitat in the C4 management area. In the E2 management area, satisfactory cover would be reduced by .8% (113 acres). Marginal cover would decrease 2.6% (131 acres) and 7.3% (944 acres) in the C4 and E2 management areas, respectively. HEI in the C4 management area would increase 1 point to 64 in response to treatment activities.

In the C3 management area (Monument, Bone Point, and Desolation winter ranges) total cover standards would be met in all three winter ranges. In the Bone Point winter range, satisfactory cover remained below standards at 8.3; there was no loss of satisfactory cover in this winter range. The Monument and Desolation winter ranges both met standards for satisfactory cover after treatment. HEI standards were not met in any of the winter ranges after treatment; however, HEI remained the same as the existing condition.

The proposed activities could temporarily increase the vulnerability of calves to predation due to reduced ground cover resulting from machinery

use and burning. This vegetation would recover in the years following burning and machinery use.

All cover related values displayed in Table W-28 (except for satisfactory cover in the Bone Point winter range) are consistent with Forest Plan standards, and therefore, contribute to the elk population management objectives of the State of Oregon, as described under the Proposed Action. HEI values would be the same as Alternative 2.

Use of these open and closed system roads within the analysis area would have the same effects as those described under All Action Alternatives. Approximately 27 miles of closed roads would be used during treatment activities.

Landscape burning and mechanical fuels treatment activities would have the same effects as those described under All Action Alternatives. Approximately 5,907 acres would be underburned. Forage for lactating cows and calves would improve for several years after burning in individual burn blocks; burning over a number of years would provide high quality forage in the analysis area in the mid term.

Although this alternative would treat cover habitat within the Monument, Bone Point, and Desolation winter ranges, there would be no change in existing cover levels or the spatial distribution of cover and forage. All satisfactory or marginal cover that is treated under this alternative will maintain sufficient canopy closure and structure to remain satisfactory and marginal cover after treatment. Because the constituent elements of the HEI calculation (amount and distribution of cover) would not be changed, there would be no need for a Forest Plan amendment to implement the proposed activities.

Cumulative Effects

The cumulative effects under this alternative would be similar to those described under All Action Alternatives. The past, present, and reasonably foreseeable future activities considered are the same as those described under All Action Alternatives. When the expected effects of this alternative are combined with the residual and expected effects of past, present, and future actions, activities, and events in the analysis area, there would be no adverse impact on elk or elk habitat. The proposed activities under this alternative would not reduce cover habitat (marginal or satisfactory) in those management areas currently below standards for HEI. HEI would not be reduced below the existing values in the C4, E2, or C3 management areas. In fact, HEI would increase in the C4 Desolation area under this alternative. Treatment activities would maintain a high level of big game habitat effectiveness in the analysis area (and all three big game winter ranges).

Alternative 4

Direct and Indirect Effects

The effects of this alternative would be to the same as those described under All Action Alternatives; however, the extent (acres) of treatment would vary. Commercial and commercial/non-commercial thinning, and regeneration harvest activities would affect approximately 4,988 acres in the project area. An additional 237 acres would be non-commercially thinned only. Table W-29 shows post-treatment satisfactory cover, total cover, and HEI by management area for Alternative 4.

Table W-29. Post-treatment satisfactory cover, total cover, and HEI by management area under Alternative 4.

Management Area (HEI Analysis Area)	Habitat Parameter		
	Satisfactory Cover (%)	Total Cover (%)	HEI
C3 Monument Winter Range	10.2	42.5	69*
C3 Bone Point Winter Range	8.3*	53.2	68*
C3 Desolation Winter Range	22.2	60	63*
C4 Desolation	30.6	62.1	64**
E2 East Potamus	10.4	52.6	55

*Gray shading indicates values below Forest Plan standards that remained the same after treatment under Alternative 2.

**Orange shading indicates a value above standards that increased under Alternative 2.

The effects of this alternative on cover and HEI would be the same as those described under Alternative 3. Under this alternative, two units (Units 27 and 29) in the Bone Point winter range that would be treated under Alternative 3 would not be treated under this alternative. In the C4 Desolation and E2 East Potamus management areas, all cover-related and HEI standards would be met after treatment. There would be no loss of satisfactory habitat in the C4 management area. In the E2 management area, satisfactory cover would be reduced by .8% (113 acres). Marginal cover would decrease 2.6% (131 acres) and 7.3% (944 acres) in the C4 and E2 management areas, respectively. HEI in the C4 management area would increase 1 point to 64 in response to treatment activities.

In the C3 management area (Monument, Bone Point, and Desolation winter ranges) total cover standards would be met in all three winter ranges. Satisfactory cover remained below standards at 8.3 in the Bone Point winter range; however, there was no loss of satisfactory cover. The Monument and Desolation winter ranges both met standards for satisfactory cover after treatment. HEI standards were not met in any of the winter ranges after treatment. HEI remained the same as the existing condition.

The proposed activities could temporarily increase the vulnerability of calves to predation due to reduced ground cover resulting from machinery use and burning. This vegetation would recover in the years following burning and machinery use.

All cover related values displayed in Table W-29 (except for satisfactory cover in the Bone Point winter range) are consistent with Forest Plan standards, and therefore, contribute to the elk population management objectives of the State of Oregon, as described under the Proposed Action. HEI values would be the same as Alternative 2.

Use of these open and closed system roads within the analysis area would have the same effects as those described under All Action Alternatives. Approximately 24.5 miles of closed roads would be used during treatment activities.

Landscape burning and mechanical fuels treatment activities would have the same effects as those described under All Action Alternatives. Approximately 18,266 acres would be underburned, covering the most acres of all the action alternatives. Forage for lactating cows and calves would improve for several years after burning in individual burn blocks. Burning would occur over a number of years, so there will be high quality forage in the analysis area for the next 5 to 10 years as individual blocks of habitat are burned.

Although this alternative would treat cover habitat within the Monument, Bone Point, and Desolation winter ranges, there would be no change in existing cover levels or the spatial distribution of cover and forage. All satisfactory or marginal cover that is treated under this alternative will maintain sufficient canopy closure and structure to remain satisfactory and marginal cover after treatment. Because the constituent elements of the HEI calculation (amount and distribution of cover) would not be changed, there would be no need for a Forest Plan amendment to implement the proposed activities.

Cumulative Effects

The cumulative effects under this alternative would be similar to those described under All Action Alternatives. The past, present, and reasonably foreseeable future activities considered under this alternative are the same as those described under All Action Alternatives. When the

expected effects of this alternative are combined with the residual and expected effects of past, present, and future actions, activities, and events in the analysis area, there would be no adverse impact on elk or elk habitat. The proposed activities under this alternative would not reduce cover habitat (marginal or satisfactory) in those management areas currently below standards for HEI. HEI would not be reduced below the existing values in the C4, E2, or C3 management areas. In fact, HEI would increase in the C4 Desolation area under this alternative. Treatment activities would maintain a high level of big game habitat effectiveness in the analysis area (and all three big game winter ranges).

Primary Cavity Excavators – Dead/Down Tree Habitat

Affected Environment

Primary cavity excavators (PCE) include bird species that create holes for nesting or roosting in live, dead, or decaying trees. They also provide secondary cavity users such as owls, bluebirds, and flying squirrels habitat for denning, roosting and/or nesting.

Environmental Consequences

The environmental consequences of the Proposed Action and Alternatives 2, 3, and 4 on primary cavity excavator habitat are described in the Dead Wood Habitat section of this report. There will be no further analysis of the environmental consequences on these species or their habitat in this portion of the document.

Pileated Woodpecker – Dead/Down Tree Habitat (mixed conifer)

Affected Environment

Preferred habitat for the pileated woodpecker consists of moist forest types of large blocks of grand fir and mixed conifer in late and old structural stages (USDA 1990). Stands should include large diameter (>21" dbh) snags and down wood (USDA 1990 and Bull and Holthausen 1993). This habitat occurs in the mid and upper elevations of the Potamus analysis area. Dry upland forest habitat also provides potential habitat for this species where shade tolerant conifers have invaded these habitats.

Environmental Consequences

The environmental consequences of the No Action Alternative, Proposed Action, Alternative 2, Alternative 3, and Alternative 4 on the pileated woodpecker, with regard to dead wood habitat is discussed in the Dead Wood Habitat section. The environmental consequences of the No Action Alternative, Proposed Action, Alternative 2, Alternative 3, and Alternative 4 on the pileated woodpecker, with

regards to the structure and composition of suitable foraging and reproductive habitat is discussed in this section.

No Action

Direct and Indirect Effects

In the short term, suitable pileated woodpecker habitat would maintain its current quality and extent in the analysis area. In the mid and long term (3 to 20+ years), the structure and composition of pileated woodpecker habitat would change. In this time frame, multi-strata conditions in suitable pileated woodpecker habitat would continue to develop; stand densities would be high, and locally high concentrations of insects and disease would provide foraging and nesting habitat by creating snags. Young stands in an unsuitable condition for pileated woodpecker foraging or nesting would also develop multi-strata characteristics in the mid and long term, increasing the amount of suitable habitat and improving the distribution of these habitats across the analysis area. Higher stand densities and increased standing and downed fuel loads would increase the risk of wildfire in these stands. On drier sites, these stands would be converted to an open shrubland/grassland with little or no tree cover. Pileated would be unlikely to use these habitats. This condition would last for 80-100 years as stands reseeded themselves, and grew into a structural stage and size class where snags were large enough to provide potential nesting and foraging sites for pileated woodpecker.

Common to All Action Alternatives

Direct and Indirect Effects

Research has shown that overstory canopy density is likely the primary factor that determines occupancy of potential nesting habitat by pileated woodpecker. It is likely that commercially and commercial/non-commercially thinned stands would not be used for nesting after harvest (in the short and mid-term) due to reductions in canopy density. Canopy density has already been impacted in stands identified for regeneration harvest by past and ongoing disease and insect infestations. This type of harvest would further reduce canopy closure through the removal of diseased green trees. It is also unlikely that these stands would be used for nesting following treatment. Table XX summarizes the expected impacts to suitable reproductive habitat under all of the action alternatives.

Table XX. Summary of expected effects to pileated woodpecker reproductive habitat

Action Alternative	Acres suitable reproductive habitat changed to an unsuitable condition (% change)
Proposed Action	1,323 (-11%)
Alternative 2	730 (-6%)

Alternatives 3 and 4	954 (-8%)

Snag densities generally would not be affected in commercial and commercial/non-commercial treatment units except where they pose a hazard to workers. Because snag densities would be maintained in these units, there would be no reduction in the quality of pileated woodpecker foraging habitat where this treatment type occurs. Within regeneration harvest units, snag densities would be reduced; the quality of these stands as pileated woodpecker foraging habitat would be reduced. This expected reduction in snags would reduce the quality of these stands for pileated foraging due to the fact that current science indicates that pileated woodpeckers select stands with high snag densities for foraging (see discussion of DecAID in Dead Wood Habitat section of this report). See Table XX for a summary of expected impacts to pileated foraging habitat. It is expected that pileated woodpeckers would continue to use treated foraging habitat, including regeneration harvest units, following treatment. Forest Plan standards would be met in all treated stands, including regeneration harvest units, following treatment. See the Dead Wood Habitat section for a full discussion of the impacts of the alternatives on snag densities.

Table XX. Summary of expected effects to pileated woodpecker foraging habitat

Action Alternative	**Acres suitable foraging habitat changed to an unsuitable condition (% change)**	**Acres suitable foraging habitat where habitat quality reduced (% of total habitat)**
Proposed Action	0 (0%)	831 (4%)
Alternative 2	0 (0%)	431 (2%)
Alternatives 3 and 4	0 (0%)	542 (3%)

Non-commercial thinning would not impact overstory structure or composition; therefore, non-commercial thinning would not impact potential pileated woodpecker habitat. Mechanical fuels treatments would occur in stands determined to be non-viable under the timber sale. This treatment would also not impact the structure or composition of overstory vegetation. Downed wood would be removed, chipped, or masticated under this treatment, reducing potential foraging sites for pileated woodpecker. Forest Plan standards for snags and downed wood would be met in these units following fuels treatment.

Cumulative Effects

Refer to the Wildlife Specialist's Report for past, present, and reasonably foreseeable future activities, actions, and events that have residual, ongoing, or expected effects on pileated woodpecker habitat within the analysis area.

When the expected effects of these alternatives are combined with the residual and expected effects of past, present, and future actions, activities, and events in the analysis area, nesting habitat for the pileated woodpecker would be cumulatively impacted. The Action alternatives would reduce suitable pileated woodpecker nesting habitat between 6% (Alternative 2) and 11% (Proposed Action) through reductions in canopy closure in commercial, commercial/non-commercial, and regeneration harvest units. The proposed activities would not reduce the quantity of suitable foraging habitat for the pileated woodpecker under any of the Action Alternatives. When these effects are combined with the residual impacts of past, present, and reasonably foreseeable future activities in the analysis area, there would be no adverse impact on the pileated woodpecker. Habitat changed to an unsuitable condition is spread throughout the analysis area; the size and distribution of suitable habitat in the analysis area would be consistent with the Forest Plan. Although foraging habitat quality would be affected due to snag reductions (regeneration harvest) and downed wood treatment (mechanical fuels), there would be no change in forage habitat suitability, or the size,distribution, and proximity of these habitats to potential nesting habitat.

Northern Three-Toed Woodpecker – Dead/Down Tree Habitat (Lodgepole pine)

Affected Environment

Preferred habitat for the northern three-toed woodpecker includes late successional, cold/moist forest types (lodgepole/mixed conifer) with high standing-wood density, generally at higher-elevations (Marshall et al 2003). This habitat occurs in scattered patches at high to mid elevations within the of the Potamus analysis area, along with a relatively small amount of potential habitat. Approximately 8 percent of the analysis area is within the cold upland forest PVG. Moist upland forest habitats in the analysis area may be considered suitable habitat for this species due to elevation and species composition.

The northern three-toed woodpecker has been observed infrequently within the Potamus watershed (NRIS –Fauna). Observations of northern three-toed woodpecker have generally been associated with old growth lodgepole pine stands.

Refer to the Wildlife Specialist's Report for discussion of the existing condition of northern three-toed woodpecker habitat in the Falls Meadowbrook analysis area.

Environmental Consequences

No Action

Direct and Indirect Effects

In the short term, there would be no change in the availability of potential habitat for the northern three-toed woodpecker in the analysis area. In the mid and long term (3-20+ years), mixed conifer and lodgepole stands would continue to develop dense canopies and larger trees. Given continued growth in these stands, lodgepole pine, large enough to provide nesting habitat, would develop. In the long term, reproductive habitat would develop, particularly in the northwest corner of the analysis area, and there would be an increase in foraging habitat.

Higher stand densities and increased standing and downed fuel loads in mixed conifer and lodgepole stands would increase the risk of wildfire and insect outbreaks in northern three-toed woodpecker habitat. A high-severity wildfire would change the composition and structure of suitable three-toed woodpecker habitat to an open shrubland/grassland with little or no tree cover. Initially (0 to 5 years post fire), three-toed woodpecker would forage in burned stands. Once bark beetles, their primary food source, disappeared from the fire area, the three-toed woodpecker would also leave. Lodgepole pine would quickly recolonize burned areas; however, it would take 30 to 40 years or more for these stands to develop into suitable foraging habitat for this species. In the mean time, the northern three-toed woodpecker would be unlikely to use these habitats due to their structure and composition.

Common to All Action Alternatives

Direct and Indirect Effects

Potential three-toed woodpecker foraging habitat would be treated by all four Action Alternatives; however, reproductive habitat would not be impacted because these habitats are not present in the analysis area. Treatment of potential foraging habitat would alter stand structure and composition, which would reduce stand density, decreasing the likelihood of wildfire and insect outbreaks. Northern three-toed woodpeckers depend on outbreaks of insects (especially bark beetles) and recent high severity wildfire for foraging. These proposed treatments (commercial and commercial/non-commercial thinning) would reduce or eliminate these occurrences in the short and mid term; however, these stands would be used for foraging following treatment.

Regeneration harvest would remove snags to prepare the area for burning and planting. Canopy closure would also be reduced in these stands.

Because snag densities and canopy closure would be reduced, regeneration harvest units would not be condsidered suitable habitat for the three-toed woodpecker following treatment. Expected impacts to potential three-toed woodpecker foraging habitat are displayed in Table XX.

Table XX. Expected impacts to potential foraging habitat for the northern three-toed woodpecker.

Action Alternative	Acres of suitable foraging habitat changed to an unsuitable condition (% change)	Acres of suitable foraging habitat with reduced habitat quality (% total habitat)
Proposed Action	199 (-9%)	268 (12%)
Alternatives 2, 3, and 4	4 (0%)	240 (11%)

Mechanical fuels treatments would occur in stands determined to be non-viable under the timber sale, targeting small diameter understory vegetation. Essentially, mechanical treatment would non-commercially thin vegetation within treatment units. Downed wood would be removed, chipped, or masticated under this treatment. These treatments would not affect overstory vegetation or snags in potential northern three-toed woodpecker habitat.

Cumulative Effects

Refer to the Wildlife Specialist's Report for past, present, and reasonably foreseeable future activities, actions, and events that have residual, ongoing, or expected effects on the northern three-toed woodpecker and its habitat within the analysis area.

When the expected effects of this alternative are combined with the residual and expected effects of past, present, and future actions, activities, and events in the analysis area, there would be a cumulative reduction in suitable foraging habitat for this species under the Proposed Action. The other three Action Alternatives would not change suitable foraging habitat to an unsuitable condition. If present, northern three-toed woodpeckers would not use regeneration harvest stands after treatment due to reductions in both overstory canopy closure and snag densities. Due to the relatively small reduction in foraging habitat under the Proposed Action, the fact that the affected acres have already been impacted by disease and insect agents, and that the affected acres are in a potential vegetation group that is generally unsuitable for this species (dry upland forest), these impacts are not expected to adversely impact this species. The size and distribution of potential habitat within the

analysis area would be consistent with Forest Plan direction following treatment.

Pine Marten– Mature & Old Stands at High Elevations

Affected Environment

Preferred habitat for the pine marten includes late successional, moist forest types (mixed conifer) near developed riparian areas with high downed wood densities and generally above 4,000 feet in elevation (Ruggiero et al. 1994). This species has not been observed in the analysis area. A relatively small to moderate amount of potential habitat occurs in the watershed; however, the size, distribution, and composition, of this habitat indicate that the likelihood of pine marten using this habitat is low.

Refer to the Wildlife Specialist's Report for a discussion of the existing condition of suitable pine marten habitat in the analysis area.

Environmental Consequences

No Action

Direct and Indirect Effects

In the short term (0 to 3 years), there would be no change in the quality or distribution of pine marten habitat in the analysis area. However, it would change in the mid (3 to 20 years) and long term (20+ years). During this time frame, old forest and young forest stands would continue to develop multiple canopy layers and increased canopy density. Mortality resulting from insects and disease in stressed stands would increase snag and downed wood densities in these stands, improving the condition of foraging habitat for the pine marten. Reproductive habitat would also increase in the future through continued stand development. Conversely, higher fuel loading would increase the risk of high severity wildfire. A wildfire of this type would cause heavy overstory mortality and consume downed wood used for denning and foraging. It would take upwards of 80-100 years for mixed conifer stands to develop a composition and structure that would be used by the pine marten for either foraging or reproduction.

Common to All Action Alternatives

Direct and Indirect Effects

Treatment of potential pine marten habitat would maintain and enhance late and old structure habitat features in the future. The largest trees in these stands would be retained; smaller overstory and understory trees would be removed. Accordingly, stand densities would decrease.

Existing stand densities in commercial or commercial/non-commercial thinning units would not be reduced below the 40% total cover threshold. Maintenance of total canopy cover above this 40% threshold level and maintenance of existing downed wood and snag habitat in commercial and commercial/non-commercial thinning units indicate that these habitats would be suitable for pine marten denning and reproduction after treatment. Reproductive habitat that would be regeneration harvested is likely at or below the 40% total canopy cover threshold; treatment would likely reduce canopy closure below 40%. Snag densities would also be reduced in regeneration harvest units. Pine marten likely would not used regeneration harvested areas for denning or reproduction following treatment due to these structural changes. See Table XX for the potential impacts to pine marten reproductive habitat.

Table XX. Expected impacts to potential pine marten reproductive habitat

Action Alternative	Acres of suitable pine marten reproductive habitat changed to an unsuitable condition (% change)	Total acres of suitable reproductive habitat treated
Proposed Action	79 (-6%)	307
Alternatives 2, 3, and 4	4 (0%)	232

Varying levels of foraging habitat would be treated under the Action Alternatives. However, these acres would continue to provide potential foraging habitat for the pine marten following treatment due to the fact that snags and downed wood would largely be maintained in thinning units and openings would not be created.

Mechanical fuels treatments would occur in stands determined to be non-viable under the timber sale. This treatment would target small diameter understory vegetation; thinning noncommercial-sized vegetation. Reductions in down wood would reduce potential foraging sites for the pine marten, but densities in these units would meet Forest Plan standards after treatment.

Cumulative Effects

Refer to the Wildlife Specialist's Report for past, present, and reasonably foreseeable future activities, actions, and events that have residual, ongoing, or expected effects on the pine marten and its habitat within the analysis area.

When the expected effects of these alternatives are combined with the residual and expected effects of past, present, and future actions, activities, and events in the analysis area, there would be a cumulative

reduction in suitable pine marten habitat under the Proposed Action. Under this alternative, there would be a 6% reduction in suitable reproductive habitat; the other Action Alternatives would have a negligible impact (-4 acres) on suitable reproductive habitat. The proposed action alternatives would not reduce the availability of foraging habitat for the pine marten. It is not expected that these effects to habitat would adversely affect this species. Habitat will continue to be distributed within the analysis area in small to moderate sized patches with adequate connectivity habitat to allow movement between habitat blocks. The size and distribution of these habitats within the analysis area would be consistent with Forest Plan direction following treatment.

Threatened, Endangered, Proposed, Candidate, & Sensitive Species

This section of the report constitutes the Terrestrial Wildlife Biological Evaluation for the Falls Meadowbrook Vegetation Management Project. Federally "listed" species includes those identified as endangered, threatened, proposed, or candidate species by the Fish & Wildlife Service (USDI 1999 and USDI 2001). "Sensitive" species are those identified on the Regional Forester's (R6) Sensitive Animal List (USDA 2004) that meet National Forest Management Act (NFMA) obligation and requirements. Sensitive species addressed on the Umatilla National Forest include those that have been documented (D - valid, recorded observation) or are suspected (S - likely to occur based on available habitat to support breeding pairs/groups) to occur within or adjacent to the Umatilla National Forest boundary. Refer to the Wildlife Specialist's Report for a discussion of Treatened, Endangered, and Sensitive species with a potential to occur on the Forest; only those species that have been observed in the analysis area, and /or have suitable habitat in the analysis area will be discussed here.

The painted turtle, peregrine falcon, yellow-billed cuckoo, Rocky Mountain bighorn sheep, and the Northern bald eagle will not be analyzed in this document because these species have not been observed in the analysis area, and /or suitable habitat for these species is not present in the analysis area.

Canada Lynx

Affected Environment

The Canada lynx occurs in mesic coniferous forests that have cold, snowy winters and provide a prey base of snowshoe hare. Primary vegetation that contributes to lynx habitat is subalpine fir vegetation types, where lodgepole pine is a major seral species, generally between 4,100-6,600 feet in elevation (NatureServe Explorer 2007, Ruediger et al. 2000, Ruggiero 2000, and Verts and Carraway 1998). Interspersed subalpine forest, moist (cool) grand fir, and moist

Douglas-fir habitat types may also contribute to lynx habitat (Ruediger et al. 2000 and Ruggiero 2000). Snow tracking surveys conducted across the District, since 1991, for wolverine, fisher, American marten and lynx have failed to identify lynx tracks on the District. Field surveys in 1999, 2000, and 2001 also failed to detect lynx on the Forest. Lynx have been observed rarely on the District, primarily in the Desolation Creek drainage north of the analysis area. Unconfirmed observations have also occurred in the Arbuckle Mountain area within the analysis area. Lynx are not currently known to occur in the analysis area.

A portion of the analysis area lies within the Kelsay Lynx Analysis Unit (LAU). The Kelsay LAU is currently composed of 72% suitable habitat for the Canada lynx. A single treatment unit is situated within the LAU. This unit, Unit 61, is entirely outside of potential lynx habitat within the LAU; therefore, there will be no change in existing lynx habitat suitability. Lynx habitat will continue to be 72% suitable within the LAU.

The Region 6 Regional Office issued updated direction on June 20, 2006 concerning the Canada lynx, the Lynx Conservation Assessment and Strategy (LCAS), and the Lynx Conservation Agreement (LCA). The Umatilla National Forest has been designated unoccupied lynx habitat. National Forests with unoccupied mapped lynx habitat are no longer required to amend their Forest Plan to incorporate LCAS guidance; the LCAS and LCA only apply to occupied, mapped lynx habitat. Therefore, there will be no Forest Plan amendment to incorporate standards and guides from the LCAS into this project.

Environmental Consequences

No Action

Direct and Indirect Effects

In the short term, the existing condition of lynx habitat will be maintained in the Kelsay LAU. In the mid and long term, potential lynx habitat will change due to natural successional processes and potential disturbance events. Unsuitable lynx habitat will follow successional pathways towards foraging habitat. Habitats will flux into and out of suitable foraging habitat. Foraging habitats and late successional denning habitats will continue to develop multi-strata characteristics. Increased stand densities and stress in overstocked stands will result in increased disease and insect mortality; ultimately, downed wood densities in denning and foraging habitat would increase. Increased fuel loading would increase the chance of high severity wildfire in suitable lynx habitat. An event of this type would convert suitable denning and foraging habitat to an unsuitable condition. Over time, burned areas would become suitable foraging habitat as regeneration occurs.

Common to All Action Alternatives

Direct and Indirect Effects

There would be no direct or indirect effects on the Canada lynx or suitable lynx habitat under these alternatives. The Canada lynx is not currently known to occur in the Kelsay LAU or on the Umatilla National Forest. Though a single proposed treatment unit (Unit 61) lies within the boundary of the Kelsay LAU, this unit is completely outside of potential lynx habitat. The habitat within the unit is classified as non-habitat for the Canada lynx. For the preceding reasons, there would be no change in the amount of suitable habitat within the LAU through treatment of Unit 61 or any of the other treatment units located outside the LAU. None of the proposed treatment units lie within mapped linkage areas.

Determination and Rationale

There would be No Effect on the Canada lynx under any of the Action Alternatives. The reasons for this determination are as follows:

- The Canada lynx is not currently known to occur in the Kelsay LAU or on the Forest. The Umatilla National Forest has been classified as unoccupied habitat for the lynx.
- There would be no change in existing lynx habitat suitability in the Kelsay LAU.
- All treatment would occur outside of potential lynx habitat (suitable and unsuitable areas) within the analysis area.
- There would be no treatment in mapped linkage areas.

Cumulative Effects

Refer to the Wildlife Specialist's Report for past, present, and reasonably foreseeable future activities, actions, and events that have residual, ongoing, or expected effects on suitable Canada lynx habitat within the analysis area.

When the expected effects of this alternative are combined with the residual and expected effects of past, present, and future actions, activities, and events in the analysis area, there would be no change in the suitability of Canada lynx habitat in the analysis area. The proposed activities under all of the action alternatives would not impact suitable lynx habitat because all treatment activities would occur outside of mapped lynx habitat and linkage areas.

California Wolverine

Affected Environment

The wolverine prefers high elevation, conifer forest types, with limited exposure to human interference (Ruggiero et al. 1994, Wolverine Foundations (TWF) 2007). Natal denning (reproductive) habitat includes open rocky slopes (talus or boulders) surrounded or adjacent to high elevation forested habitat that maintains a snow depth greater than 3 feet into March and April (Ruggiero et al. 1994, TWF 2007). The wolverine is an opportunistic scavenger, with large mammal carrion the primary food source year-round. While foraging, they generally avoid large open areas, tend to stay within forested habitat at the mid and high elevations (>4,000'), and typically travel 18-24 miles to forage/hunt (Ruggiero et al. 1994, TWF 2007). The analysis area does not contain high elevation forest types or open rocky slopes for natal denning habitat. Potential denning habitat occurs about 25 to the southeast of the analysis area near the Vinegar Hill area (Vinegar Hill Inidan Roack Scenic Area). Snow tracking surveys conducted across the District, since 1991, for wolverine, fisher, American marten and lynx has resulted in one suspected set of wolverine tracks (2/18/94) on the "Kelly Route" near the 2105 road on Ellis Creek. The set of tracks was most likely a transient or dispersing wolverine. Refer to the Wildlife Specialist's Report for a discussion of existing suitable wolverine foraging habitat in the analysis area.

Environmental Consequences

No Action

Direct and Indirect Effects

There would be change in potential wolverine foraging and denning habitat in the analysis area in the short term. Potential natal denning habitat is not present in the analysis area. In the mid and long term, wolverine habitat would continue to develop multi-strata habitat features including dense canopy layers, understory regeneration and shrub cover, and high stand densities. Increased fuel loads resulting from insect and disease outbreaks would increase the risk of high severity wildfire in the analysis area. A fire of this type would alter stand structure and composition, converting suitable foraging habitat for the wolverine to an unsuitable condition, and fragmenting existing habitat.

Common to All Action Alternatives

Direct and Indirect Effects

Potential foraging habitat would be affected under all of the Action Alternatives. The number of acres treated would vary between alternatives. No reproductive habitat would be affected by any of the Action Alternatives because these habitats are not present. Stand densities would be reduced in all vegetative treatment units. Commercial

and commercial/non-commercial thinning units would remain foraging habitat after treatment because these units would largely maintain existing stand structure. Non-commercial thinning would not affect the quality or quantity of wolverine foraging habitat. Regeneration harvest in potential foraging habitat would convert already open stands to a Stand Initiation (SI) stand structure. These stands would not be considered suitable wolverine habitat after treatment, therefore regeneration harvest would reduce the amount of potential wolverine foraging habitat. This reduction in habitat would be temporary; in the mid and long term, overstory canopy would develop in these stands. Refer to Table XX for expected impacts to potential wolverine foraging habitat.

Table XX. Expected effects on potential wolverine foraging habitat in the Falls Meadowbrook analysis area.

Action Alternative	Acres of primary foraging habitat changed to an unsuitable condition (% change)	Acres of secondary foraging habitat changed to an unsuitable condition (% change)
Proposed Action	0	1413 (-4%)
Alternative 2	0	848 (-2%)
Alternatives 3 and 4	0	882 (-2%)

Mechanical fuels treatments would occur in proposed treatment units. This treatment would target small diameter understory vegetation; essentially, non-commercially thinning vegetation within treatment units. This treatment activity would not affect potential habitat suitability for the California wolverine.

The California wolverine is currently not known to occur in the analysis area; therefore, there would be no direct impacts on this species. If a California wolverine were present in the project area during implementation, it would likely move elsewhere for the duration of implementation. These movements away from treatment activities would be temporary and short in duration.

Determination and Rationale

It has been determined that all of the Action Alternatives (Proposed Action, Alternatives 2, 3, and 4) may impact habitat for the California wolverine, but are not likely to contribute to a trend towards federal listing or cause a loss of viability to the population or species. The rationale for this determination is as follows:

- The California wolverine is not known to occur in the analysis area; therefore there would be no direct effects on this species.

- There would be no impacts on potential natal denning habitat under any of the action alternatives.
- Treatment (regeneration harvest) would result in a 2% to 4% reduction in potential foraging habitat within the analysis area. These acres are generally poor wolverine habitat; they have already been affected by disease and insect outbreaks that have affected habitat quality.
- All forging habitat that would be changed to an unsuitable condition (due to reduced canopy closure) are classified as secondary foraging habitat. No primary foraging habitat would be changed to an unsuitable condition under any of the Action Alternatives.
- Given the wide-ranging nature of the wolverine, a reduction in potential foraging habitat of the magnitude described in Table XX would not adversely affect this species. These foraging habitats are located in scattered locations across the analysis area.

Cumulative Effects

Refer to the Wildlife Specialist's Report for past, present, and reasonably foreseeable future activities, actions, and events that have residual, ongoing, or expected effects on California wolverine habitat within the analysis area.

The expected effects of these alternatives would combine with those of past, present, and future actions, activities, and events in the analysis area, cumulatively reducing the amount of suitable foraging habitat for this species. The Proposed Action would have the greatest impact on foraging habitat (-4%), while the other three action alternatives would have virtually the same impact on these habitats (-2%). If passing through the area, the wolverine would avoid these habitats due to the low canopy closures in these stands following treatment. A reduction in suitable foraging habitat of the magnitude described above (2%-4%) would not adversely impact the availability of habitat for the wolverine due to the size of the area that would be affected. The affected areas are generally small in size and scattered throughout the higher elevation portions of the analysis area. Connectivity of wolverine habitat would not be adversely impacted by the proposed activities under any of the Action Alternatives.

Columbia Spotted Frog - Sensitive

Affected Environment

The Columbia spotted frog frequents waters and associated vegetated (grassy) shorelines of ponds, springs, marshes, and slow-flowing streams and appears to prefer waters with a bottom layer of dead and decaying vegetation (NatureServe Explorer 2007 and Csuti et al. 1997). They typically occur between 150 and 8,000 feet in elevation (Corkran and Thoms 1996). Spotted frogs breed in the

spring in shallow water at pond edges, stream margins, and inundated floodplain areas (Corkran and Thoms 1996). Springs maybe used as over-wintering sites for local populations of spotted frogs.

The Columbia spotted frog has been observed in the analysis area. Suitable habitat for the spotted frog can be found along perennial streams, wet meadows, and seeps. Most of the streams in the analysis area do not provide potential breeding habitat for the frog due to their moderate to high gradient, rocky substrate, and lack of instream aquatic vegetation. Larger streams and adjacent riparian vegetation would likely be used during the summer by adults, but again would not be suitable for breeding. Some perennial stock ponds in the analysis area would be considered suitable breeding habitat for the Columbia spotted frog.

Environmental Consequences

No Action

Direct and Indirect Effects

In the short term, the quality and extent of Columbia spotted frog habitat would not change. In the mid and long term, continued development of riparian habitat would improve habitat quality for this species. Riparian areas would recover from past disturbances, resulting in increased riparian shading (overstory and shrubs) along streams and pond edges. In the long term, the risk of high severity wildfire would also increase due to continued multi-strata development and increasing fuel loads. A wildfire of this type would consume riparian vegetation used by the spotted frog for cover. A fire of this type would not alter the suitability of potential breeding habitat (ponds) in the analysis area as these habitats are generally in openings where fire effects would be minimal.

Common to All Action Alternatives

Direct and Indirect Effects

All treatment activities would occur outside of Riparian Habitat Conservation Areas (RHCAs) under all of the Action Alternatives; therefore, there would be no direct effects on this species or potentially occupied habitat under any of the alternatives. Indirectly, sediment from activities outside of RHCAs could reach stream channels. If sediment were to enter streams, there would be no impact on the spotted frog because only adults would be present in streams; they do not provide potential breeding habitat for the spotted frog. Ponds (potential breeding habitat) and springs (overwintering habitat) would be buffered from treatment under all Action Alternatives, so there would be no effect on these habitats. Pumping water from ponds for dust abatement has the potential to affect developing tadpoles and froglets. They could be impinged on screens or pulled through pumps, causing direct mortality.

Proposed underburning would not directly affect spotted frogs because burns would be slow moving, low-intensity fires that would back into riparian areas.

Determination and Rationale

The Proposed Action, and Alternatives 2, 3, and 4 may impact individuals, but are not likely to contribute to a trend towards federal listing or cause a loss of viability to the population or species. The rationale for this determination is as follows:

- The spotted frog is known to occur in the analysis area.
- All treatment activities would occur outside of RHCAs.
- Breeding and overwintering habitat quality would not be affected by the proposed activities.
- Pumping of water from ponds potentially used for breeding has the potential to cause mortality of developing tadpoles and froglets.

Cumulative Effects

Refer to the Wildlife Specialist's Report for past, present, and reasonably foreseeable future activities, actions, and events that have residual, ongoing, or expected effects on the Columbia spotted frog and its habitat within the analysis area.

The expected effects of the Action Alternatives would combine with those of past, present, and future actions, activities, and events in the analysis area, cumulatively impacting individual spotted frogs. Habitat quality would not be affected under any of the Action Alternatives; therefore, there would be no cumulative reduction in breeding or summer habitat. Under all of the Action Alternatives, there is a potential for individual tadpoles or froglets to be injured or killed where ponds are used to supply water for dust abatement or other harvest-related activities. This low level of mortality of individuals would combine with existing low levels of mortality associated with grazing activities; however, there would be no adverse impacts on populations within the analysis area.

Gray Flycatcher - Sensitive

Affected Environment

This species prefers woodland and shrubland habitats including juniper woodland, tall sagebrush, bitterbrush, and mountain mahogany vegetative communities (Csuti et al. 1997, NatureServe Explorer 2007, and Marshall et al. 2003). This species also occupies open ponderosa pine and lodgepole stands with an understory of sagebrush or bitterbrush (Csuti et al. 1997 and Marshall et al. 2003). The gray flycatcher is generally found below 6,000 feet in elevation (Csuti et al. 1997 and Marshall et al. 2003).

Potential habitats within the analysis area are considered marginally suitable at best; these habitat types include ponderosa pine with a shrubby understory, scattered patches of young juniper, and upland shrubs (mountain mahogany, bitterbrush, and sagebrush). Although the habitat characteristics offer the potential for the species to occur, the gray flycatcher has not been observed in the analysis area or documented on the District. It has been documented on the neighboring Heppner Ranger District.

Environmental Consequences

No Action

Direct and Indirect Effects

In the short term, there would be no change in potential gray flycatcher habitat in the analysis area. Over time, conifer encroachment into open and semi-open stands would reduce understory shrub vegetation, reducing potential habitat for this species. Conifers would also continue to encroach into grassland/shrubland habitats. Continued encroachment of juniper into shrubland habitats has the potential to improve habitat quality for this species in the long term.

Common to All Action Alternatives

Direct and Indirect Effects

The gray flycatcher would not be directly affected by treatment activities because this species is not known to occur in the analysis area. No harvest would occur in suitable gray flycatcher habitat. Indirectly, harvesting and thinning would change the structure and composition of forested stands. Harvest activities would change the density of live trees in harvest units, creating more open stands where dense closed canopy stands currently exist. Multi-layered stands would be thinned to promote a single-stratum condition. Stand composition would shift from Douglas-fir and mixed conifer types to a more historical Ponderosa pine type. Thinning would promote the growth of dry-site adapted shrubs in the understory. In the mid and long term, these stands may provide suitable habitat for the gray flycatcher.

Burning would occur under all four Action Alternatives. Burning would reduce fuels created from treatment activities and affect untreated areas where fire was historically a driving force behind the structure and composition of these areas. Burning acres by alternative are displayed in Table XX.

Table XX. Acres of burning in the Falls Meadowbrook analysis area by alternative.

Action Alternative	Acres of landscape and treatment-created debris

	burning
Proposed Action	7,130
Alternative 2	17,244
Alternative 3	5,907
Alternative 4	18,266

Cumulative Effects

Refer to the Wildlife Specialist's Report for past, present, and reasonably foreseeable future activities, actions, and events that have residual, ongoing, or expected effects on gray flycatcher habitat within the analysis area.

When the expected effects of the proposed Action Alternatives is combined with the residual and expected effects of past, present, and future actions, activities, and events in the analysis area, there would be no cumulative reduction in suitable habitat for this species through proposed vegetative treatments. Cumulative impacts resulting from prescribed underburning will be discussed below.

Common to the Proposed Action and Alternative 3

Direct and Indirect Effects

The effects of these alternatives would be the same as those described under All Action Alternatives. Burning would reduce fuels created from treatment activities. Potential gray flycatcher habitat would not be affected by this activity because burn units coincide with treatment unit boundaries; no potential gray flycatcher habitat lies within proposed burning units.

Determination and Rationale

Under these alternatives (Proposed Action and Alternative 3), there would be no impact on the gray flycatcher. The reasons for this determination are as follows:

- Gray flycatcher are not known to occur in the analysis area.
- Potential habitat would not be impacted because it is entirely outside harvest units.
- Burning would have no effect on this species; all burning would occur outside of potential gray flycatcher habitat.

Cumulative Effects

The cumulative effects under this alternative would be to the same as those described under All Action Alternatives. Because burning would occur completely outside of potential flycatcher habitat under these

alternatives, there would be no cumulative impact on this species or its habitat.

Unique to Alternatives 2 and 4

Direct and Indirect Effects

The effects of these alternatives would be the same as those described under All Action Alternatives. Burn blocks under these two alternatives include grassland and shrubland habitats outside of vegetative treatment units. Potential gray flycatcher habitat in the Potamus Point area would be included in burn boundaries under this alternative. Burning has the potential to cause mortality of upland shrubs (bitterbrush, mountain mahogany, and sagebrush) potentially used for nesting and perching. Burns would be designed to minimize impacts on desired vegetation; low intensity underburning is expected to have minimal impacts on the composition of suitable gray flycatcher habitat.

Determination and Rationale

These alternatives may impact individuals, but are not likely to contribute to a trend towards federal listing or cause a loss of viability to the population or species. The rationale for this determination is as follows:

- Gray flycatcher are not currently known to occur in the analysis area. Suitable habitat for this species is present in the analysis area.
- There is a potential that underburning would impact the structure and composition of potential gray flycatcher habitat by causing mortality of upland shrubs potentially used for nesting.
- If killed by underburning, reestablishment of upland shrubs would be difficult due to the limited availability of natural seed sources and ungulate grazing.

Cumulative Effects

The cumulative effects under this alternative would be to the same as those described under All Action Alternatives. The past, present, and reasonably foreseeable future activities considered under this alternative are the same as those described under All Action Alternatives. When the expected effects of this alternative are combined with the residual and expected effects of past, present, and future actions in the analysis area, there would be a cumulative reduction in suitable gray flycatcher habitat within the analysis area. Burning would occur in suitable gray flycatcher habitat under these alternatives. Low intensity fire could cause mortality of upland shrubs; subsequent cattle and wild ungulate grazing would retard the regeneration of upland shrubs, potentially causing a long-term reduction in suitable nesting habitat for this species.

Upland Sandpiper - Sensitive

Affected Environment

Upland sandpiper habitat is primarily restricted to open tracts of grassland habitat with water or intermittent creeks nearby. This includes large meadows and grasslands (1,000-30,000 acres), usually surrounded with trees (lodgepole pine and some ponderosa pine), or in the middle of sagebrush communities, and generally at elevations from 3,400 to 5,000 feet (Csuti et al. 1997, NatureServe Explorer 2007, and Marshall et al 2003). Taller grassy areas are preferred for nesting and brood cover (NatureServe Explorer 2007). Foraging occurs in open meadows (Csuti et al. 1997, NatureServe Explorer 2007, and Marshall et al 2003). The upland sandpiper has not been observed on the Umatilla National Forest or within the Potamus watershed (NRIS –Fauna). However, upland sandpipers have been observed on private land around Ukiah and Albee Meadows, approximately 10-15 miles north of the analysis area. Relatively large grasslands occur across the mid section of the analysis area; however, these sites are dry and scattered with ponderosa pine. These grasslands in the Potamus Point area total approximately 1,000 acres, are dotted with invading conifers, and are bisected by timber strigers.

Environmental Consequences

No Action

Direct and Indirect Effects

The quality of potential upland sandpiper habitat would not change in the short term. In the mid and long term, conifers would continue to encroach into grassland and shrubland habitats, reducing the quality of these habitats for the upland sandpiper.

Common to All Action Alternatives

Direct and Indirect Effects

There would be no direct effects on the upland sandpiper because this species is not known to occur in the analysis area. There would be no mechanical vegetative treatment activities within potential sandpiper habitat in the Potamus Point area. Treatment activities would be restricted to forested habitats.

Burning of debris created by treatment and landscape underburning would occur under all Action Alternatives. The magnitude (acres) of burning for each of the action alternatives would vary by alternative; this information is displayed in Table XX.

Cumulative Effects

Refer to the Wildlife Specialist's Report for past, present, and reasonably foreseeable future activities, actions, and events that have residual,

ongoing, or expected effects on potential upland sandpiper habitat within the analysis area.

When the expected effects of these alternatives are combined with the residual and expected effects of past, present, and future actions, activities, and events in the analysis area, there would be cumulative impact on this species or its habitat. Suitable habitat does not occur within proposed mechanical vegetative treatment units; therefore, there would be no impact on this species or its habitat.

Common to the Proposed Action and Alternative 3

Direct and Indirect Effects

The effects of these alternatives would be the same as those described under All Action Alternatives. There would be no direct effects on the upland sandpiper because this species is not known to occur in the analysis area. There would be no mechanical vegetative treatment or underburning within suitable sandpiper habitat under these two Action Alternatives.

Cumulative Effects

The cumulative effects under this alternative would be to the same as those described under All Action Alternatives. The past, present, and reasonably foreseeable future activities considered under these alternatives are the same as those described under All Action Alternatives. When the expected effects of these alternatives are combined with the residual and expected effects of past, present, and future actions in the analysis area, the sandpiper and its habitat would not be cumulatively impacted. Potential habitat does not occur within proposed burning units; therefore, the Proposed Action and Alternative 3 would not directly or indirectly affect this species.

Determination and Rationale

These alternatives would have No Impact on the upland sandpiper. The rationale for this determination is as follows:

- This species has not been observed in the analysis area and is not currently known to occur in the analysis area or on the District.
- Proposed treatment activities (mechanical vegetative treatment, fuels treatments, and landscape burning) would occur completely outside of potential sandpiper habitat. There would be no impact on these habitats.

Unique to Alternatives 2 and 4

Direct and Indirect Effects

These alternatives would have the same effects as those described under All Action Alternatives. There would be no direct effects on the upland

sandpiper because it is not currently known to occur in the analysis area or on the District. Under these alternatives, there would be no mechanical vegetative treatments within potential upland sandpiper habitat. Landscape underburning would occur in marginally suitable upland sandpiper habitat in the Potamus Point area. Landscape underburning would not impact the structure or composition of grassland habitats or cause these habitats to become unsuitable following treatment. Burning of grasslands would have a beneficial effect on potential upland snadpiper habitat by reducing conifer encroachment and stimulating growth of native vegetation.

Determination and Rationale

These alternatives would have No Impact on the upland sandpiper. The rationale for this determination is as follows:

- This species has not been observed in the analysis area and is not currently known to occur in the analysis area or on the District.
- Proposed mechanical vegetative treatments would occur completely outside of potential sandpiper habitat.
- Underburning would not adversely affect the structure or composition of grassland habitats; burning would have a beneficial effect by reducing conifer encroachment and stimulating growth of native vegetation.

Cumulative Effects

The cumulative effects under this alternative would be to the same as those described under All Action Alternatives. The past, present, and reasonably foreseeable future activities considered under this alternative are the same as those described under All Action Alternatives. When the expected effects of this alternative are combined with the residual and expected effects of past, present, and future activities, there would be no cumulative impact on the upland sandpiper or its habitat. Burning would not affect the structure or composition of suitable habitat for this species. Burning would help reverse past encroachment of conifers into grassland habitats, improving habitat quality for the upland sandpiper.

Gray Wolf - Endangered

Affected Environment

Habitat preference for the gray wolf is prey-dependent rather than cover-dependent. The wolf is a habitat generalist inhabiting a variety of plant communities, typically containing a mix of forested and open areas with a variety of topographic features (Verts and Carraway 1998). Wolves are strongly territorial, with territory size and location strongly related to prey abundance. Wolves prey mainly on large ungulates, such as deer and elk, and to a lesser extent on small mammals. The gray wolf prefers areas with few roads, generally

avoiding areas with an open road density greater than one mile per square mile (NatureServe Explorer 2007). Natal dens typically occur as underground burrows, but can also be caves or other types of shelter. Rendezvous sites are generally open areas. The Idaho wolf population has been increasing steadily; dispersal into the Blue Mountains is expected to continue in the future.

Potential habitat for this species occurs within the analysis area; wolves will generally inhabit areas with adequate prey and a low level of human disturbance. Habitat in portions of the analysis area could be limited due to high open road densities. Road densities in winter ranges are generally less than 1 mile of open road per square mile. Wolves have been found to prefer densities of 1 mile of open road per square mile.

Environmental Consequences

No Action

Direct and Indirect Effects

The quality of gray wolf habitat is not expected to change in the short term. Prey populations are also expected to remain stable or decrease slightly in the short term. In the mid and long term, open road densities are not expected to change. Big game populations (prey) are also expected to be relatively stable (at or slightly below state management objectives). In the long term, openings (meadows) potentially used for denning or as rendezvous sites may experience some conifer encroachment over time; however, the size or number of these openings would not be significantly reduced.

Common to All Action Alternatives

Direct and Indirect Effects

Vegetative treatments and fuels treatments (activity fuels burning/mechanical treatment) would not directly affect the gray wolf because this species is not known to occur in the analysis area or on the District. Dens and rendezvous sites would also not be affected because neither has been identified on the District. Use of closed roads during treatment activities would temporarily increase road-related disturbance in the analysis area. All closed roads used during treatment activities would be restricted to harvest and administrative use and would be closed again after activities are completed. There would be no change in existing open road densities under any of the Action Alternatives.

Proposed vegetative and fuels treatments would affect big game (prey) habitat under all of the Action Alternatives. Refer to the Rocky Mountain Elk section of this report for a comprehensive discussion of the effects on elk. Treatment activities would cause short-term disturbance on elk during implementation and increase vulnerability of elk (due to increased sight distances). It is not expected that elk populations or their distribution

within the analysis area will be measurably affected by these impacts under any of the Action Alternatives.

Landscape underburning would improve forage conditions (quantity and quality) in treatment units. Reductions in canopy closure resulting from commercial and non-commercial thinning and regeneration harvest would increase the production of grasses, forbs, and shrubs in the understory, improving forage for potential prey animals.

Determination and Rationale

Under all of the action alternatives, it has been determined that there would be No Effect on the gray wolf. The rationale for this determination is as follows:

- The gray wolf is not currently known to occur in the analysis area or on the District.
- No denning or rendezvous sites have been identified on the District; therefore, there would be no impact on these habitats.
- There would be no change in existing open road densities under any of the action alternatives; existing unroaded and lightly roaded portions of the analysis area would maintain this roadless character following treatment.
- Habitat effectiveness for prey would be maintained at current levels or increase in all management areas (C3, C4, and E2) following treatment under all action alternatives. An adequate prey base would be maintained within the analysis area to support potential gray wolf.

Cumulative Effects

Refer to the Wildlife Specialist's Report for past, present, and reasonably foreseeable future activities, actions, and events that have residual, ongoing, or expected effects on gray wolf habitat within the analysis area.

When the expected effects of these alternatives are combined with the residual and expected effects of past, present, and future actions, there would be no cumulative reduction of suitable gray wolf habitat in the analysis area. The proposed activities will affect stand structure and composition to some degree; potential disturbance of gray wolves could increase after treatment. The proposed activities under these alternatives would not increase road densities or reduce the size of unroaded areas in the analysis area. Treatment activities would maintain a high level of big game habitat effectiveness in the analysis area (including all three big game winter ranges).

SPECIES OF INTEREST

These are species that are "of interest" to the public at the local or regional level, or were identified as a species of concern by the Fish and Wildlife Service. Generally species of interest or concern come from state threatened, endangered, and sensitive species lists. Occurrence determinations are based on observation records, vegetative and wildlife species inventory and monitoring, published literature on the distribution and habitat utilization of wildlife species, and the experience and professional judgment of wildlife biologists on the Umatilla National Forest.

California Bighorn Sheep

Affected Environment

California bighorn sheep are present in the analysis area. They have similar habitat preferences as those described for Rocky Mountain bighorn sheep (see Rocky Mountain Bighorn Sheep section). The population numbers approximately 75 (spring 2007 estimate, ODFW), and was reintroduced into the Potamus Creek canyon in January of 2003. They generally stay downslope of the proposed treatment units in the cliff/rimrock breaks along the North Fork John Day River and Potamus Creek. They may use ridgetops for foraging in the winter and spring.

Environmental Consequences

No Action

Direct and Indirect Effects

In the short term, there would be no change in the availability or quality of California bighorn sheep habitat. In the mid and long term, trees (ponderosa pine and western juniper) will continue to encroach into open grass-dominated hillslopes in bighorn sheep habitat; this occurrence would not alter habitat quality for the bighorn sheep.

Common to All Action Alternatives

Direct and Indirect Effects

There would be no direct effects on this species under any of the Action Alternatives. The bighorn do not occur in or near proposed treatment units; therefore proposed treatments (thinning, mechanical fuels treatment, and burning of debris created by treatment) would not affect their habitat. They typically use open grass-dominated hillslopes along the North Fork John Day River and Potamus Creek. The distance that separates proposed treatment activities from occupied habitats is such that there would be no disturbance on the bighorn sheep.

Cumulative Effects

Refer to the Wildlife Specialist's Report for past, present, and reasonably foreseeable future activities, actions, and events that have residual, ongoing, or expected effects on California bighorn sheep and their habitat within the analysis area.

When the expected effects of these alternatives are combined with the residual and expected effects of past, present, and future actions in the analysis area, there would be no cumulative impact on the California bighorn or their habitat. None of the proposed mechanical vegetative treatments under these alternatives would occur in suitable bighorn habitat; therefore, there would be no direct or indirect effects on the bighorn.

Common to the Proposed Action and Alternative 3

Direct and Indirect Effects

All proposed burning under these alternatives would occur outside of potential bighorn habitat. For this reason, there would be no disturbance of bighorn sheep due to burning.

Cumulative Effects

The cumulative effects under this alternative would be to the same as those described under All Action Alternatives. The past, present, and reasonably foreseeable future activities considered under these alternatives are the same as those described under All Action Alternatives. When the expected effects of these alternatives are combined with the residual and expected effects of past, present, and future actions, activities, and events in the analysis area, there would be no cumulative impact on the California bighorn or their habitat. None of the proposed activities under this alternative would occur in suitable bighorn habitat; therefore, there would be no direct or indirect effects on the bighorn.

Unique to Alternatives 2 and 4

Direct and Indirect Effects

The effects of these alternatives would be similar to those described under All Action Alternatives. Bighorn sheep do not occur in or near proposed thinning, mechanical fuels, or activity fuels units.

Landscape underburning would occur outside of proposed vegetative treatment units under these alternatives. Potential foraging habitat in the Potamus Point area would be burned under these alternatives. Bighorn sheep would not be present in this area when burning would occur (late spring or early fall). Bighorn may temporarily move away from the area due to smoke associated with burning. Burning of these 2 burn blocks (totaling approximately 980 acres) would improve forage quality and quantity for several years following burning.

Cumulative Effects

The cumulative effects under this alternative would be to the same as those described under All Action Alternatives. The past, present, and reasonably foreseeable future activities considered under these alternatives are the same as those described under All Action Alternatives. When the expected effects of this alternative are combined with the residual and expected effects of past, present, and future actions in the analysis area, there would be no cumulative impact on the California bighorn sheep or its habitat. Low intensity underburning of grassland habitats would not alter the structure or composition of these habitats. Encroaching conifers would be thinned, potentially reducing cover for predators of the bighorn sheep. Burning would have a positive effect on forage quality and quantity for several years following burning.

Northern Goshawk

Affected Environment

Preferred habitat for the goshawk consists of coniferous forests with a mosaic of structural stages. Nesting sites typically consist of a dense cluster of large trees, surrounded by a similar forest type with a more open overstory. The understory is relatively open and the nest site is generally situated within one-quarter mile of a stream or other water source. The best foraging habitat occurs in a mosaic of structural stages scattered across the landscape. Potential goshawk habitat occurs throughout the mid and upper elevations of the analysis area.

The analysis area provides a mosaic of structural stages, creating microhabitats for prey species. The northern goshawk and its nest stands have been observed in the Falls Meadowbrook analysis area (FAUNA; North Fork John Day Ranger District Wildlife Database). Surveys in June 2005 found one northern goshawk near an old nest site near Putney Mountain (Southeast portion of analysis area). Based on the behavior of this individual, it was assumed by the District Wildlife Biologist that a nest was present. All proposed units in the vicinity of this location were dropped. There are two other known historic nesting territories in the analysis area, both in the southwestern portion. One territory was last active in 1996. Subsequent surveys in 1998,1999, and 2005 found no evidence of use in this territory. The other territory was last active in 2001. Surveys in 2005 found no goshawk in the area. Proposed treatment Unit CD lies within a portion of this territory. Surveys will continue prior to implementation to locate possible active goshawk nesting in this area.

Refer to the Wildlife Specialist's Report for a discussion of existing suitable habitat for the goshawk in the analysis area.

Environmental Consequences

No Action

Direct and Indirect Effects

Potential nesting and foraging habitat would remain unchanged in the short term. In the mid and long term, stands would continue to grow and develop multiple dense canopy layers. Young stands would develop large trees over time; openings created by past harvest would close. The availability of nesting habitat would increase in the long term due to a greater abundance of large trees and dense multi-layered habitat. Foraging habitat would be reduced as the area grows denser and more homogenous, resulting in fewer microhabitats for prey species. The multi-layer condition would increase the susceptibility of stands to high-intensity wildfires and insect or disease outbreaks. A major disturbance on the landscape would change the composition and structure to an open shrubland/grassland with little or no tree cover. Suitable nesting and foraging habitat would be converted to an unsuitable condition by an event like this.

Common to All Action Alternatives

Direct and Indirect Effects

Treatment activities (commercial, commercial/non-commercial, and regeneration harvest) would occur in potential goshawk nesting and foraging habitat under all of the Action Alternatives. The largest trees in treatment units would be retained in all proposed units. Treatment in general would reduce stand densities and overstory canopy closure. Goshawk prefer to nest in large trees in stands that have at least 50% canopy closure. Proposed commercial and commercial/non-commercial thinning would reduce canopy closure below 50% in treated stands. This would also be the case in regeneration harvest units. Insects and disease agents have already affected these stands, reducing their quality as goshawk nesting habitat by causing heavy overstory mortality. These stands are currently very near 50% canopy closure or less; regeneration treatment would further reduce canopy closure below this level. Due to canopy closure reductions, goshawk would not use these stands for nesting after treatment. Table XX displays the expected impacts on suitable reproductive habitat in the analysis area by alternative.

Table XX. Expected impacts to suitable northern goshawk reproductive (nesting) habitat in the Falls/Meadowbrook analysis area.

Action Alternative	Acres commercial and commercial/non-commercial thinning	Acres regeneration harvest	Acres suitable reproductive habitat changed to an unsuitable condition (% change)
Proposed Action	334	200	534 (-14%)
Alternatives 2, 3, and 4	289	4	293 (-8%)

Although these acres would not be used for nesting in the short and mid term, they would be used as foraging habitat. Suitable nesting habitat would continue to be well distributed throughout the middle and upper elevations of the analysis area following treatment. Treatment of foraging habitat would also reduce canopy closure; however, goshawk prefer a mosaic of open, semi-open, and forested habitats for foraging. There would be no reduction in foraging habitat under any of the Action Alternatives. By reducing stand densities (commercial and regeneration harvest) and understory vegetation (non-commercial thinning), goshawk would be better able to maneuver and hunt in these habitats. Goshawk may temporarily avoid treated habitats during implementation due to noise and disturbance, but would forage in these stands following the completion of harvest activities. There would be no reduction in foraging habitat under any of the action alternatives. Burning of treatment debris would not impact potential goshawk nesting or foraging habitat or adversely impact potential goshawk prey. Mechanical fuels treatment would target small diameter understory vegetation; essentially, mechanical treatment would non-commercially thin vegetation within treatment units. Mechanical treatment would open understories, improving foraging accessibility for the goshawk. This activity is not expected to impact prey species for the goshawk.

The proposed activities under all Action Alternatives would be consistent with direction contained in the Forest Plan (as amended) for northern goshawk habitat and existing nesting territories in the analysis area.

Cumulative Effects

Refer to the Wildlife Specialist's Report for past, present, and reasonably foreseeable future activities, actions, and events that have residual, ongoing, or expected effects on the northern goshawk and its habitat within the analysis area.

When the effects of this alternative are combined with the residual and expected effects of past, present, and future activities in the analysis area, there would be a cumulative reduction in the amout of suitable northern goshawk nesting habitat. The Proposed Action would combine with past

activities, actions, and events to reduce suitable nesting habitat an additional 14%; the other three Action Alternatives would reduce suitable nesting habitat by an additional 8%. Goshawk foraging habitat would not be cumulatively reduced by the proposed activities, although foraging habitat quality would be reduced in some stands. Suitable nesting habitat would continue to be well distributed throughout the middle and upper elevations of the analysis area. Foraging habitat would also be well distributed throughout the analysis area after treatment. It is not expected that goshawk populations would be adversely impacted by the proposed activities under any of the Action Alternatives.

Olive-sided Flycatcher

Affected Environment

Preferred habitat for the olive-sided flycatcher consists of coniferous forest associated with openings and edges near water (streams and wet areas (Marshall et al 2003). This includes burned areas with snags and scattered tall, live trees; riparian zones at the edge of late and early-successional forests; and open or semi open forest stands with low canopy cover (Marshall et al 2003). Tall, prominent trees and snags, which serve as foraging and singing perches, are common features of nesting habitat (Marshall et al 2003). Preferred habitat occurs in riparian corridors within the analysis area. The olive-sided flycatcher has been documented on the Umatilla National Forest. The species has not been documented in the analysis area but is presumed present due to the presence of potential habitat.

Environmental Consequences

No Action

Direct and Indirect Effects

In the short term, the quality of habitat for the olive-sided flycatcher would not change. In the mid and long term, riparian communities would continue to develop along existing successional pathways; canopy closure would increase, stands would develop large trees with multiple canopy layers, and riparian vegetation would continue to recover from past disturbance. High severity wildfire (resulting from increased fuel loading and changes in stand composition and structure) would create edge habitat and create large diameter snags potentially used by the flycatcher as perches.

Common to All Action Alternatives

Direct and Indirect Effects

The olive-sided flycatcher is not known to occur in the analysis area; therefore, there would be no direct effects on this species. Habitat quality in late and old structure riparian habitat would not be affected by the proposed activities because no commercial harvest would occur in RHCAs. The largest trees in treatment units (those preferred for nesting) would be retained. Because there would be no effect on potential nesting or perching habitat, and the olive-sided flycatcher has not been observed in the analysis area, there would be no impact on this species.

Landscape burning (activity fuels burning) would not be lit in riparian areas, but fire would be allowed to back into these areas. If this were to occur, there would be no impact on potential olive-sided flycatcher habitat because underburning would be low intensity. High fuel moisture levels would make it very unlikely that riparian shrubs or overstory vegetation would be consumed by low intensity underburning.

Treatment of aspen within proposed thinning and harvest units would improve habitat quality in these remnant stands.

Cumulative Effects

Refer to the Wildlife Specialist's Report for past, present, and reasonably foreseeable future activities, actions, and events that have residual, ongoing, or expected effects on the olive-sided flycatcher and its habitat within the analysis area.

When the expected effects of these alternatives are combined with the residual and expected effects of past, present, and future activities there would be no cumulative impact on the olive-sided flycatcher. The proposed activities under all of the action alternatives would not result in impacts to riparian vegetation or late and old structure habitat in riparian areas.

White-headed Woodpecker

The white-headed woodpecker is identified as a primary excavator, and as such, a Management Indicator Species in the Forest Plan. This species is discussed in the Snags section of this Chapter. Please refer to the Wildlife Specialist's Report under Species of Interest for a discussion of effects on this species and its habitat.

Lewis' Woodpecker

The Lewis' woodpecker is a Primary Cavity Excavator (PCE) species, identified as a Management Indicator Species in the Forest Plan. This species is discussed in the Snags section of this Chapter. Please refer to the Wildlife Specialist's

Report under Species of Interest for a discussion of effects on this species and its habitat.

Bats of Interest

Affected Environment

Bats associated with cave or cave like dwellings (mines, buildings, etc.) for hibernation or roosting (maternity or day/night roost) are not included in this assessment because the analysis area does not provide this key habitat feature. Available habitat for bats in the analysis area includes dry upland and moist upland forest types associated with water. Forest dwelling bats often use large-diameter snags with exfoliating bark as roosts. They may also use rock crevices as day or night roosts. The following species will be assessed as a group and not individually: long-eared myotis, long-legged myotis, and Yuma myotis.

Given the current vegetative condition of the analysis area, potential roost habitat (large-diameter snags with exfoliating bark) for forest bats occurs within the analysis area and proposed treatment units. In general, bats have not been specifically surveyed (mist-net or bat detection devices) within the analysis area. The long-eared myotis, long-legged myotis, and Yuma myotis are year-long residents in the analysis area.

Additional informantion on bat habitat is located in the Snag and Downed Wood section.

Environmental Consequences

No Action

Direct and Indirect Effects

Potential roosting habitat (large snags with exfoliating bark, rock crevices, etc.) would remain unchanged in the project area in the short term. Over time, stands in the project area would continue to grow and develop dense multi-layered canopies. Large diameter snags would provide roosting habitat in these stands. However, dense multi-layer conditions would increase the susceptibility of stands to high-intensity wildfires and insect or disease outbreaks. Insect and disease outbreaks would tend to create potential roosting habitat. Wildfire would also create snags for roosting, but due to the limited time snags are suitable for roosting (while bark is exfoliating), a high severity wildfire would create a shortage of roosting habitat in the mid and long term.

Common to All Action Alternatives

Direct and Indirect Effects

Proposed commercial and commercial/non-commercial treatment activities would target green timber rather than dead standing trees

(snags). Snags would only be felled in the treatment units where they pose a safety hazard to workers. Sound snags with tight or exfoliating bark (those that would be used by roosting bats) generally would not be affected by these activities; snags in later stages of decay would be more likely to be felled for safety reasons. Snag reductions in these units are expected to be minimal, so it is expected that the effects on snag-roosting bats would also be minimal. Proposed regeneration harvest would reduce snag densities in treatment units. Snag densities would be reduced to the Forest Plan standards in regeneration harvest units. Reductions in snags in these units would likely reduce potential roosting habitat for bats of interest. Table XX displays acres of treatment by prescription for each of the action alternatives. The proposed action would have the greatest impact on potential roosting habitat for forest-dwelling bats of interest

Table XX. Acres of treatment by prescription type

Action Alternative	Acres of commercial and commercial/non-commercial thinning	Acres of regeneration harvest
Proposed Action	4,958	1,587
Alternative 2	2,951	959
Alternative 3	4,144	967
Alternative 4	4,021	967

Reductions in stand densities would improve stand health and reduce those agents (disease and insects) that create snags. This, when combined with reductions in green trees in treated stands (particularly regeneration harvest units where green trees may already be limited) could reduce potential roosting habitat in the long term.

Cumulative Effects

Refer to the Wildlife Specialist's Report for past, present, and reasonably foreseeable future activities, actions, and events that have residual, ongoing, or expected effects on forest-dwelling bats and their habitat within the analysis area.

When the residual and expected effects of past, present, and reasonably foreseeable future activities are combined with the expected effects of these alternatives, there would be a cumulative reduction in snags potentially used by roosting bats. Impacts on snags are generally expected to be minor; Forest Plan standards for snags would continue to be met following treatment under all of the Action Alternatives.

Neotropical Migratory Birds

Neotropical migratory birds are those that breed in the U.S. and winter south of the border in Central or South America. Continental and local declines in population trends for migratory and resident landbirds have developed into an international concern. Causes for the declines include habitat degradation in winter and summer ranges and the continued use of toxic pesticides in Latin America.

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

Habitat types and features contained in the Strategy will be used to evaluate effects of the proposed actions on migratory landbird species. Only habitat spresnt in the analysis area will be analyzed. No further analysis of the environmental effects will occur for the riparian woodland, montane meadow, subalpine fir forest, and alpine habitat types because they do not occur within the analysis area.

Dry Forest Habitat

Affected Environment

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

Approximately 42,143 acres in the analysis area are in the dry upland forest potential vegetation group (PVG). Old forest single stratum habitat in the dry upland forest PVG is currently 13% below the HRV.. Old forest multi-strata habitat in the dry upland forest potential vegetation group is currently within HRV. Potential habitat for the white-headed woodpecker, flammulated owl, chipping sparrow, and Lewis' woodpecker occurs in scattered locations throughout the analysis area.

Environmental Consequences

No Action

Direct and Indirect Effects

In the short term, there would be no change in the composition or structure of dry forest habitats. Patch size would remain the same; however, in the long term, high-intensity wildfire or insects and disease outbreaks could fragment existing dry forest habitats. A major disturbance on the landscape would change the composition and structure of dry forest habitats to an open shrubland/grassland with little or no tree cover. This would reduce or eliminate old forest patches in dry upland forest habitats in the analysis area.

Open and semi-open old forest habitats dominated by ponderosa pine would continue to decline in the future due to continued invasion by shade and fire-intolerant tree species. As a result, potential habitat for the chipping sparrow, white-headed woodpecker, and the Lewis' woodpecker would decrease in the future. Habitat for the flammulated owl would improve in the future due to dense regeneration of trees on dry forest habitats in the absence of fire. Given that stand densities are increasing and the risk of high severity wildfire has also increased in the analysis area, there is a potential that habitat for the Lewis' woodpecker could occur over a large portion of the analysis area after a high severity disturbance event (fire).

Common to All Action Alternatives

Direct and Indirect Effects

Proposed activities under all Action Alternatives would affect the composition and structure of dry forest habitat. Tree species uncharacteristic of old forest single-stratum ponderosa pine habitats would be targeted for removal. Ponderosa pine and western larch, and the largest trees in these stands would be favored for retention. Reduced stand densities would improve stand health and stimulate growth in residual trees; growth rates would increase in thinned stands. In the mid and long term, commercial thinning and regeneration harvest is expected to promote the development of single-layered canopies with larger trees and understories dominated by herbaceous cover. In the mid and long term, habitat conditions for migratory landbirds in the dry forest type will

improve in the affected area, because old forest single stratum, the forest mosaic, openings, and patch size will either be maintained or improved through treatment. Patches of dense pine and fir regeneration would be retained in non-commercial thinning units, maintaining these habitats for migratory birds requiring these patches (focal species: flammulated owl). Table XX displays the acres of mechanical vegetation treatment and burning by alternative in the dry forest habitat type.

Table XX. Acres of mechanical treatment and burning in dry forest habitat by alternative.

Action Alternative	Acres of mechanical vegetation treatment	Acres of landscape and debris/slash burning
Proposed Action	5465	5714
Alternative 2	3220	12808
Alternative 3	4408	4652
Alternative 4	4059	13073

The Proposed Action would treat the most acres of dry forest habitat when compared to the other action alternatives. In the mid and long term, this alternative would positively impact the most acres of dry forest habitat by promoting structural stages and vegetation compositions characteristic of this habitat type.

Harvest operations have the potential to displace or crush low-lying vegetation and structure (shrubs, downed wood, and other debris) in the short term. In the 1 to 2 years following treatment, these habitat features would recover. There is also a potential that these activities could disturb ground nesting birds and result in nest abandonment or loss. It is expected that an occasional nest may be impacted by the proposed activities. If nests are lost, birds would likely renest. Mechanical equipment would only impact a portion of the available habitat within treatment units; the majority of the unit would not be traversed by machinery. Because the Proposed Action would treat the most acres of dry forest habitat, it would also have the greatest potential impact on nesting birds.

Understory burning and thinning, where appropriate, is beneficial to restoring or maintaining dry forest habitat for migratory landbirds. In the short term (0 to 3 years), prescribed landscape underburning and mechanical fuels treatment could temporarily displace ground and shrub nesting birds. Species would re-occupy these habitats as shrubs regenerate following treatment. A prescribed spring underburn is expected to burn in a mosaic pattern across the landscape, generally blackening approximately 50 percent of the area. Table XX displays the acres of burning associated with each action alternative in the dry forest

habitat type. Depending on timing of the burns, nests situated on the ground or in low shrubs could be lost (spring burning). Alternatives 2 and 4 would burn the most acres of dry forest habitat when compared to the other action alternatives. These alternatives would be expected to have the greatest impact on nesting birds as a result. Re-nesting would be expected in unburned patches and/or other locations outside the affected area.

Some snags may be felled within treatment units to provide for safety. Because snag densities would be minimally affected in commercial and commercial/non-commercial thinning units and meet Forest Plan standards in regeneration harvest units, it is expected the impact on dry forest associated bird species requiring snags would be minimal. Dead downed wood would be minimally affected by burning and downed wood densities would be reduced by mechanical fuels treatment activities. Forest Plan standards for downed wood would be met in all underburn and mechanical fuels treatment units.

Cumulative Effects

Refer to the Wildlife Specialist's Report for past, present, and reasonably foreseeable future activities, actions, and events that have residual, ongoing, or expected effects on the dry forest habitat type or associated neotropical migratory bird species in the analysis area.

When the effects of these alternatives are combined with the residual and expected effects of past, present, and future activities in the analysis area, they would combine to cumulatively increase short term impacts on habitat quality and associated species. In the short term, treatment activities would impact dry forest habitats by reducing nesting and hiding cover and disturbing migratory birds, potentially causing nest abandonment and loss. In the mid and long term, proposed treatment activities would begin to reverse habitat changes resulting from fire suppression and promote the growth of single-stratum dry forest habitats. Dry forest associated birds would benefit in the mid and long term through vegetative treatments and burning due to structural and compositional changes in these stands; understory vegetation (shrubs and grasses) would be stimulated by these activities, improving both the quality and quantity of suitable dry forest habitat for these species. It is not expected that these impacts will affect populations of migratory birds in this habitat type.

Mesic Mixed Conifer Habitat

Affected Environment

This habitat type includes areas historically and currently dominated by a mix of overstory tree species including Douglas-dir, grand fir/white fir, western larch, lodgepole pine, and Engelmann spruce. Mesic (moist) mixed conifer habitats are generally higher in elevation, wetter, on northerly aspects, and in draws where

soils are mesic (Altman 2000). The focal species for this habitat type include the Vaux's swift, Townsend's warbler, varied thrush, MacGillivray's warbler, and olive-sided flycatcher.

Approximately 9,048 acres of mesic mixed conifer habitat are scattered throughout the analysis area. Currently, old forest multi-strata stands in the moist upland potential vegetation group are below HRV; old forest single-stratum stands in the moist upland potential vegetation group are above HRV.

Environmental Consequences

No Action

Direct and Indirect Effects

In the short term, there would be no change in the composition or structure of mesic mixed conifer habitats. This habitat type would continue along existing successional pathways in the short and early mid term. In the late mid term and long term, the available mesic mixed conifer habitat could experience changes in the quantity and quality of habitat in relation to migratory birds. Stand densities would increase making these stands more susceptible to insect and disease outbreaks due to increased stress and competition for resources. Overstory mortality resulting from insects and disease would increase fuel loads, leading to a greater risk of high severity wildfire. A fire of this type would eliminate or greatly reduce the availability of suitable mesic mixed conifer habitat in the analysis area for a number of years.

Common to All Action Alternatives

Direct and Indirect Effects

The composition and structure of mesic mixed conifer habitat would be affected under all Action Alternatives. Stand densities would be reduced on treated acres. Treatment would favor the retention of overstory tree species characteristic of this habitat type. The Townsend's warbler and varied thrush depend on dense multi-layered closed canopy forest. Treatment would reduce the availability of suitable habitat for these species in the short and mid term. Decreased canopy closure in treated stands will stimulate understory growth, benefiting bird species dependent on dense brush such as the MacGillivray's warbler. Habitat for the olive-sided flycatcher may also improve in response to treatment due to the creation of forested edge habitat.

Understory vegetation would be disturbed by mechanical treatment activities. There is also a potential that these activities could disturb ground nesting birds and result in nest abandonment or loss. It is expected that an occasional nest may be impacted by the proposed activities. If nests are lost, birds would likely renest. Table XX displays

the acres of mechanical treatment and burning in the mesic mixed conifer habitat type by alternative.

Table XX. Acres of mechanical treatment and burning in the mesic mixed conifer habitat type.

Action Alternative	Acres of mechanical treatment	Acres of burning
Proposed Action	821	833
Alternative 2	568	1,868
Alternative 3	763	774
Alternative 4	762	1,955

The Proposed Action would treat the most acres of mesic mixed conifer forest habitat when compared to the other action alternatives. In the mid and long term, this alternative would positively impact the most acres of mesic mixed conifer forest by making these stands more resilient to large scale disturbance, such as insects infestations, disease, and wildfire.

Mechanical equipment would only impact a portion of the available habitat within treatment units; the majority of the unit would not be traversed by machinery. Although understory vegetation may be disturbed during the period when harvest occurs, it will quickly recover in the one to two years following harvest.

Snags within mesic mixed conifer stands would not be targeted for removal in commercial and commercial/non-commercial thinning units, but it is likely that a few will be lost in order to provide for safety. Snags densities within regeneration harvest units would be reduced by the proposed activities in these stands. Although snags would be reduced in regeneration harvest units, it is not expected that this reduction in snags would affect migratory birds requiring this habitat feature because Forest Plan standards would be met following treatment.

Burning would also affect the quality of mesic mixed conifer habitat. Grasses, shrubs, and fine fuels would be consumed by underburning in these stands. Shrubs would generally reoccupy burned areas 1 to 3 years following the burn. In the short term, birds requiring understory shrubs would be displaced to unburned patches within the burn area or other suitable mesic mixed conifer habitats adjacent to the burn area. Alternatives 2 and 4 would burn the most acres of mesic mixed conifer habitat when compared to the other action alternatives. As a result, these alternatives would be expected to have the greatest impact on ground nesting birds. Burning also has the potential to consume snags and downed wood. Mechanical fuels treatment would also impact understory vegetation and reduce downed wood densities; birds requiring understory shrubs would be displaced in the short term as shrubs recover. Due to the

low intensity of proposed burning, impacts on large diameter downed wood and snags are expected to be minimal; small diameter snags, fine litter, and debris resulting from treatment activities would be consumed by proposed underburning. Downed wood and snag densities would meet Forest Plan standards following treatment.

Cumulative Effects

Refer to the Wildlife Specialist's Report for past, present, and reasonably foreseeable future activities, actions, and events that have residual, ongoing, or expected effects on the mesic mixed conifer forest habitat type or associated neotropical migratory bird species in the analysis area.

When the residual and expected effects of past, present, and reasonably foreseeable future activities are combined with the expected effects of these alternatives, there would be a short-term reduction in the quality of mesic mixed conifer habitat. Vegetative treatments and burning would impact these habitats by reducing or crushing nesting and hiding cover. Overstory cover and the multi-layered condition in these stands would also be affected. Impacts on understory vegetation and overstory canopy structure and composition would impact associated bird species. There is the potential that nests would be lost due to disturbance and machinery use; some species could become more vulnerable to predators due to decreased stand density and complexity. Changes in structure and composition may cause some species to utilize un-treated mesic mixed conifer habitat in the immediate area. In the long term, mesic mixed conifer habitats would be more resilient to wildfire; habitat quality would be maintained in these stands whereas under the No Action Alternative, they would have been reduced to early seral stands with little or no overstory. It is not expected that these impacts will affect populations of migratory birds in this habitat type. Treatment activities would occur on a relatively small portion of the available mesic mixed conifer habitat in the analysis area.

Riparian Shrub Habitat

Affected Environment

This habitat type includes riparian shrubs (willow, alder) that occur along bodies of water (e.g., streamside, lakeside) or in association with wet meadows and wetlands (Altman 2000). The riparian habitat type generally occurs along creeks and streams in the analysis area and may occur adjacent to or within proposed treatment units.

The project area riparian shrub habitat meets the priority criteria. Along streams and creeks in the affected area, shrub cover occurs in scattered clumps, occupying less than 50 percent of the area. Shrubs are intermixed with open

areas, but in many areas, tree cover is greater than 40 percent. Generally, patch size is greater than 2 acres. Potential habitat for the willow flycatcher occurs along streams at scattered locations throughout the analysis area. The willow flycatcher has not been documented but could occur, based on the vegetative composition and structure in the analysis area.

Further discussion of riparian habitat is found in the hydrology and fish habitat sections.

Environmental Consequences

No Action

Direct and Indirect Effects

Riparian shrub habitat would essentially remain unaltered in the project area in the short term. Over time (long term), riparian shrub stands in the project area would continue to grow and develop in response to improved riparian and livestock management practices. Riparian communities would become more dense, eventually occupying a larger portion of the analysis area. Herbaceous open areas would decrease in size with the encroachment of shrub cover. Tree seedlings and saplings may also encroach into these openings and occupy those sites along streams. In the long term, patch size would increase as shrubs occupy more of the area. Overall, habitat suitability for the willow flycatcher would improve as the riparian shrub community develops.

Common to All Action Alternatives

Direct and Indirect Effects

Harvest and thinning would not occur in Riparian Habitat Conservation Areas (RHCAs). Therefore, there would be no direct or indirect effects on riparian shrub communities or the neotropical migratory birds associated with these habitats.

Landscape burning and burning of debris resulting from treatment activities has the potential to affect riparian habitats. Prescribed underburns would not be ignited in riparian areas, but would be allowed to back into some riparian areas (those that are not listed as critical habitat for Mid-Columbia River steelhead). Due to relatively high fuel moistures in riparian areas, it is unlikely that streamside shrubs will be consumed. A low intensity underburn would remove a portion of the grasses and other fine fuels in riparian areas.

Cumulative Effects

Refer to the Wildlife Specialist's Report for past, present, and reasonably foreseeable future activities, actions, and events that have residual, ongoing, or expected effects on the riparian shrub habitat type or associated neotropical migratory bird species in the analysis area.

When the expected effects of the Action Alternatives are combined with the residual and expected effects of past, present, and future activities, events, and actions, there would be no additional effects on riparian shrub habitat. None of the proposed mechanical activities would occur in riparian shrub habitat; therefore, there would be no direct effects on these habitats. Underburns would not be lit in riparian areas; the condition of fuels and the intensity of the proposed underburns would make it very unlikely that riparian shrub habitat and associated neotropical migratory birds would be affected by this activity.

Steppe-Shrubland

Affected Environment

Steppe-shrublands occur in a wide range of habitat types, including grassland, sagebrush, montane meadows, fallow fields, juniper-steppe, and dry open woodlands and openings in forested habitats (Altman 2000). Forested habitats within portions of the analysis area are interspersed with grassland, shrubland, and juniper-woodland habitats; these non-forest habitats cover approximately 23,949 acres within the analysis area. These habitats vary in size from a few acres to several hundred acres.

Environmental Consequences

No Action

Direct and Indirect Effects

In the short term, steppe-shrubland habitats would not be directly affected by current management direction because habitat criteria would essentially remain unaltered. In the long term, given current fire suppression, encroachment of juniper and other conifer species into steppe-shrubland habitats would continue. Species diversity and distribution would decrease in response to further invasion by these species. As a result, nesting structure and cover would be altered, potentially affecting those migratory bird species associated with these habitats.

Common to All Action Alternatives

Direct and Indirect Effects

Commercial harvest, non-commercial thinning, and regeneration harvest would have no direct or indirect effects on shrub-steppe habitats because proposed treatments would not occur in these areas.

Cumulative Effects

Refer to the Wildlife Specialist's Report for past, present, and reasonably foreseeable future activities, actions, and events that have residual, ongoing, or expected effects on the steppe-shrubland habitat type or associated neotropical migratory bird species in the analysis area.

When the residual and expected effects of past, present, and reasonably foreseeable future activities are combined with the expected effects of these alternatives, there would be no additional impacts on shrub-steppe habitats. The proposed mechanical vegetation treatment activities would not impact this habitat type.

Unique to Alternatives 2 and 4

Direct and Indirect Effects

Under these two alternatives, burning would occur in the shrub-steppe habitat type. Table XX shows the acres of burning that would occur in the shrub-steppe habitat type under these alternatives.

Table XX. Acres of burning within the shrub-steppe habitat type.

Action Alternative	Acres of shrub-steppe habitat burned
Alternative 2	3,197
Alternative 4	3,195

These alternatives would virtually burn the same number of acres when compared to one another. Prescribed spring underburns are expected to burn in a mosaic pattern across the landscape, generally blackening approximately 50 percent of the area. Prescribed burning would temporarily remove grasses, forbs, and a portion of the shrub layer in these habitats. Prescribed burning would temporarily displace ground and shrub-nesting birds associated with grass and shrub communities, but species would re-occupy these habitats in the season following the burn. Burning could also result in nest loss for these ground or shrub-nesting birds. Re-nesting would be expected in unburned patches and/or other locations outside the burn unit. Burning would occur in blocks ranging from 200 to 2,000 acres in size. Adjacent burn blocks would not be burned in the same year to maintain unaffected steppe-shrubland habitats for birds potentially displaced from adjacent underburn areas.

Cumulative Effects

The cumulative effects under this alternative would be similar to those described under All Action Alternatives. The past, present, and reasonably foreseeable future activities considered under this alternative are the same as those described under All Action Alternatives. When the

residual and expected effects of past, present, and reasonably foreseeable future activities are combined with the expected effects of this alternative, there potentially could be a further reduction in upland shrub regeneration and a reduction in the size of blocks of this habitat type. Reseeding of these shrubs after burning may prove difficult due to ungulate (wild and domestic) grazing of regenerating shrubs. Shrub and ground nesting birds could be affected in the short term through nest abandonment/loss and a temporary reduction in nesting habitat. In the mid and long term, nesting habitat for shrub-nesting species could be reduced. Burning in grassland habitats would reduce nest cover; nests could be abandoned or lost to burning. Grassland habitats (composition) would not be altered by the proposed activities; burning in these areas would stimulate vegetation growth.

Aspen

Affected Environment

This habitat type includes aspen stands associated with streams, springs, and other wet areas. Aspen stands were once widespread throughout the Blue Mountains, however, a combination of factors including fire suppression, competition with invading shade-tolerant species, overgrazing (livestock and wild ungulates), and drought have contributed to their decline.

The aspen stands within the analysis area do not meet the criteria identified in the Strategy. Individual stands consist of single trees or small groups of decadent trees, with little to no regeneration in the understory, and large aspen snags are scarce.

Environmental Consequences

No Action

Direct and Indirect Effects

In the short term, there would be no change in the size or number of existing aspen stands in the analysis area. In the long term, aspen habitat would continue to decline; the size of existing stands would decrease, and individual stands would disappear. In the absence of fire, continued invasion of aspen stands by shade tolerant conifers would further reduce the ability of aspen to maintain their current distribution within the analysis area. Grazing by livestock and big game would further suppress regeneration of these stands. Aspen would ultimately be extirpated from the analysis area.

Common to All Action Alternatives

Direct and Indirect Effects

Thinning of conifers from these stands would have a beneficial effect on aspen within these units. Removal of conifers would reduce competition and shading of these habitats, increasing the vigor of remaining aspen. Future fencing (see cumulative effects analysis) of these stands would improve habitat quality and allow regeneration to occur. In the mid and long term, habitat for aspen associated bird species will be improved by treatment of these stands. Short term impacts are expected to be minor. Table XX shows the number of proposed treatment units where aspen stands are know to occur and may be thinned.

Table XX. Number of proposed treatment units with aspen stands that may be treated under the Falls Meadowbrook Project.

Action Alternative	Units with aspen stands that may be treated
Proposed Action and Alternatives 3 and 4	8
Alternative 2	4

The Proposed Action and Alternatives 3 and 4 would benefit more aspen habitat than Alternative 2.

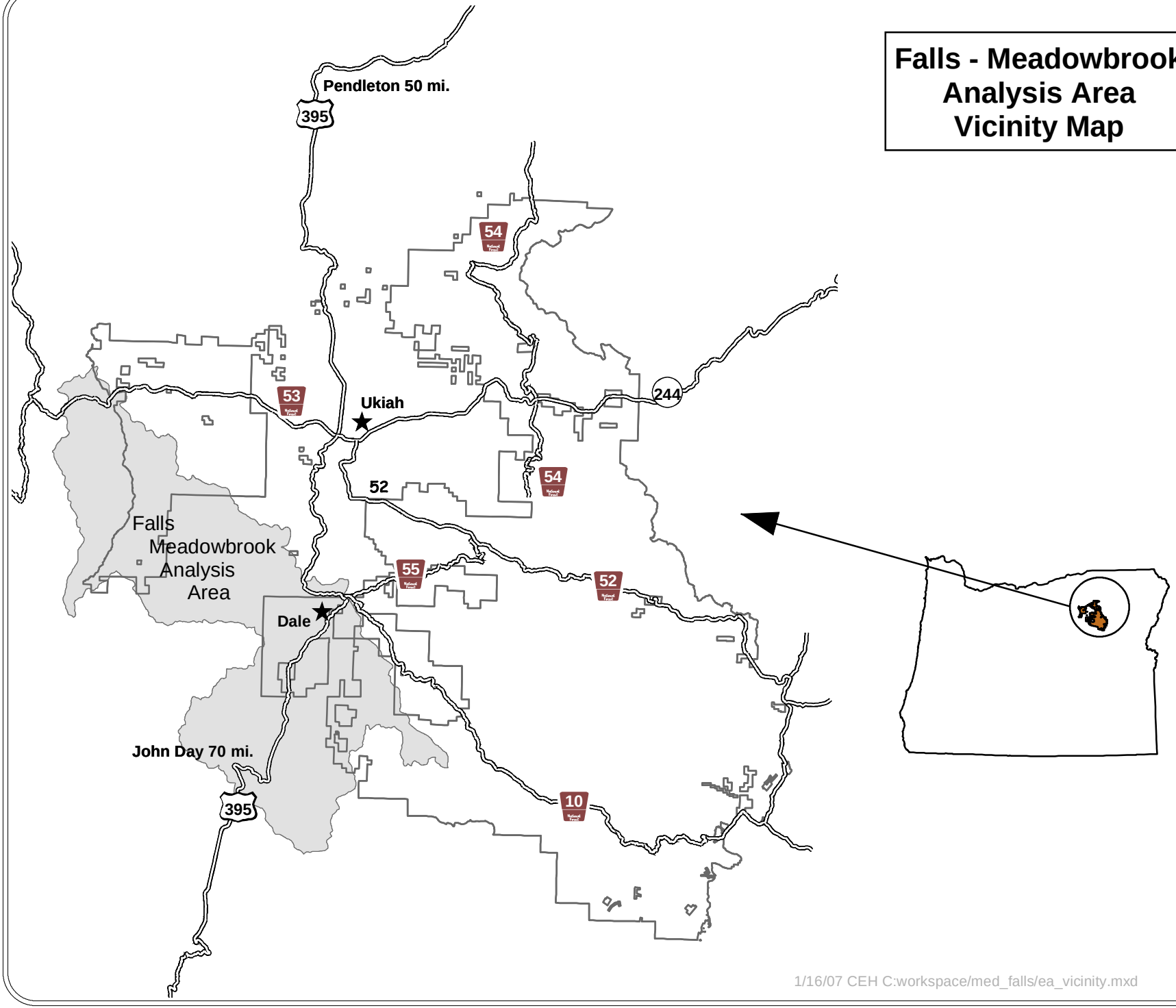
Landscape burning or mechanical treatment would occur in units known to have remnant aspen stands. Burning would increase the vigor of aspen, encouraging resprouting (suckering) in the years following burning. Mechanical fuels treatments may occur in aspen stands. Essentially, mechanical fuels treatment would non-commercially thin small diameter conifers, improving aspen habitat by reducing competition.

Cumulative Effects

Refer to the Wildlife Specialist's Report for past, present, and reasonably foreseeable future activities, actions, and events that have residual, ongoing, or expected effects on the aspen habitat type or associated neotropical migratory bird species in the analysis area.

When the residual and expected effects of past, present, and reasonably foreseeable future activities are combined with the expected effects of these alternatives, the quality of remnant aspen stands within treatment units would be improved. Conifers would be removed from these stands, stimulating regeneration of the clone and growth in remnant trees. Habitat for the red-naped sapsucker could be limited for some time due to the lack of mature aspen and aspen snags in some stands. In the long term, these activities, when combined with fencing of these stands, would improve habitat quality and insure that small stands of aspen are not lost.

Falls - Meadowbrook Analysis Area Vicinity Map



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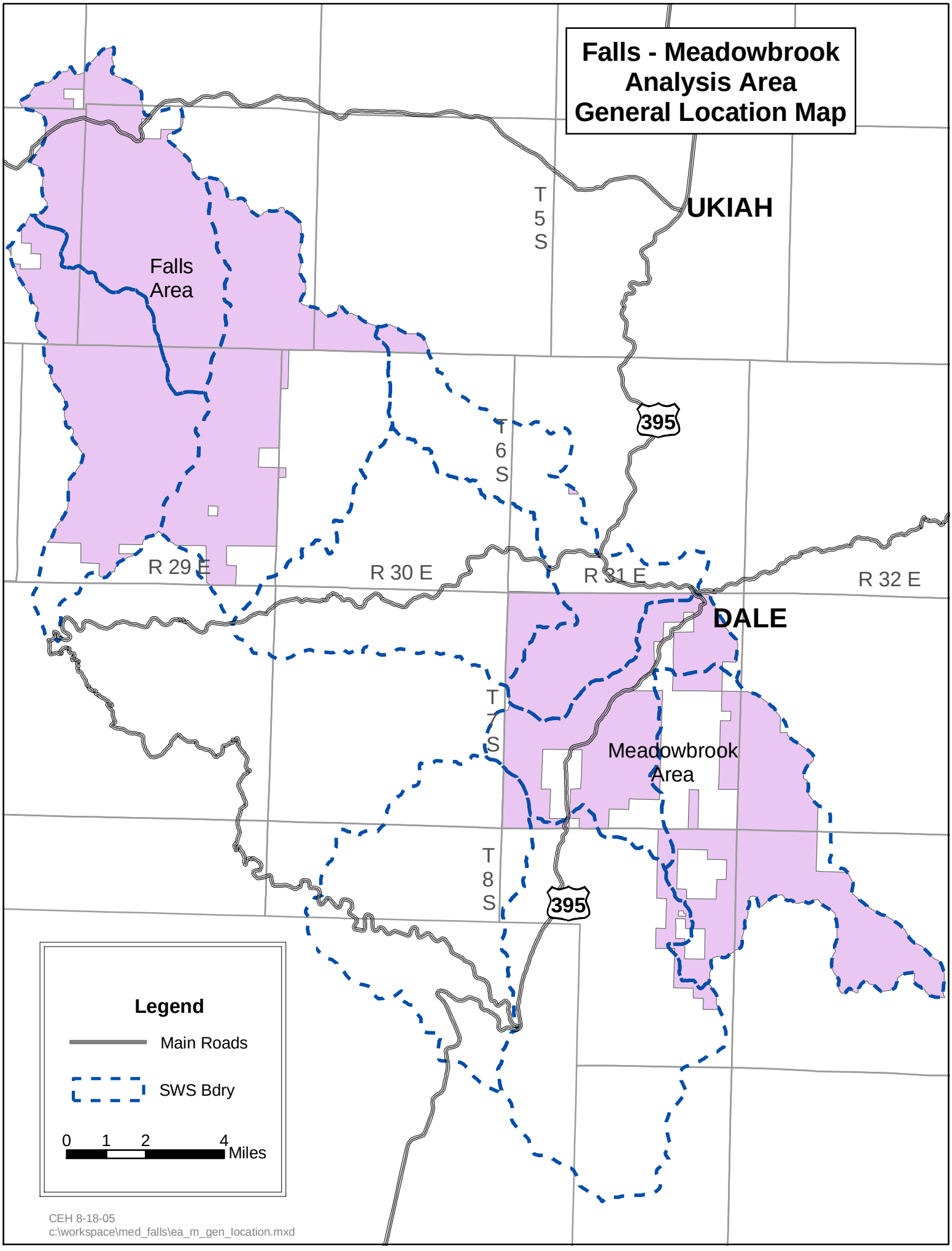
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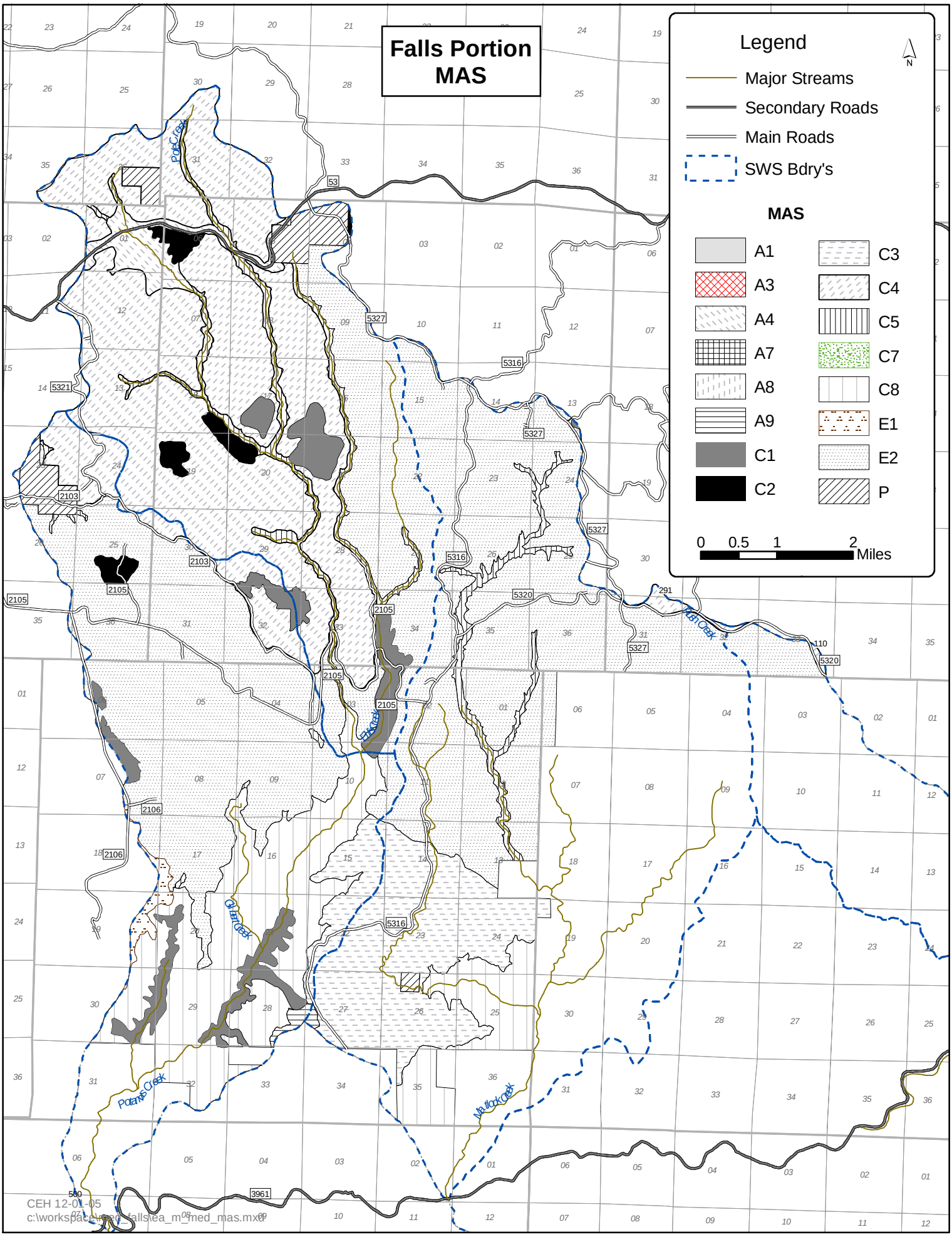

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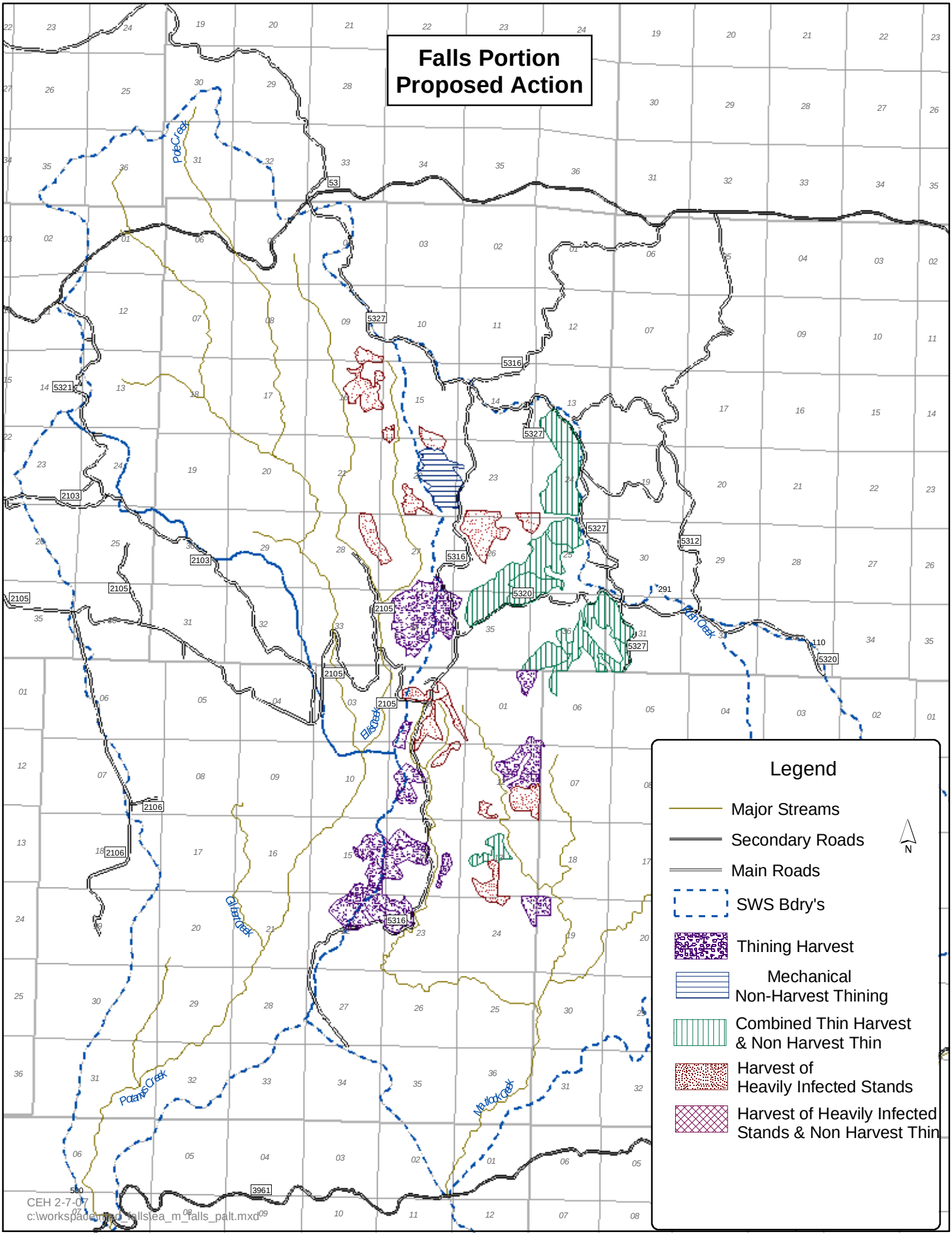
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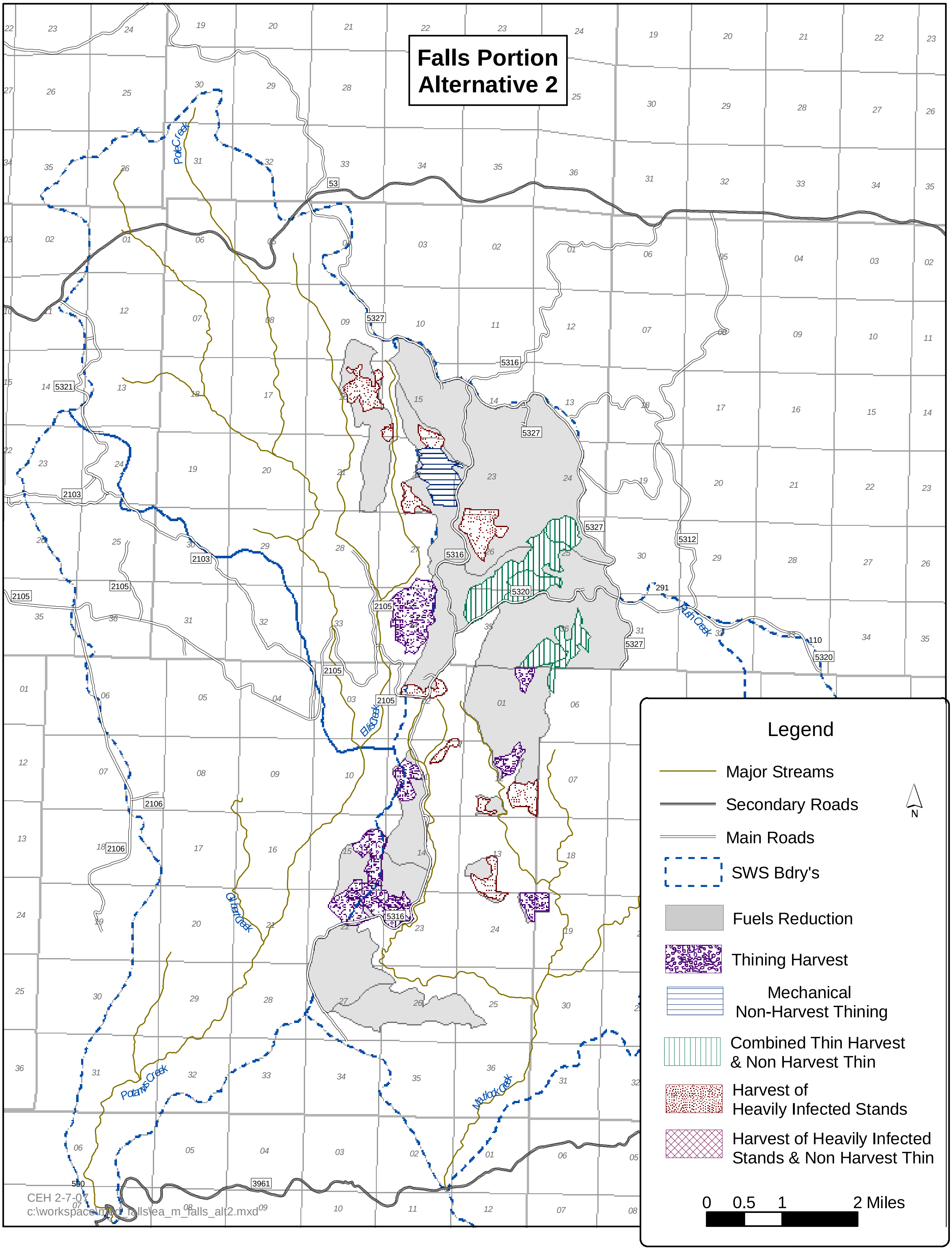
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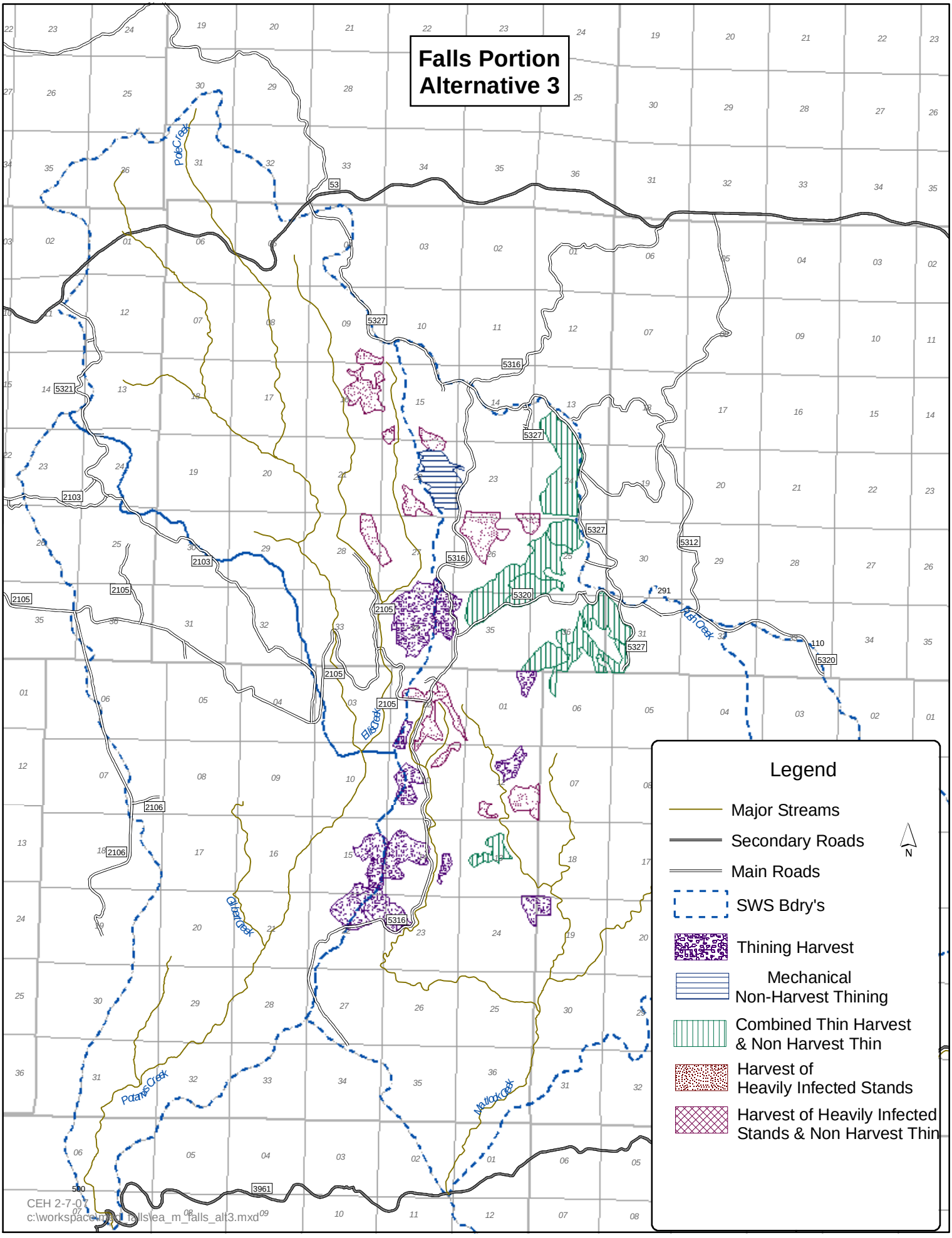
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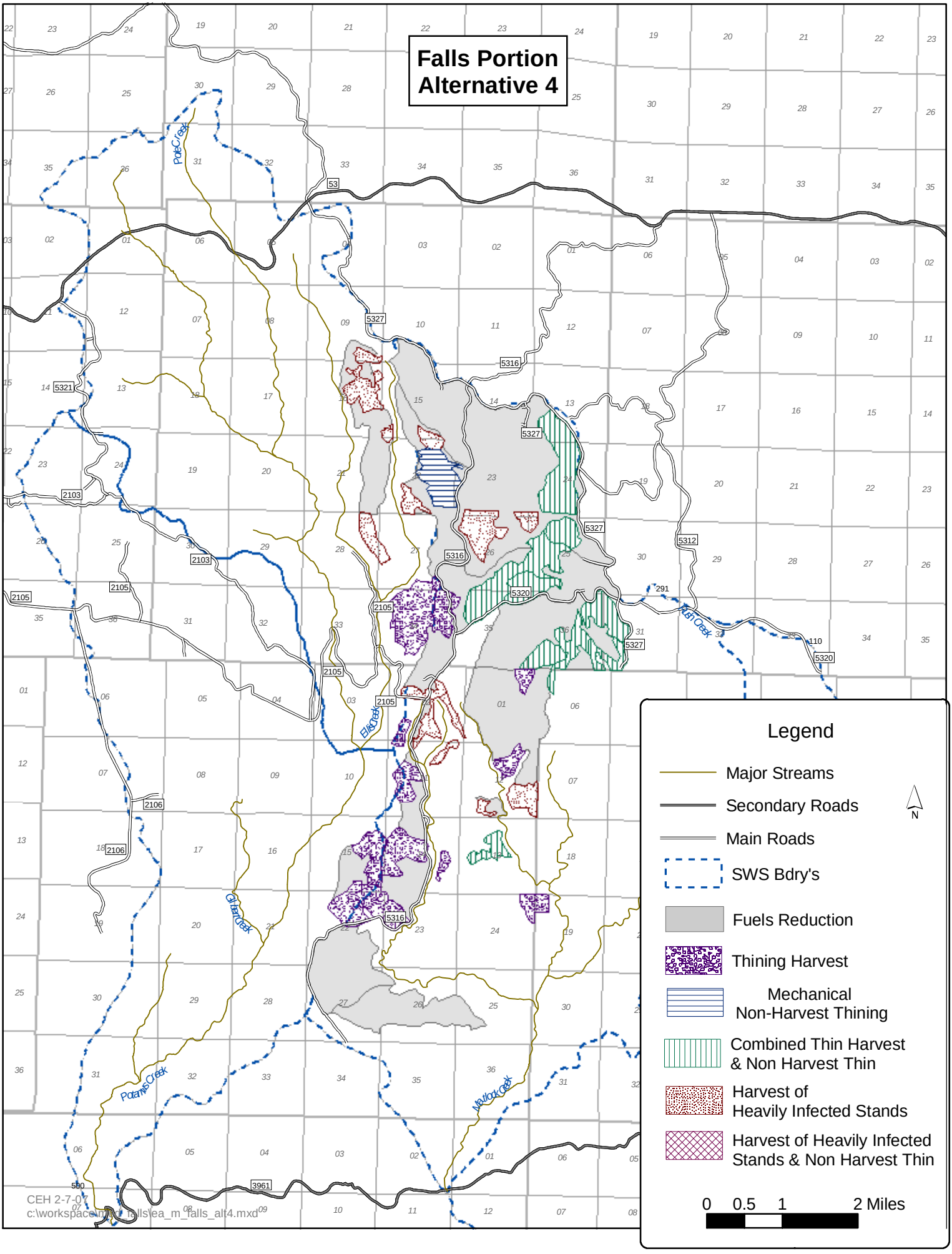
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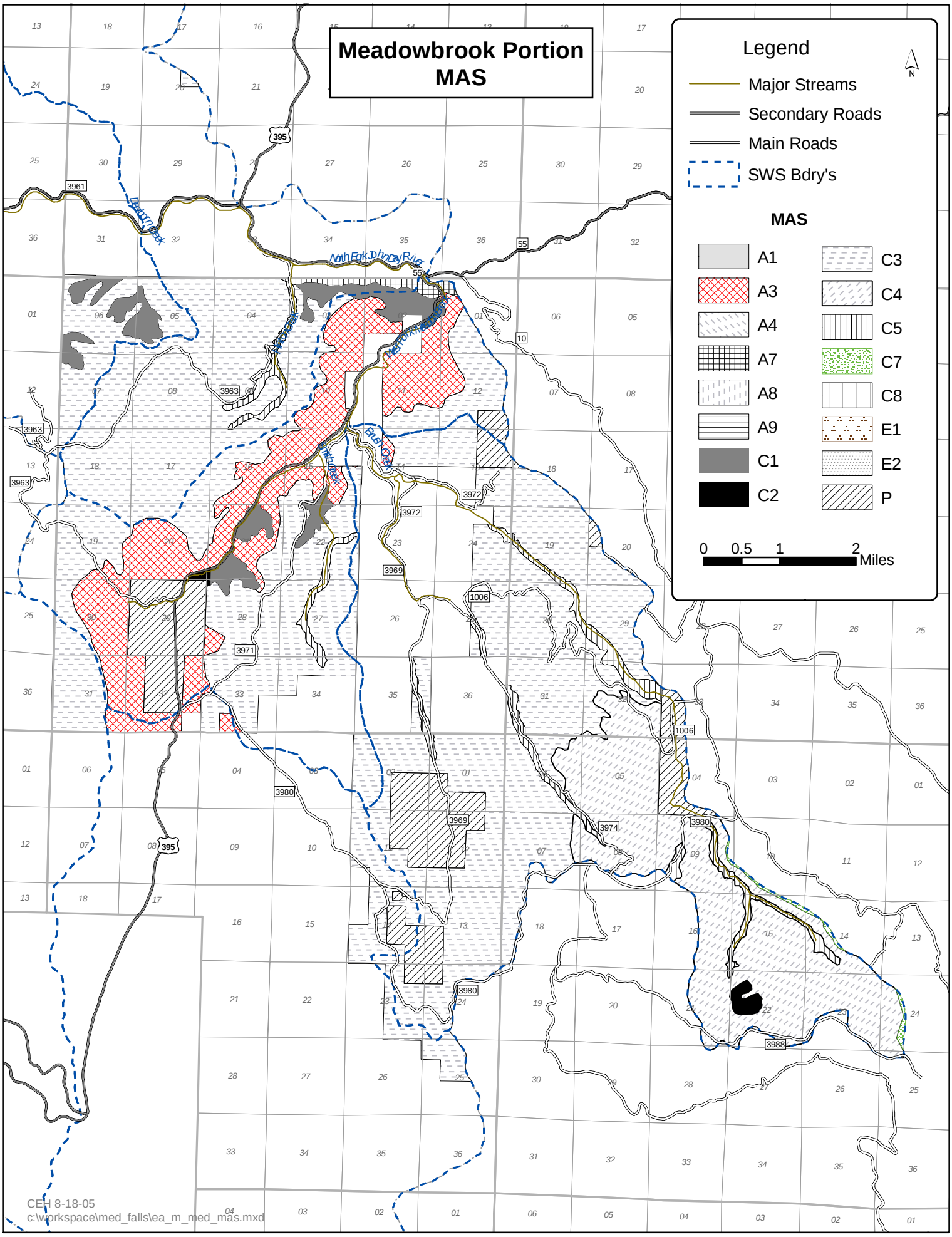

CEH 8-18-05
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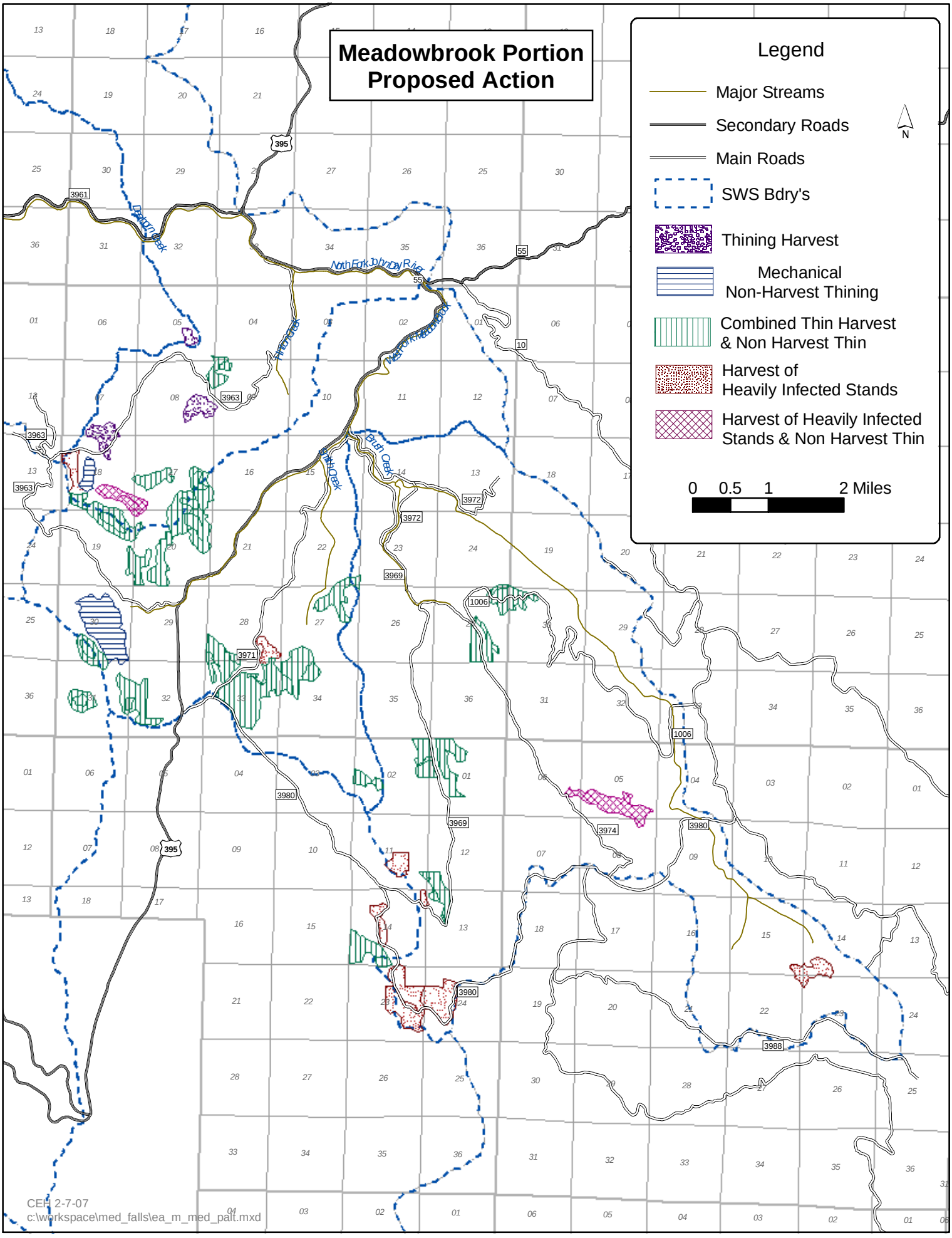

CEF 2-7-07
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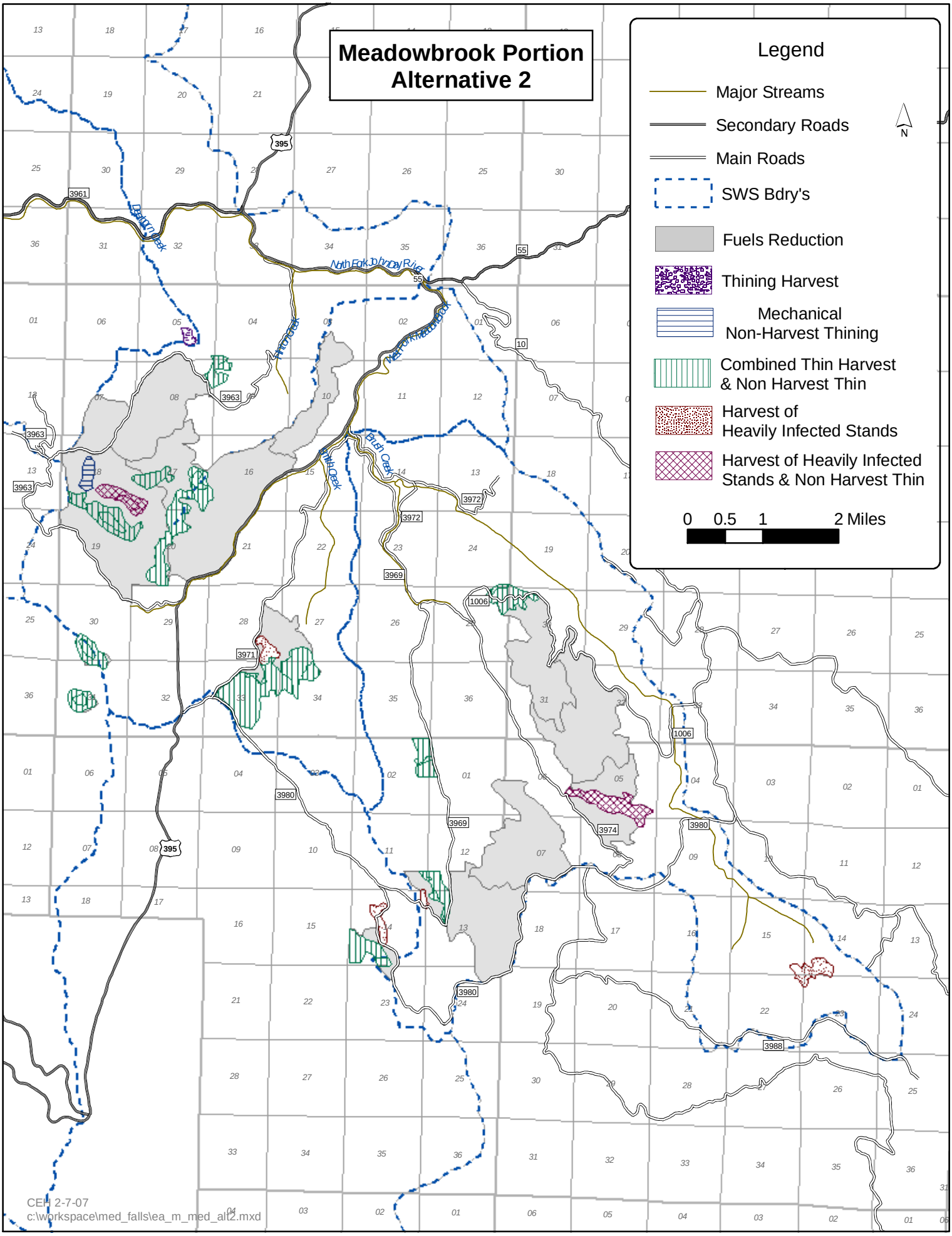

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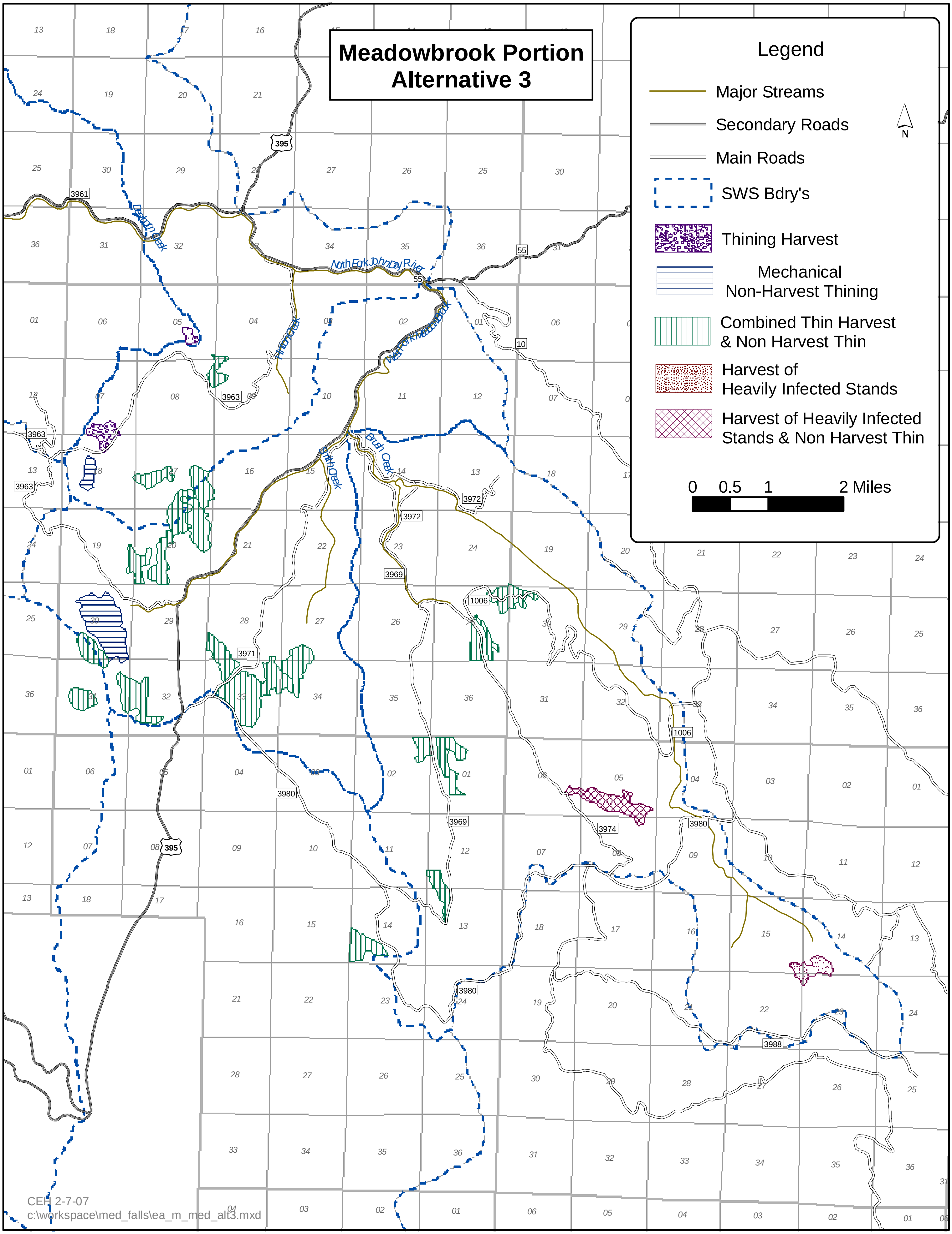
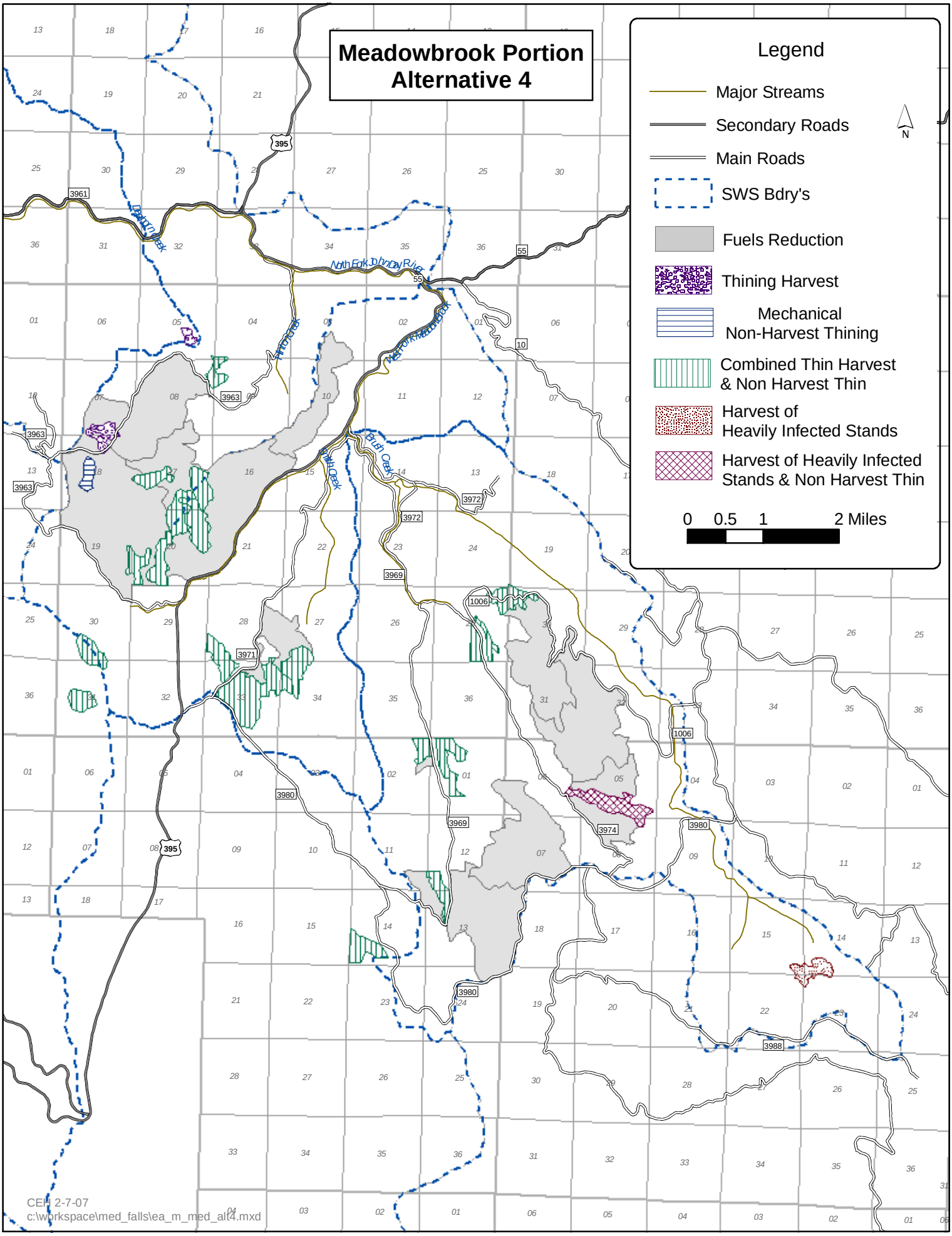


Meadowbrook Portion
Alternative 3
Legend
Major Streams
Secondary Roads
Main Roads
SWS Bdry's
Thining Harvest
Mechanical Non-Harvest Thining
Combined Thin Harvest & Non Harvest Thin
Harvest of Heavily Infected Stands
Harvest of Heavily Infected Stands & Non Harvest Thin
0 0.5 1 2 Miles
N
395
3961
3963
55
10
3972
3969
1006
3971
3980
3974
3988
Smith Creek
Brush Creek
CEH 2-7-07
c:\workspace\med_falls\ea_m_med_alt3.mxd



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