CHAPTER 2 – ALTERNATIVES

This chapter is intended to describe the alternatives and how they were formulated for the North Fork Mill Creek Restoration Opportunity project. This chapter is the heart of the document and provides readers and the recommending and responsible officials with a description of the project, displaying the alternatives, design criteria and mitigation measures, monitoring requirements and a comparison of effects of the alternatives. This chapter provides a clear basis for choice among options by the line officer.

ALTERNATIVE FORMULATION

This project is being prepared under the Health Forest Restoration Act (HFRA) authorities with an emphasis on reducing hazardous fuels in the Mill Creek Watershed to protect the City of The Dalles Watershed. The project is located within the Wildland Urban Interface (WUI) boundary and is further than 1½ miles from the boundary of an at-risk community. As such, HFRA requires the agency to analyze the Proposed Action as well as one action alternative (Alternative 2) [HR 1904, Section 104(d)(1)]. During scoping, Oregon Wild recommended that the Forest Service consider an alternative addressing concerns over cutting large trees and constructing new roads; these comments formed the basis for Alternative 2. Alternative 2 proposes vegetation management treatments in existing plantations and does not proposed treatments in naturally appearing stands. In addition to the Proposed Action and Alternative 2, the No Action Alternative was considered to form a baseline for the project.

In addition to these comments, the Interdisciplinary Team (IDT) considered all of the issues proposed during scoping (see scoping letters in the project record and content analysis in Appendix 2), and where feasible, adjusted the original proposed action to resolve those issues. In some cases, this was handled by adding design criteria and mitigation measures to the project and in other cases the design of the project was modified.

No other alternatives were considered and eliminated from detailed study for this project.

ALTERNATIVES CONSIDERED IN DETAIL

The Mill Creek planning area includes the North Fork of Mill Creek watershed and small portions of Mosier and Neal Creek watersheds on National Forest System lands. It is located approximately 5 miles east and southeast of the community of Mt. Hood. The legal land description is T1S, R10E (Hood River County) and T1S, R11E (Wasco County), Willamette Meridian. (See Figure 1-1 for Vicinity Map.)

No Action Alternative

Under this alternative, no hazardous fuels reduction treatments would be implemented. No commercial or sapling thinning, cottonwood aspen enhancement, prescribed burning, brush removal, mowing, or pruning would occur. There would be no landings, skid trails or temporary roads built to facilitate removal of fuels. No fire suppression openings would be created; therefore, interagency fire suppression efforts would continue as they operate currently. The fuel

hazard would not be reduced. Dead or dying trees would not be removed and would contribute to the fuel hazard. Natural fuels (downed wood and other dead vegetation) would not be removed and would continue to accumulate. Natural processes of decay are not likely to remove the down and dead woody debris before the next fire cycle. As the available fuel increases, so would the potential for a large stand-replacing wildfire event.

None of the design criteria or mitigation measures would be implemented. There would be no improvements made to the National Forest road system. None of the other restoration projects would be implemented including no road closures, no road decommissioning, no culvert replacements or removals, and no trail construction or reconstruction.

The No Action alternative would not meet the purpose and need for action. Effects of the No Action alternative are analyzed by resource in Chapter 3.

Alternative 1 – Proposed Action

Vegetation Treatments

Alternative 1 – Proposed Action proposes to treat approximately 2,800 acres. The purpose of the treatments is to improve forest health conditions (removing root rot pockets, removing diseased trees) and reduce hazardous fuels (removal of surface fuels, removal of ladder fuels, and opening of the canopy). The mechanical fuels reduction treatment methods would consist of tree thinning from below, machine piling, hand thinning, pruning by hand, machine mastication, and manual brush removal. Underburning (prescribed fire) would be used in combination with mechanical treatments (954 acres) or without any additional treatments (610 acres) to restore stand health and to restore fire to its historical role.

Thinning from below for the purpose of hazardous fuels reduction means that smaller diameter trees growing in lower crown positions would be removed, leaving more space around remaining larger trees. To further reduce fuel loadings, trees would be selected for removal if their spacing facilitates the spread of a crown fire (canopy closure), or a tree form contributes to the initiation of a crown fire (crown base height) such as low growing tree branches over brush, which if ignited, could lead to crown fire initiation. Trees heavily infected with dwarf mistletoe would also be removed, since these trees contribute to ladder fuels (low hanging “brooms”), to low crown base height (distance from surface fuels to bottom of tree crowns), and to torching. These trees may be removed through mechanical means, pruned, or girdled to provide for snags and wildlife trees. Tall brush, which may contribute to the initiation of a crown fire, would also be reduced. Activity fuels (residue from mechanical treatments such as masticated material, thinning, etc.) as well as residual fuels from natural accumulation would be treated by piling and burning, to reach a target fuel loading of between 7 and 15 tons per acre in the zero to three-inch in diameter downed woody material. Stands where the dominant species and fire regime are appropriate, such as ponderosa pine and western larch in a low intensity, frequent fire return interval, would be treated so that future underburning could occur to maintain stand conditions. Variable density thinning would be completed as appropriate.

The stands proposed for fuel reduction would average 40 to 60 trees per acre after treatment. The target canopy closure of remaining overstory would be 30 percent to 60 percent, depending on slope and the condition of potential trees to be retained within a stand. The lower target canopy

closure result for the existing stand conditions where insect and disease has resulted in a large number of dead or dying trees (as indicated in Table 2-3). Achieving this canopy closure would be extremely difficult in many areas. The largest trees were removed from the entire project area many decades ago, and the residual stands are heavily infected with dwarf mistletoe and most have centers of root disease. It is unlikely that these stands would be in their present condition if fire had played its natural (i.e., sanitizing) role in this landscape. Fuel reduction activities through root disease centers is likely to result in some patch openings. Where root disease is identified, disease resistant species would be left. Stand density would vary with the availability of healthy leave trees. Table 2-1 summarizes the proposed vegetation treatments of the planning area.

Table 2-1: Proposed vegetation treatments for Alternative 1

Treatment	Acres
Restoration Thin	2121
Sapling Thin	26
Aspen Cottonwood Enhancement	45
Underburn	610
Total Acres	2802

All proposed treatment areas are shown on the Proposed Action map (Figure 1-5). The vegetation treatments would follow the stand treatment parameters in Table 2-2. The overarching objective of the treatments in the North Fork Mill Creek Planning area is to reduce fuels and restore stands to their historical species composition while also providing for wildlife habitat needs. By doing so, the Forest Service would be moving treated areas toward the appropriate condition class based on the fire regime classification and therefore be addressing fuels reduction needs in the treated areas. Promoting a diversity of tree species would allow the forest to more readily adapt to climate change. Stand treatments would also reduce the vulnerability of the area to uncharacteristic fires that put large amounts of carbon into the atmosphere. Other treatments would occur in the area (i.e. sapling thinning, underburning, pruning, etc.). Cutting of trees identified as hazards along open roads is required to provide for public safety and therefore is one area where the identified size parameters for cutting trees would not apply. Hazard tree removal, to the extent possible, would try to be consistent with the guidelines outlined in Table 2-2. Table 2-3 provides detailed treatments for each unit.

Table 2-2: North Fork Mill Creek Restoration Project Stand Treatment Parameters

Stand condition	Douglas-fir	White fir	Ponderosa pine, larch, western white pine, western red cedar, etc
Stands with root-rot pockets (where target understory or target residual stand is not root rot susceptible species) - openings created through tree removal generally should be around 1-acre in size; however, larger openings may occur if they are naturally appearing in shape (amoeba shaped). The objective is to leave the best of what is left in the largest size class available and to avoid leaving openings that are larger than 2-acres in size. Other treatments such as pre-commercial thinning, pruning, underburning, etc. would still occur. Snag and on-site woody debris would be left on-site, however may be adjusted to meet fuel loading concerns.	30-inch and greater size class Retain unless compelling reason present to girdle. For example, tree presents a fuels risk (i.e., ladder fuel) to adjacent desirable species (ponderosa pine, western white pine, larch, and other healthy fire-resistant species) and measures such as pruning of ladder fuel would not adequately address the risk.	30-inch and greater size class Retain unless within/adjacent to root rot pocket or if a fuels risk to adjacent desirable species, then remove.	Retain all unless stocking density or mistletoe hazard rating (normally when more than one-third of the tree crown is infected with mistletoe) compromises long-term health of residual stand. In that case only remove the smaller trees, but still retain variable density characteristics of the stand. Girdle larger mistletoe infected trees and retain on site unless retention results in excessive fuels loading (refer to dimension parameters identified under Douglas-fir). Plant openings with these resistant species
	24 to 29-inch size class Retain unless compelling reason to girdle (see above). If of such quantity as to result in excessive fuel loading, remove those in the lower end of the diameter class. Generally, the emphasis would be to use the removed trees in this size class for **restoration*** projects. Retain if in clumps that are healthy and not susceptible to infection due to proximity to root rot pockets	24 to 29-inch size class Remove those that are infected and those that are at the edges of infection centers unless there is insufficient number of Douglas-fir on site to meet snag and/or on-site woody debris requirements	
	Less than 24-inch size class Remove those that are clearly infected or at the edge of infection centers. Retain healthy clumps, if available and not overstocked. Thin overstocked clumps with emphasis to leave the best in the largest size class available.	Less than 24-inch size class Remove unless retention of healthy white fir is necessary to meet other resource objectives	

Stand condition	Douglas-fir	White fir	Ponderosa pine, larch, western white pine, western red cedar, etc
Stands where the objective is to restore historical species composition and where target understory is comprised of species such as Douglas-fir, ponderosa pine, western larch, western white pine, western red cedar, etc. Most of these stands had previous entry and resulted in a residual stand that was a seed tree, shelterwood, partial cut (usually selective species removal), or plantation (old clearcuts). These are stands where commercial thinning is prescribed or where there is a need to start over in terms of the understory component (current component has limited ability to achieve long-term growth and health objectives). Other treatments such as sapling thinning, pruning, underburning (where appropriate) would still occur. The emphasis is to leave the best of what is available in the largest size class. Snag and on-site woody debris would be left on-site, however may be adjusted to meet fuel loading concerns.	30-inch and greater size class Retain. If tree is infected with mistletoe and it compromises viability of understory then girdle.	30-inch and greater size class Retain unless presence compromises establishment of target understory, then girdle and leave on-site.	Retain all unless stocking density or mistletoe hazard rating (normally when more than one-third of the tree crown is infected with mistletoe) compromises long-term health of residual stand. In that case, only remove the smaller trees, but still retain variable density characteristics of the stand. Girdle larger mistletoe trees and retain on site unless retention results in excessive fuels loading (refer to dimension parameters identified under Douglas-fir). Plant openings with these resistant species
	24 to 29-inch size class Girdle all that are infected with dwarf mistletoe and if left on-site would compromise health and viability of understory. If of such quantity so as to result in excessive fuel loading, remove those in the lower end of the diameter class. Generally, the emphasis would be to use the removed trees in this size class for **restoration*** projects.	24 to 29-inch size class Remove unless: 1) retention of healthy white fir is needed to meet other resource objectives; or 2) if there is insufficient # of other species on-site to meet snag and/or woody debris requirements.	
	Less than 24-inch size class Remove those that are infected with mistletoe and if left on site would compromise health and viability of understory. Thin where the stand is overstocked with emphasis to leave the best of what's left in the largest size class.	Less than 24-inch size class Remove unless retention of healthy white fir is necessary to meet other resource objectives	

Restoration* generally includes those projects that would result in a benefit to resources on-the-ground such as stream and aquatic restoration, trail restoration, road decommissioning, and site productivity restoration.

Table 2-3: Treatment prescriptions by unit for Alternative 1

Unit	Treatment	Underburn	Existing Canopy Cover	Target Canopy Cover	Silviculture Remarks	Acres
1	Thinning	No	55	15	Heavy dwarf mistletoe in overstory and understory.	35
2	Thinning	No	55	15	Heavy dwarf mistletoe in overstory and understory.	11
3	Thinning	No	50	15	Heavy dwarf mistletoe in overstory and understory.	60
4	Thinning	No	60	20		85
5	Thinning	No	50	30	Thin mid-story. Dwarf mistletoe and root rot.	5
6	Thinning	No	60	40	Dwarf mistletoe.	36
7	Thinning	No	70	50		8
8	Thinning	No	60	40		5
9	Thinning	No	15	15		19
10	Thinning	Yes	60	40	Root rot pockets.	136
11	Thinning	Yes	60	40		47
12	Thinning	Yes	65	45		24
13	Thinning	No	60	40	Young **s**econd growth stand.	20
14	Thinning	Yes	55	40	Second growth stand.	58
15	Thinning	Maybe	60	40	Second growth stand. Leave lodgepole pine.	51
16	Thinning	Yes	50	40	Old selection cut.	10
17	Thinning	Yes	50	25	Old selection cut. Severe dwarf mistletoe.	15
18	Thinning	Yes	50	40	Severe root disease.	57
19	Thinning	No	60	40		3
20	Thinning	No	60	40	Old selection cut.	17
21	Thinning	No	60	40	Old selection cut.	2
22	Thinning	No	50	30	Severe dwarf mistletoe.	18
23	Thinning	No	50	30	Severe dwarf mistletoe.	30
24	Thinning	Yes	60	40	Second growth stand.	46
25	Thinning	Maybe	75	30	Thinned 1975. Severe dwarf mistletoe.	167
26	Thinning	Yes	70	40	Root rot pockets.	35
27	Thinning	Maybe	80	40		22
28	Thinning	Yes	65	40	Root rot pockets.	6
29	Thinning	Yes	60	40	Dwarf mistletoe.	14
30	Thinning	No	60	50		81
31	Thinning	No	70	40	Root rot pockets.	54
35	Thinning	No	70	40	Root rot pockets.	23
36	Thinning	No	65	40	Thinned 1976. Severe dwarf mistletoe.	54

Unit	Treatment	Underburn	Existing Canopy Cover	Target Canopy Cover	Silviculture Remarks	Acres
37	Thinning	No	75	50	Dwarf mistletoe and root rot.	28
38	Thinning	No	70	40	Root rot pocket.	84
39	Thinning	No	70	50	Dwarf mistletoe and root rot.	6
40	Thinning	No	70	50	Dwarf mistletoe.	28
41C	Thinning	No	60	40	Dwarf mistletoe and root rot.	20
42	Thinning	No	75	50	Dwarf mistletoe and root rot.	17
43	Thinning	No	50	30	Heavy dwarf mistletoe and root rot.	18
44	Thinning	No	70	40		28
45	Thinning	Yes	60	30	Root rot pocket.	25
46	Thinning	Yes	60	30	Root rot pocket.	4
47	Thinning	No	50	25	Root rot pocket.	11
48	Thinning	Maybe	55	30	Root rot pocket.	14
49	Thinning	Maybe	60	60		28
50	Thinning	Maybe	50	40		46
51	Thinning	Maybe	50	40		8
52	Thinning	Yes	30	30		5
52C	Thinning	Yes	40	30		15
53	Thinning	Maybe	70	60	Root rot pocket.	67
54	Thinning	Maybe	60	30	Root rot pocket.	56
55	Thinning	Yes	70	40	Root rot pocket.	6
56C	Thinning	Yes	55	40		15
57	Thinning	No	50	30	Dwarf mistletoe and root rot.	21
58	Thinning	No	50	30	Dwarf mistletoe and root rot.	31
59	Thinning	No	70	40	Dwarf mistletoe and root rot.	57
59C	Thinning	No	70	30		11
60	Thinning	No	50	30	Root rot pocket.	36
61	Thinning	No	50	40	Root rot pocket.	151
62	Thinning	No	70	40		16
63	Thinning	No	50	30	Root rot pocket.	13
70	Sapling thinning	Yes	75	45		11
71	Sapling thinning	Yes	40	30		7
72	Sapling thinning	Yes	25	25		7
81	Aspen/Cottonwood Enhancement	Yes	30	20		1
82	Aspen/Cottonwood Enhancement	Yes	50	30		24
83	Aspen/Cottonwood Enhancement	Yes	40	30		17
84	Aspen/Cottonwood Enhancement	Yes	60	40		1

Unit	Treatment	Underburn	Existing Canopy Cover	Target Canopy Cover	Silviculture Remarks	Acres
85	Aspen/Cottonwood Enhancement	Yes	50	40		1
86	Aspen/Cottonwood Enhancement	Yes	30	20		1
87	Aspen/Cottonwood Enhancement	Yes	35	25		3
91	Underburn	Yes	50	40		549
92	Underburn	Yes	5	5		8
94	Underburn	Yes	5	5		53
TOTAL ACREAGE						**2802**

* Acreages are rounded. Acres do not agree with overall acreage due to approximations from GIS.

In addition to traditional vegetation treatments, the Proposed Action includes 45 acres of cottonwood/aspen enhancement treatments. Manipulation techniques that are potentially available to perpetuate aspen forests include: doing nothing, commercial harvest, prescribed fire, mechanical root stimulation, removal of vegetative competition, protection of regeneration from herbivory, or regenerating from seed. Choosing the appropriate technique for a given aspen stand depends upon its age, vigor, stocking, associated vegetation, accessibility, the abundance of other aspen in the landscape, and the importance ascribed to maintaining aspen at a particular location. None of the above techniques could be used in all situations. Fire meets all the requirements of the aspen regeneration triangle. It stimulates suckering by killing overstory stems and by killing near-surface root segments and thereby interrupting the flow of auxin to surviving downstream root segments. Fire removes competing understory vegetation and conifer seedlings and allows sunlight to reach the forest floor. Fire is an important comportment in both establishing new stands of aspen an in assisting aspen in maintaining its position on the landscape. Prescribed fire would keep burn severity to a low and medium burn severity in and around moist areas in aspen stands found in the planning area. No hand lines would be constructed through the interior of any of the aspen stands. Hand lines in conjunction with wetlines would be utilized on the perimeter of the aspen stands as control lines to regulate prescribed fire spread. Historically sensitive aspen trees (Figure 2-1) found in the planning area would be protected by pulling back debris from the base of leave trees, reflective heat wrap also would be used in conjunction with pulling back of debris before ignition would take place.

Treatment within 100-feet of an intermittent stream would be limited to hand treatment or left untreated completely. Similarly, within 150-feet of a perennial stream, activities would be limited to hand treatment or left untreated completely. These riparian treatments apply to all units. Snags would be retained to meet habitat requirements for the Northern spotted owl. Also, snags would be created through the girdling of trees infected with dwarf mistletoe. A minimum of 120 linear feet of down woody material and 4 snags/acre would be retained. Snags to be created by girdling trees infected with dwarf mistletoe are included in this number.

The Proposed Action includes snowplowing to allow for hauling under winter conditions, if necessary and if approved by the District Ranger. Vegetation treatment over most of the area would involve the use of available roads and skid trails existing from past activities (approximately 68

percent of proposed treatment areas were entered in the past 30 to 35 years). Less than one mile of temporary roads would be constructed for removal of vegetation in some stands, but these roads would be decommissioned at the end of the project. Figure 2-2 is a map of the proposed temporary roads.

Figure 2-1: Historic Aspen Stand in North Fork Mill Creek Planning area.

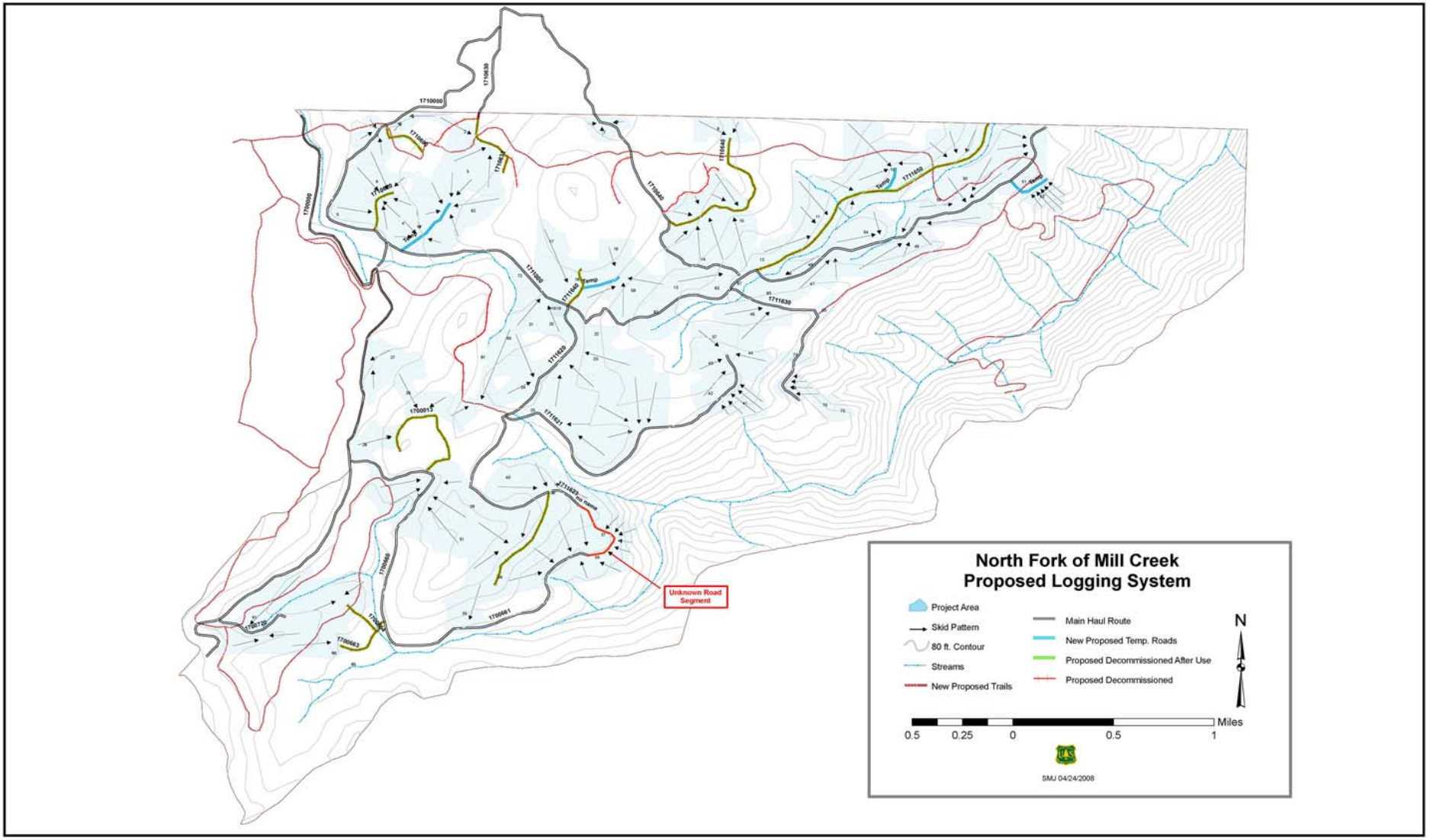

Figure 2-2: Map of Proposed Temporary Roads within the Planning Area.
Note: The exact location of these roads may change during implementation, but no more than 1-mile of temporary roads would be constructed.

Other Fuel Reduction Activities

Natural fuels (litter, brush, and trees) would be treated in the Proposed Action and Alternative 2. Treatment methods would be handpiling, pile burning, underburning, mowing/mastication, fireline construction, and maintenance treatments. The treatments would be used over a large area to reduce the fuel loadings and modify the fuel profiles of the unit.

Hand Piling
Handpiling is the piling of understory brush, small trees, and down dead woody material by hand crews into piles of woody debris that may be later burned or utilized. Chainsaws and hand tools would be used to cut the material to aid in the piling operation. Ladder fuels are reduced as a result of the piling of brush and small trees. The fuel loading is reduced by the piling and subsequent burning of the down dead woody material. The piles are burned in the fall season.

Machine Piling
Machine piling is the use of mechanical devices to pile activity and residual fuels. Bulldozers are generally more efficient in collecting and piling vegetative debris and creating compact piles. Typical mechanical use on the Mt. Hood National Forest is grapple piling to reduce soil disturbance.

Pile Burning
Pile burning is the consumption of landing, hand and/or mechanical piles. The hand piles would contain woody material from brush, small trees, and other dead woody material found on the surface. Mechanical piles would contain woody material from within a treatment unit consisting of residual and activity fuels. The landing piles would contain the woody material (limbs, needles, bark and portions of the trunk) removed from the tree during the harvesting procedure. Landing piles are much larger than hand piles to disposes of the piled fuel concentrations. Pile burning would occur in the fall season. A burn plan would be written which outlines the parameters under which the burning would occur.

When possible, utilization of piles would be encouraged rather then burning. Utilization is dependent on existing market conditions. After thinning operations, there is a small amount of clean up remaining, which consists of burning the residual piles. Burning the pile eliminates the high concentrations (fuel loading) of woody material.

Mowing/Mastication
The treatment consists of mowing the understory of brush, small trees, and other vegetation. A mowing attachment is towed behind a dozer or tractor, or attached to the head of an excavator. The vegetation is chopped into small pieces and left on the surface. Ladder fuels are reduced by mowing thus reducing potential for crown fire initiation.

Underburning
Underburning is the use of prescribed fire underneath existing or residual trees to treat natural and /or created fuels, such as dead woody material, needle litter and dead brush. The majority of the units in the project area would require thinning and/or mowing before underburning could be done safely and effectively. Underburning unit boundaries would be coordinated with individuals from archaeology, silviculture, and fire management. In most of the units needing to be

underburned, the burning would be completed one to four years after the original hand piling or mowing is completed. The underburning is conducted in the spring and fall seasons. A burn plan would be written which outlines the parameters under which the burning would occur.

Underburning would occur in stands classified as existing in Fire Regime 1, as described in the Fire and Fuels section. A post-treatment review would determine the need for implementing the underburns.

Leave Tops Attached Yard
This method is used to harvest trees. Commercial harvest would occur in trees four inches up to 24 to 29 inches diameter breast height (DBH), depending on the species as specified in Table 2-2. Trees would be thinned from below to approximately 50 to 60 percent canopy closure, and to a basal area per acre determined for the stand type and future stand structure. A mechanized feller buncher or similar machinery, restricted to designated skid trails, or cable systems on steeper slopes would be used to remove any vegetative material to meet silvicultural and fuels needs. The tops and limbs are left attached to the last log of each tree as it is yarded to the landing. The tops and limbs are machine piled and burned at the landing or utilized as chips or fuel wood. Vegetation removal may be done over frozen ground or when soil conditions allow.

Fireline Construction
In the units to be underburned, firelines would need to be constructed to serve as control lines during burning operations. The firelines would be constructed either with hand crews with hand tools, with a small plow pulled by an ATV (all-terrain vehicle) or with another form of mechanized equipment (if needed due to fuels or topography). Firelines would be constructed to minimum standards needed to control the burns. Normally a 4 to 6 foot clearing with a 1 to 1.5 foot wide mineral soil line would be sufficient. All downed woody fuels would be cleared, but no duff, grasses or other ground cover would need to be removed. Brush may need to be cut out if line locations cannot avoid them.

Combined Fuel Treatments
In some instances, a combination of treatments would occur in the same unit, such as mowing/mastication, thinning, piling, pile burning, and underburning. Underburning would occur at least one year or possibly several years, after other treatments (hand pile, pile burn, thinning, and/or mastication).

All prescribed burning would occur under the guidance of a site-specific plan that would be developed for each burn area prior to ignition. The burn plan includes the weather and fire behavior prescriptions, resource needs, contingency plans, mitigations, smoke management requirements, lighting techniques, risk assessment, hazard analysis, and site specific resource objectives. Burn plans are written in accordance with the current 5140 directive (FM-5140), and must meet all required elements prior to approval of the plan by the District Ranger or Forest Supervisor.

Maintenance Treatments
It is expected that vegetation would return at varying rates, which would facilitate a staggered maintenance program. Most of the maintenance would include brush removal. Triggers would be established to determine when an area was ready for future treatment (e.g. when grass or trees

get to a certain height). Tall shrubs are reduced significantly after a thinning, but may return to pre-thin levels within 5-7 years (Wilson and Puettmann 2006). Prescribed burning and pile burning would be included as part of the maintenance plan.

Road Reconstruction/Maintenance

No new permanent road construction would be necessary. Road reconstruction and maintenance is necessary on haul routes identified for this project. Weak areas would be reconstructed as needed. These activities are described in Table 2-4. Only the activities needed for log hauling would be completed. Snowplowing may occur on all roads within the project area, if needed for implementation.

Table 2-4 list routes along with the length that could be used for haul. The table includes four categories for maintenance and reconstruction work that are recommended to be accomplished prior to commercial haul. The majority of the work would be accomplished with standard road maintenance specifications, including brushing, drainage maintenance and routine blading.

Table 2-4: Road reconstruction and maintenance needs for identified haul routes in Alternative 1

Road[1]	Miles	Brushing	Drainage[2]	Surface[3]	Blading[3]
1700000 From MP 0.00 to 4.00	4.00	X	X	X	X
1700000 From MP 4.00 to 4.80	0.80	X	X	X	X
1700000 From MP 4.80 to 8.66	3.86	X	X	X	X
1700000 From MP 8.66 to 11.03	2.37	X	X	X	X
1700013 From MP 0.00 to 0.70	0.72	X	X	X	X
1700660 From MP 0.00 to 2.34	2.34	X	X	X	X
1700661 From MP 0.00 to 1.21	1.21	X	X	X	X
1700663 From MP 0.00 to 0.35	0.35	X	X	X	X
1700664 From MP 0.00 to 0.22	0.22	X	X	X	X
1700720 From MP 0.00 to 0.40	0.40	X	X	X	X
1710000 From MP 0.00 to 0.93	0.93	X	X	X	X
1710000 From MP 0.93 to 2.30	1.37	X	X	X	X
1710620 From MP 0.00 to 0.13	0.13	X	X	X	X
1710630 From MP 0.00 to 0.94	0.94	X	X	X	X
1710631 From MP 0.00 to 0.40	0.40	X	X	X	X
1710640 From MP 0.00 to 1.28	1.28	X	X	X	X

Road[1]	Miles	Brushing	Drainage[2]	Surface[3]	Blading[3]
1710640 From MP 1.28 to 1.90	0.62	X	X	X	X
1710644 From MP 0.00 to 0.61	0.61	X	X	X	X
1710690 From MP 0.00 to 0.40	0.40	X	X	X	X
1711000 From MP 0.00 to 1.01	1.01	X	X	X	X
1711000 From MP 1.01 to 4.05	3.04	X	X	X	X
1711620 From MP 0.00 to 1.12	1.12	X	X	X	X
1711620 From MP 1.12 to 2.19	1.07	X	X	X	X
1711621 From MP 0.00 to 1.68	1.68	X	X	X	X
1711623 From MP 0.00 to 0.19	0.19	X	X	X	X
1711624 From MP 0.00 to 0.92	0.92	X	X	X	X
1711630 From MP 0.00 to 2.67	2.67	X	X	X	X
1711640 From MP 0.00 to 0.40	0.40	X	X	X	X
1711650 From MP 0.00 to 1.51	1.51	X	X	X	X
1720193 From MP 0.00 to 0.11	0.11	X	X	X	X
TOTAL MILES	**36.67**				

1 Roads are asphalt, gravel, and native surface.
2 Road drainage consists of ditch to culverts or insloped or outsloped surface to drain dips or berms.
3 Deep patching, patching and reconditioning of aggregate surface roads would use standard construction specifications. All work would be within the existing road structure.

Other Restoration Activities

In addition to the vegetation treatments and associated activities, this project includes restoration projects (road closures, road decommissioning, culvert replacement/removal, and trail construction/improvement). The road proposal includes implementing seasonal closures on approximately 7.6 miles of road, year-round closures on approximately 7.8 miles of road, and obliterating approximately 8.8 miles of road (see Table 2-5). All the roads proposed for decommissioning would be obliterated (remove road bed) at a minimum within sight distance from the main road. The remaining portion of the road would have the culverts and waterbars removed and the soil would be ripped. The culvert proposal includes removing/replacing 12 culverts on and off-Forest on roads that are under Forest Service jurisdiction (see Table 2-6). These road treatment proposals would serve to improve wildlife habitat, reduce the risk of spread of noxious weeds, improve water quality, and reduce the costs of road maintenance in the area.

Lastly, the Proposed Action includes designating and improving the non-motorized trail system within the planning area, as shown in the Proposed Action map (Figure 1-5). Approximately 7.6

miles of horse/hiking trails and approximately 8.8 miles of horse/hiking/biking trails are being proposed for improvement and/or construction. The trails would have a 24-inch wide tread with six to eight-foot clearing height depending on the site distance. All horse trails would have a 10-foot clearing height. Perennial and fish-bearing stream would have bridge as a stream crossing, and all stream crossing would meet the Aquatic Conservation Strategy.

Table 2-5: Proposed Road Closures and Decommissioning

Road #	Miles Closed
Seasonal Closures	
1711	2.83
1711630	2.67
1720193	2.14
Sub-total	**7.64**

Road #	Miles Closed
Year-Round Closures	
1710640	1.29
1700660	2.26
1700662	2.97
1700665	0.13
1700740	0.40
1711620	0.73
Sub-total	**7.78**

Road #	Miles Closed
Decommission	
1711650	1.46
Unnamed spur rod to 1710	0.49
1710643	0.3
1710644	0.87
1710630	0.48
1710631	0.27
1710632	0.09
1710690	0.27
1710620	0.25
1711640	0.22
1711620 from the 1711623 junction	0.57
N10911	1.7
1711624	0.61
1700013	0.7
1700663	0.3
1700664	0.2
Sub-total	**8.78**

Table 2-6: Proposed Culvert Replacements and Removals

Creek	Culvert	Location	Action
North Fork Mill Creek	1700-660	on-Forest	Replacement
	1700-663	on-Forest	Removal
Alder Creek	1721	on-Forest, in The Dalles Municipal Watershed	Replacement
West Fork Neal Creek	1700	on-Forest	Replacement
	1710	on-Forest	Replacement
	1700-710	on-Forest	Removal
	1700	~0.5 mile downstream of Forest boundary	Replacement
	1700-630	~0.5 mile downstream of Forest boundary	Replacement
	1700	~1.5 mile downstream of Forest boundary	Replacement
Tributary to West Fork Neal Creek	1700	~1.25 mile downstream of Forest boundary	Replacement
	1700-730	~1.0 mile downstream of Forest boundary	Replacement
Neal Creek	1710	~1.25 mile downstream of Forest boundary	Replacement

Alternative 2

Alternative 2 proposes to treat vegetation to discourage wildfire from spreading through National Forest land and into adjacent private land. Treatments would vary depending on the existing vegetative conditions. In total, approximately 1275 acres are proposed for some type of treatment. These treatments include restoration thinning, sapling thinning, cottonwood/aspen enhancement and underburning. Restoration thinning would only occur in previously harvested timber stands.

Table 2-7 summarizes the proposed vegetation treatments and Table 2-8 provides detailed treatments for the proposed units. Figure 2-3 shows the treatment units proposed under this alternative.

Table 2-7: Proposed vegetation treatments for Alternative 2

Treatment	Acres
Restoration Thin	594
Sapling Thin	25
Aspen Cottonwood Enhancement	47
Underburn	610
Total Acre	1276

Table 2-8: Treatment prescriptions by unit for Alternative 2

Unit	Treatment	Underburn	Existing Canopy Cover	Target Canopy Cover	Silviculture Remarks	Acres
7	Thinning	No	70	50		8
8	Thinning	No	60	40		5
10	Thinning	Yes	60	40	Root rot pocket.	136
11	Thinning	Yes	60	40		47
12	Thinning	Yes	65	45		24
13	Thinning	No	60	40	Second growth stand.	20
14	Thinning	Yes	55	40	Second growth stand.	58
15	Thinning	Maybe	60	40	Second growth stand. Leave lodgepole pine.	51
16	Thinning	Yes	50	40	Old selection cut.	10
24	Thinning	Yes	60	40	Second growth stand.	46
26	Thinning	Yes	70	40		35
28	Thinning	Yes	65	40		6
45	Thinning	Yes	60	30	Root rot pocket.	25
46	Thinning	Yes	60	30	Root rot pocket.	4
47	Thinning	No	50	25	Root rot pocket.	11
48	Thinning	Maybe	55	30	Root rot pocket.	14
50	Thinning	Maybe	50	40		46
52	Thinning	Yes	30	30		5
52C	Thinning	Yes	40	30		15

Unit	Treatment	Underburn	Existing Canopy Cover	Target Canopy Cover	Silviculture Remarks	Acres
56C	Thinning	Yes	55	40		15
63	Thinning	No	50	30	Root rot pocket.	13
70	Sapling thinning	Yes	75	45		11
71	Sapling thinning	Yes	40	30		6
72	Sapling thinning	Yes	25	25		7
81	Aspen/Cottonwood Enhancement	Yes	30	20		1
82	Aspen/Cottonwood Enhancement	Yes	50	30		24
83	Aspen/Cottonwood Enhancement	Yes	40	30		17
84	Aspen/Cottonwood Enhancement	Yes	60	40		1
85	Aspen/Cottonwood Enhancement	Yes	50	40		0
86	Aspen/Cottonwood Enhancement	Yes	30	20		1
87	Aspen/Cottonwood Enhancement	Yes	35	25		3
91	Underburn	Yes	50	40		549
92	Underburn	Yes	5	5		8
94	Underburn	Yes	5	5		53
TOTAL ACRES						**1275**

The thinning methods, stand objectives, aspen cottonwood/enhancement treatments, stream prescriptions, and other fuel reduction activities described in Alternative 1- Proposed Action would apply to the units proposed for treatment in this alternative. All the temporary roads needed to remove the timber from the commercially thinning units would be built, as indicated in Figure 2-2. The road reconstruction and maintenance needs would be reduced as detailed in Table 2-9. The other proposed restoration activities, including road closures/decommissioning, culvert removal/replacement, and trail construction/improvement would remain unchanged in this alternative.

Table 2-9: Haul Route Analysis for Alternative 2

Road[1]	Miles	Brushing	Drainage[2]	Surface[3]	Blading[3]
1700000 0.00 to 4.00	4.00	X	X	X	X
1700000 4.00 to 4.80	0.80	X	X	X	X
1700000 4.80 to 8.66	3.86	X	X	X	X
1700000 8.66 to 11.03	2.37	X	X	X	X
1700013 0.00 to 0.72	0.72	X	X	X	X

Road[1]	Miles	Brushing	Drainage[2]	Surface[3]	Blading[3]
1700660 0.00 to 2.34	First 0.4	X	X	X	X
1710000 0.00 to 0.93	0.93	X	X	X	X
1710000 0.93 to 2.30	1.37	X	X	X	X
1710640 0.00 to 1.28	1.28	X	X	X	X
1710640 1.28 to 1.90	0.62	X	X	X	X
1710644 0.00 to 0.61	First 0.35	X	X	X	X
1711000 0.00 to 1.01	1.01	X	X	X	X
1711000 1.01 to 4.05	First 2.50	X	X	X	X
1711620 0.00 to 1.12	1.12	X	X	X	X
1711620 1.12 to 2.19	1.07	X	X	X	X
1711624 0.00 to 0.92	0.92	X	X	X	X
1711630 0.00 to 2.67	2.67	X	X	X	X
1711650 0.00 to 1.51	1.51	X	X	X	X
1720193 0.00 to 0.11	0.11	X	X	X	X
TOTAL MILES	**27.61**				

1 Roads are asphalt, gravel, and native surface.
2 Road drainage consists of ditch to culverts or insloped or outsloped surface to drain dips or berms.
3 Deep patching, patching and reconditioning of aggregate surface roads would use standard construction specifications. All work would be within the existing road structure.

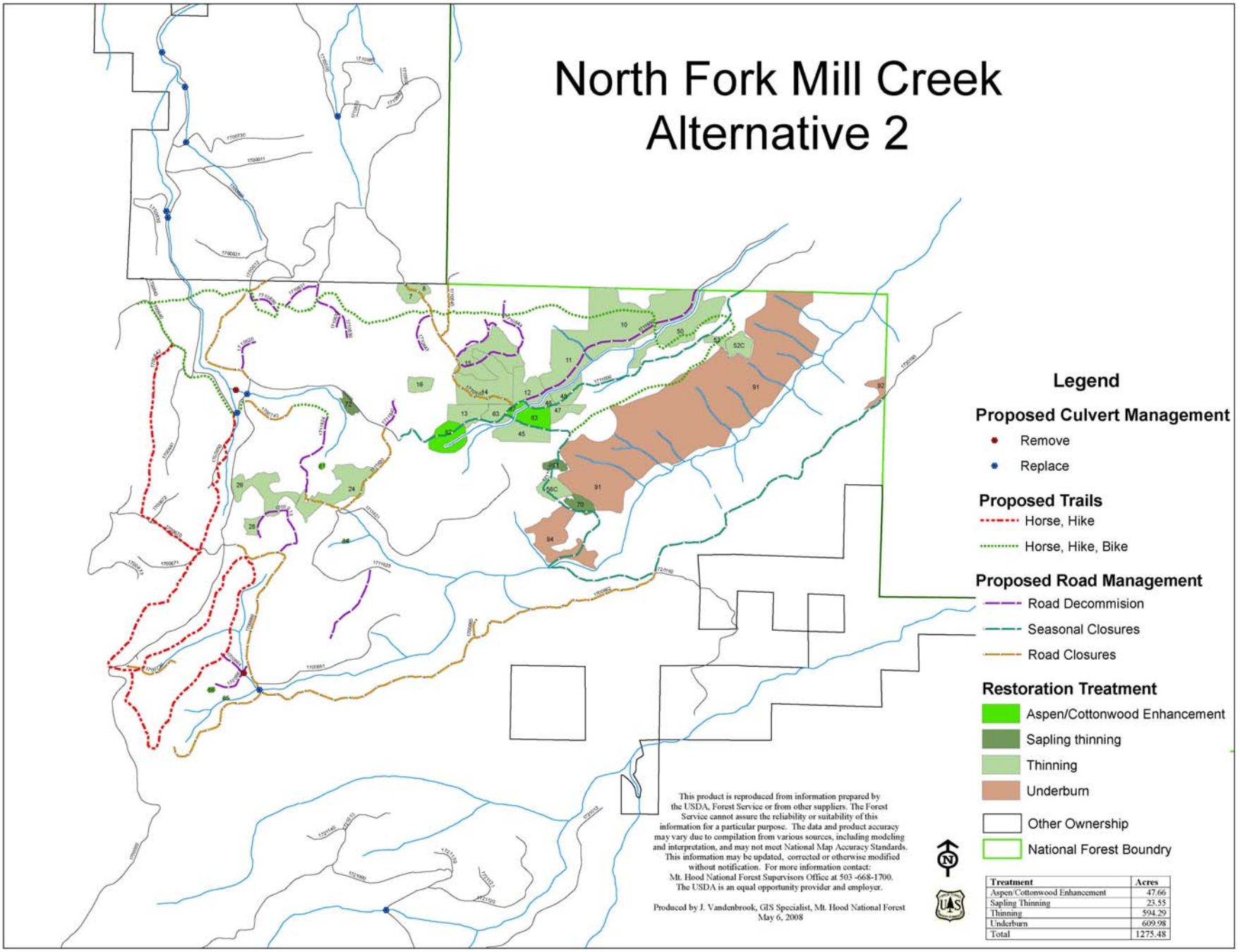

Figure 2-3: Alternative 2 Map

Design Criteria/Mitigation Measures for All Alternatives

The National Environmental Policy Act defines "mitigation" as avoiding, minimizing, rectifying, reducing, eliminating or compensating project impacts. The following design criteria and mitigation measures are an integral part of this project and would be carried out if the project is implemented under the Proposed Action or Alternative 2. In most cases, the effects analysis in Chapter 3 is based on these design criteria and mitigation measures being implemented.

Design Criteria/Mitigation Measures for Vegetation Treatments and Trail Proposals

Fuels:

1. Any mechanical slash piling within units would be done with equipment capable of picking up (grasping) slash material and piling (as opposed to pushing/dozing) thereby meeting the objectives of minimizing detrimental soil impacts. Piles would be covered with water resistant material meeting clean air standards to facilitate consumption of piled fuels. Piles need to be 4-feet wide, 4-feet long, and 6-feet high as a minimum*.
2. Hand piles would be constructed with enough fine fuels to allow for ignition during fall and winter months, and covered with water resistant material meeting clean air standards to facilitate consumption of piled fuels. Piles need to be 4-feet wide, 4-feet long, and 6-feet high as a minimum[1].
3. Piles should be as compact and free of dirt as possible.

Vegetation:

1. Patch opening size needs to be sufficient to provide for conditions suitable for early seral species establishment and growth (normally at least 1-acre in size). Generally, patch size should not exceed two acres. However, there may be instances where this would be allowed to address root disease issues. In these instances, the patches would be of irregular share (with scattered retention pockets) and of limited distribution/number within the unit.
2. Where the understory would be adversely affected, retained trees with a dwarf mistletoe rating of 2 or more would be girdled within unit boundaries.

Roads:

1. As appropriate, where haul route crosses streams on gravel or native-surface roads, roads should be improved to minimize the risk of delivering sediment to streams to the extent practicable. Haul would be restricted to the normal operating season (May 15-October 31), unless weather conditions permit operating outside of this window.
2. As appropriate, the roads should be treated for dust abatement during extreme dry weather.
3. If a proposal to implement winter logging is presented, the following would be considered by the District Ranger and Responsible Official if the ground is not frozen hard enough and/or insufficient snow depth to support the weight and movement of machinery in moist to wet soil conditions (these are based upon observations and monitoring of winter logging in Sportsman's Park):
    a. The proposal would be considered on a unit-by-unit basis using soil types in the area

[1] The Forest Service would meet an *average* width of 8-feet and height of 6-feet for mechanical and hand piles. From past experience with implementation, it is virtually impossible to maintain an exact dimension of fuel piles, so allowance for a small deviation would be made as long as this deviation doesn't jeopardize meeting the above stated goals.

since some soils may be more prone to detrimental damage than others.

b. Since the margin of difference between not detrimental and detrimental soil damage could be so slim under moist to wet soil conditions, monitoring of the logging activity may need to occur daily, or more, as agreed to by sale administrator and soil scientist.
c. Equipment normally expected to traverse the forest, such as feller bunchers, track mounted shears, etc., would be restricted to skid trails once soil moistures are such that even one or two trips are causing detrimental soil damage out in the unit (i.e., not on landings or skid trails).
d. When soils become fully saturated (approach their liquid limit), equipment with a pounds per square inch of 9 or higher would not be used. Typically rubber-tired equipment (e.g., skidders) would not be permitted under these conditions.

4. Locate new temporary roads and landings outside of Riparian Reserves. Use of existing facilities within riparian reserves may be allowed if erosion potential and sedimentation concerns could be sufficiently mitigated. All temporary roads and landings would be decommissioned immediately after harvest operations are completed.
5. Snowplowing would be restricted when a freeze/thaw condition is expected or when a saturated base and subgrade would result.
6. The contractor or permittee would be responsible for snow removal in a manner which would protect roads and adjacent resources.
7. Rocking or other special surfacing and drainage measures may be necessary before the operator would be allowed to use the roads after snowplowing.
8. After snowplowing, snow berms should be removed or breached to avoid accumulation or channelization of melt water on the road and prevent water concentration on erosive slopes or soils. If the road surface is damaged, the contractor or permittee shall replace lost surface material with similar quality material and repair structures damaged in the operations, unless otherwise agreed to in writing.

Soil Resource:

1. All skid trails would be rehabilitated immediately after harvest activities. Landings and temporary roads normally would have erosion control measures installed following fuels or reforestation treatments. If those treatments are anticipated to be delayed beyond the current field season, then temporary effective closure of roads would occur to prevent unauthorized use.
2. In commercial units, ground-based harvest systems should not be used on slopes greater than 30 percent to avoid detrimental soil and/or watershed impacts.

Riparian Areas*:*

1. No vegetation removal or manipulation, or hand piling slash would occur within 60-feet[2] of any perennial and 30-feet[2] of any intermittent streams, seeps, springs or wetlands. This would ensure current stream shading would remain unchanged and protect stream temperatures as well as reduce the likelihood of eroded material entering streams.
2. No wheeled or tracked motorized equipment would be allowed within 100-feet[2] of streams,

[2] The Forest Service would meet an *average* distance of 30-feet, 60-feet, or 100-feet from streams, seeps, springs or wetlands. From past experience with implementation, it is virtually impossible to maintain an exact distance from a wet area due to stream sinuosity and dense riparian vegetation so allowance for a small deviation would be made as long as this deviation doesn't jeopardize meeting the above stated goals.

seeps, springs or wetlands. This would reduce the chance of sediment delivery to surface water.

3. Fueling of gas-powered machinery would not occur within 150-feet of any live waters to maintain water quality. Each fueling area shall have a hazardous material recovery kit, including absorbent pads on site.
4. Use erosion control measures where de-vegetation may result in delivery of sediment to adjacent surface water. Soil scientists or hydrologists would assist in evaluation of sites to determine if treatment is necessary and the type of treatment needed to stabilize soils.
5. Any felled trees which fall into the 60-foot unmanaged area of perennial streams or the 30-foot unmanaged area of intermittent streams, seeps, springs or wetlands would be bucked at the unmanaged edge and only the portion of tree outside these areas could be removed.
6. Low severity burns[3] should constitute the dominant type of controlled burn within the Riparian Reserve, resulting in a mosaic pattern of burned and unburned landscape.
7. Moderate-severity burns[4] are permitted in no more than 20% of the Riparian Reserves to invigorate desirable deciduous species.
8. Ignition could occur anywhere in the Riparian Reserve as long as all other design criteria are met.
9. Burning activities excluded in the Riparian Reserves are as follows: No mechanical piles, mechanical fire line construction (e.g. dozer, small tractor etc.), or chemical fire retardants. Fireline construction is defined to mean activities that result in exposure of bare mineral soil. Hand fireline construction should be minimized within the Riparian Reserve and wet line or black line is preferred. An exception to this would be situation where fireline is needed to control burn intensity and spread due to unforeseen circumstances. In these situations, there would be an emphasis to mitigate any potential for sedimentation to streams.
10. All trails crossing perennial or fish-bearing streams would have a bridge as a stream crossing, including but not limited to West Fork Neal Creek and tributary to North Fork Mill Creek. All stream crossing would meet the Aquatic Conservation Strategy objectives.

Wildlife:

1. Known Northern spotted owl activity centers would be protected through the implementation of seasonal operating restrictions (March 1- July 15) for Units 41, 42, 47, 54, and 55. In the event that new activity center(s) is/are located during the period of the contract(s) seasonal operating restrictions would be implemented in the area affected.
2. No underburning may take place less than ¼-mile from spotted owl activity centers (between March 1 and July 15).
3. A seasonal operating restriction (restricting harvest and fuels treatment activities) for winter range would be implemented with this project from December 1 through April 1 for Units 10, 11, 12, 14, 15, 46 through 56, 70, and 71.
4. A seasonal closure of December 1 thru April 1 would apply to portions of trails that are

[3] Low severity burn is defined as: "Small diameter woody debris is consumed; some small twigs may remain. Leaf litter may be charred or consumed, and the surface of the duff may be charred. Original forms of surface materials, such as needle litter or lichens may be visible; essentially no soil heating occurs."

[4] Moderate severity burn is defined as: "Foliage, twigs, and the litter layer are consumed. The duff layer, rotten wood, and larger diameter woody debris is partially consumed; logs may be deeply charred; shallow ash layer and burned roots and rhizomes are present. Some heating of mineral soil may occur if the soil organic layer was thin."

within deer and elk winter range (B10 land allocation).
5. Rare and uncommon species needing protection would be designated on-the-ground prior to ground disturbing activities occurring.

Botany:
1. Buffer seep/spring habitat in Unit 95 by at least two site potential tree heights for *Botrychium minganense* (moonwort). A botanist would visit site to post buffer.
2. Buffer seep/spring habitat in sapling thinning treatment (Unit 25) for *Botrychium minganense* (moonwort). A botanist would visit site to post buffer.
3. Buffer grassland habitat by approximately 50-meters (164 feet) for Sickle-pod rockcress in grassland underburn (Unit 92) on the summit of Mill Creek Ridge. A botanist would visit site to post buffer.
4. Collect seed from Sickle-pod rockcress and native grasses during July to September 2008 and 2009 to sow into Unit 92 after proposed treatments completed.

Invasive Species:
1. It is recommended that "pre-treatment" occur before any harvest activities are implemented along roads 1700 (treatment sites #66-044 and #66-074), 1700-013 (treatment site #66-055), 1700-662 (treatment sites #66-081 and #66-033). If possible schedule implementation of work from infestation-free areas into infested areas rather than vice-versa.
2. Incorporate the standard contract provision that require cleaning of equipment.
3. The process for locating all new skid trails and landing locations would be coordinated with a noxious weed specialist so as to insure these locations are not within any currently established noxious weed populations. If necessary, pre-treat existing landings and skid trails that may be used for project implementation where existing infestations present an unacceptable risk of spreading established invasive plant populations.
4. If the need for restoration/revegetation of skid trails and landings is identified, the use of native plant materials are the first choice for meeting this objective where timely natural regeneration of the native plant community is not likely to occur. Non-native, non-invasive plant species may be used in any of the following situations: 1) when needed in emergency conditions to protect basic resource values (e.g., soil stability, water quality and to help prevent the establishment of invasive species), 2) as an interim, non-persistent measure designed to aid in the re-establishment of native plants, 3) if native plant materials are not available, or 4) in permanently altered plant communities.
5. If using straw, hay or mulch for restoration/revegetation in any areas, use only certified, weed-free materials.
6. Reforestation and restoration efforts should limit use of container stock or other practices where soils or other growing mediums are brought into the planning area.
7. Create a 3-5 year implementation plan for prescribed fire in areas that are dominated by invasive non-native grasses and noxious weeds. Include collection of fire tolerant perennial native bunch grasses for seed increase contract.
8. Inspect active gravel, fill, sand stockpiles, quarry sites, and borrow material for invasive plants before use and transport. Treat or require treatment of infested sources before any use of pit material. Use only gravel, fill, sand, and rock that is judged to be weed free by District or Forest weed specialists.

Recreation (Trails and Campgrounds):

1. Trees harvested within the 50-feet of Gibson Prairie Horse Camp would be felled directionally away from the camp
2. All landings and skid trails would be located at least 100-feet from Gibson Prairie Horse Camp unless blocked by topography from view.
3. All brush piles within 100-feet of Gibson Prairie Horse Camp would be disposed of within 1-year. Exceptions may occur under agreement with volunteers hosting at the horse camp.
4. All stumps within 100-feet of Gibson Prairie Horse Camp would be cut to 6-inches in height or less.
5. Prescriptions would meet the Partial Retention Visual Quality Objectives (VQO) in the area viewed from the Gibson Prairie Horse Camp.
6. The methods used to rehabilitate landings, skid trails and temporary roads would be designed to meet VQO within foreground of Gibson Prairie Horse Camp.
7. Ground disturbance and activity debris resulting from project activities within 1-year would become visually subordinate in the immediate foreground Gibson Prairie Horse Camp.
8. New trail construction would be coordinated with an archeologist.
9. All new trail construction would be made compatible with existing range pasture fences within the Long Prairie Grazing Allotment. The trails may be made compatible through measures, such as installing gates or walk-thoughs.

Heritage Resource Sites:

1. All designated cultural resource sites (excepting these described in heritage resource design criteria #3 below) requiring protection would have a 100-foot buffer zone where heavy machinery would be excluded. Treatment of vegetation by hand could still occur as necessary.
2. Prescribed burning may occur, but piling may not occur within the flagged buffer zones.
3. All culturally-modified trees or trees with insulator mountings would be avoided during harvest activities, unless otherwise specified by the archaeologist.

Design Criteria/Mitigation Measures for Road Decommissioning and Culvert Projects

1. Ensure that an experienced professional fisheries biologist, hydrologist or technician is involved in the design of road decommissioning and/or culvert removal/replacement projects. The experience should be commensurate with technical requirements of a project.
2. Follow the appropriate Oregon Department of Fish and Wildlife (ODFW) guidelines for timing of in-water work. Exceptions to the ODFW in-water work windows must be requested by the Forest or its contractors, and subsequently approved by ODFW.
3. Project actions would follow all provisions and requirements (including permits) of the Clean Water Act for maintenance of water quality standards as described by the Oregon Department of Environmental Quality.
4. All equipment used for restoration work shall be cleaned and leaks repaired prior to entering the project area. Remove external oil and grease, along with dirt, mud and plant parts prior to entering National Forest system lands. Thereafter, inspect equipment daily for leaks or accumulations of grease, and fix any identified problems before entering streams or areas that drain directly to streams or wetlands. This practice does not apply to service vehicles traveling frequently in and out of the project area that would remain on the

roadway.

5. Spill Prevention Control and Containment Plan (SPCCP) – The contractor would be required to have a written SPCCP, which describes measures to prevent or reduce impacts from potential spills (fuel, hydraulic fluid, etc). The SPCCP shall contain a description of the hazardous materials that would be used, including inventory, storage, handling procedures; a description of quick response containment supplies that would be available on the site (e.g., a silt fence, straw bales, and an oil-absorbing, floating boom whenever surface water is present.).
6. All trucks used for refueling shall carry a hazardous material recovery kit, including absorbent pads to be used during refueling if that occurs in the project area. Any contaminated soil, vegetation or debris must be removed from National Forest System Lands and disposed of in accordance with state laws.
7. Refuel mechanized equipment at least 150 feet from water bodies or as far as possible from the water body where local site conditions do not allow a 150-foot setback to prevent direct delivery of contaminants into water.
8. Absorbent pads would be required under all stationary equipment and fuel storage containers.
9. Dispose of slide and waste material in stable sites out of the flood prone area. Waste material other than hardened surface material (asphalt, concrete, etc) may be used to restore natural or near-natural contours.
10. Trees that need to be felled during project implementation should be directionally felled, where feasible, away from the road prism and into the surrounding forest. Trees would not be bucked and would be left undisturbed to the extent possible.
11. Prior to implementation of any road decommissioning, culvert removal, or culvert replacement invasive plant surveys should be performed at the project site(s). If any invasive plants are found on or near roads, the full extent of the invasion should be determined by surveying off road to the extent that it is reasonable to assume the invasive species may have spread. The invasive plant infestations should then be mapped and weed site reports completed. Depending upon the seriousness of the weed invasion, as determined by a trained botany or noxious weed coordinator, recommendations for treatment of the weed site(s) would be made and an updated Noxious Weed Risk Analysis and Mitigation Report would be prepared.
12. Inspect active gravel, fill, sand stockpiles, quarry sites, and borrow material for invasive plants before use and transport. Treat or require treatment of infested sources before any use of pit material. Use only gravel, fill, sand, and rock that is judged to be weed free by District or Forest weed specialists.
13. Place sediment barriers prior to construction around sites where significant levels of fine sediment may enter the stream directly or through road ditches. Maintain barriers throughout construction.
14. For road decommissioning projects within riparian areas, re-contour the road prism to mimic natural floodplain contours and gradient to the greatest degree possible.
15. Drainage features used for stormproofing projects should be spaced to disconnect road surface runoff from stream channels.
16. Minimize disturbance of existing vegetation in ditches and at stream crossings to the greatest extent possible.
17. Conduct activities during dry-field conditions—low to moderate soil moisture levels.

18. Restore the stream channel and banks to original pre-road (natural) contours as much as possible when culverts are removed from the road prism.
19. When removing a culvert from a non-fishing bearing stream, aquatic specialists shall determine if culvert removal should follow design criteria outlined below in the Culvert Replacement section. Culvert removal on fish bearing streams shall adhere to the Culvert Replacement design criteria.

Culvert Replacement Only:

1. Follow stream simulation design requirements for all new stream crossings (i.e. match, to the degree possible, stream width, slope, and substrate conditions with up and downstream conditions).
2. Rip Rap – The use of riprap is permissible above bankfull height to protect the inlet or outlet of new culverts or open-bottomed arches. If the use of riprap is required for culvert stability, then additional analysis may be required to ensure that the structure is not undersized. Riprap may only be placed below bankfull height when necessary for protection of abutments and pilings for bridges. However, the amount and placement of riprap around the abutments and/or pilings should not constrict the bankfull flow.
3. Grade Control Structures – Grade control structures are permitted to prevent headcutting above or below the culvert or bridge where natural channel regarding is not desired. Grade control typically consists of boulder structures that are keyed into the banks, span the channel, and are buried in the substrate.
4. Road Dips – Where applicable, incorporate road dips into stream crossing design, to ensure catastrophic flood events would transport overflow back into the stream channel instead of onto the road bed.
5. Structures containing concrete must be cured or dried before they come into contact with stream flow.
6. When removing woody debris from the road-crossing inlet, place the debris downstream of the road crossing.
7. In streams where fish are present above and/or below the culvert a fish collection and removal procedure shall be implemented prior to dewatering (see below) and construction. The project area shall remain isolated using block nets or some other means during the construction period.
8. **Dewater Construction Site**: The preferred method for replacing a culvert involves dewatering the construction site to minimize impacts to water quality and fish populations. Upstream of the isolated construction area, divert flow around the construction site with a coffer dam (built with non-erosive materials) and an associated pump or a by-pass culvert. Pumps must have fish screens and be operated in accordance with NMFS fish screen criteria (NMFS 1995). Dissipate flow energy at the bypass outflow to prevent damage to riparian vegetation or stream channel. If diversion allows for downstream fish passage (i.e., is not screened), place diversion outlet in a location to promote safe reentry of fish into the stream channel, preferably into pool habitat with cover. When necessary, pump seepage water from the de-watered work area to a temporary storage and treatment site or into upland areas and allow water to filter through vegetation prior to reentering the stream channel.
    - **Stream Re-watering**: Upon project completion, slowly re-water the construction site to prevent loss of surface water downstream as the construction site streambed

absorbs water and to prevent a sudden increase in stream turbidity. Monitor downstream during re-watering to prevent stranding of aquatic organisms below the construction site.

Mt. Hood Land and Resource Management Plan Consistency

Standards and guidelines in the Mt. Hood Forest Plan were not written to address hazardous fuels reduction. When the Mt. Hood Forest Plan was written, it emphasized traditional timber sales, rather than fuels reduction projects. The following standards would not be met with either Alternative 1-Proposed Action or Alternative 2.

- Organic Matter (FW-033): At least 15 tons per acre of dead and down woody material in eastside vegetation communities…should be maintained and evenly distributed across managed sites.

  It is likely organic matter tonnage would be reduced to levels below Forest Plan Standard FW-033, especially in the higher fire frequency areas and on the south and west slopes. Since the overarching goal of the hazardous fuel reduction project is to reduce organic matter available to burn, it is a trade-off to meet the purpose and need. Fine organic matter levels should trend upward as the forest floor in higher fire frequency areas increase in shrubs, forbs, and grasses. Also, it is likely localized acreage would be lower than Forest Plan standards for organic matter, which is an intention of the proposed action for a hazardous fuel reduction project. When this occurs, it is not expected to be a substantial impact to nutrient cycling because these are not clearcuts followed by intense burning and extreme loss of current and future organic matter. Many of the soils impacted would retain substantial organic matter reserves in the mineral topsoil due the way in which they have developed. See Chapter 3, Soil Productivity for more details.

- Silvicultural Systems (FW-333): Uneven-age management should not be applied on slopes where cable logging systems would be necessary (30+% slopes).

- Silvicultural Systems (FW-337). Uneven-aged management should not be applied where stands are moderately to heavily infected with dwarf mistletoe.

  Silvicultural systems refer to whether even-aged or uneven-aged management should be applied. Even-aged systems are regeneration harvests, including clearcutting, seed tree, and shelterwood cuts. The Forest Plan recommends an even-aged system on slopes over 30 percent because the residual trees in an uneven aged harvest system are often damaged with cable logging systems. Even-aged management is also the preferred approach when treating stands with dwarf mistletoe because of the spread of the parasitic plants to healthy trees under the canopy of infected trees. These Standards (FW-333 and FW-337) are not being met because the silvicultural prescriptions specify appropriate mitigation measures in management areas where uneven-aged management is being considered to fulfill resource objectives other than timber production (Forest Plan, Four-88). The objective of this project is fuels reduction while maintaining structure for aesthetics, wildlife, nutrient cycling, future stand composition and health. Mitigation measures

create patch openings, girdle mistletoe-infected trees, underburn, and use directional falling techniques to limit residual tree damage on cable logged slopes which are part of the design of the proposed action. The expected condition after harvest is reduced mistletoe infestation creating a more open forest with a greater grass, forb, and shrub undergrowth. See Chapter 3, Vegetation Resources section for more details.

Exceptions to these standards are required to meet the purpose and need of effective fuel reduction. These exceptions were identified during the interdisciplinary planning analysis and the IDT process concluded that these exceptions were within the purpose and need for action. Exceptions are allowed under the Forest Plan, if they are identified during the interdisciplinary process. All other standards and guidelines are expected to be met with this proposal.

NFMA Findings for Vegetation Manipulation:
As required by regulations (FSH 1909.12 5.31a), "all proposals that involve vegetative manipulation of tree cover for any purpose must comply with the seven requirements found at 36 CFR 219.27(b)." All of these requirements are met by the project.

Suitability for Timber Production
The primary objective of the proposal is fuel reduction rather than timber production. As a pre-cursor to the silvicultural diagnosis process, however, stand examinations are conducted to determine existing stand conditions, and a determination of suitability (in regard to management of the stand for timber production) is made for each stand. Stands proposed for harvest treatment were examined for suitability in accordance with 36 CFR 219.13, Timber resource land suitability. Stands were found to be suitable for timber management based upon the following:

- Meet the definition of forestland as described in 36 CFR 219.3.

- Technological feasibility exists to ensure soil productivity and watershed protection. All sites considered for treatment would use established harvesting and site preparation methods. In combination with resource protection standards in the Forest Plan and applicable Best Management Practices, these methods would be sufficient to protect soil and water resource values.

- There is reasonable assurance that lands could be restocked within 5 years of final harvest (this generally does not apply to the proposed harvest units, as they would be thinned. Small openings in root disease pockets would be regenerated with rot resistant species.).

Suitability for uneven-aged management
Forest Plan guidelines advise against uneven aged management in stands with dwarf mistletoe and/or root disease. Even-aged management is the effective way to manage dwarf mistletoe and root disease. The Forest Plan states: "However, silvicultural prescriptions may specify appropriate mitigation measures in Management Areas where uneven-aged management is being considered to fulfill resource objectives other than timber production" (Mt. Hood FP Four-88). The resource objective here is hazardous fuels reduction while maintaining structure for aesthetics, wildlife, nutrient cycling, and future stand composition and health. Project design features/mitigation measures such as patch openings and girdling mistletoe-infected residual overstory trees are written into the design of the proposed action to meet Forest Plan direction.

REGULATORY FRAMEWORK

Best Management Practices included in Alternatives 1 and 2
According to the Northwest Forest Plan, Best Management Practices (BMP) would be incorporated into the implementation of the project. BMP are drawn from General Water Quality Best Management Practices, Pacific Northwest Region (November 1988) and the Draft Environmental Protection Agency Region 10 Source Water Protection Best Management Practices for USFS, BLM (April 2005).

Consistency with the Healthy Forest Restoration Act and the Northwest Forest Plan for Alternatives 1 and 2
Old growth stands: The Healthy Forest Restoration Act (HFRA) (H. R. 1904-8) requires that projects designed under its authority fully maintain, or contribute toward the restoration of, the structure and composition of old growth stands according to the pre-fire suppression old growth conditions characteristic of the forest type, taking into account the contribution of the stand to landscape fire adaptation and watershed health, and retaining the large trees contributing to old growth structure. Section 102(e)2 states HFRA projects should "fully maintain, or contribute toward the restoration of, the structure and composition of old growth stands according to the pre-fire suppression old growth conditions characteristic of the forest type, taking into account the contribution of the stand to landscape fire adaptation and watershed health, and retaining the large trees contributing to old growth structure."

This project would retain the structure and composition of pre-fire suppression old growth by promoting fire-adapted species where their health condition does not threaten the overall health of the stand. Also, the treatments would not impact the Special Old Growth Area (A7) in the planning area.

HFRA provides that old growth direction in the Northwest Forest Plan Record of Decision is sufficient to meet the requirements of the Act. The Northwest Forest Plan Record of Decision recognizes that large-scale disturbances, such as fire, could eliminate spotted owl habitat on hundreds or thousands of acres. Elevated risk levels are attributed to changes in the characteristics and distribution of the mixed conifer forests resulting from past fire protection. Management activities designed to reduce risk levels are encouraged in Late Successional Reserves even if a portion of the activities must take place in currently late successional habitat (S &G C-13, ROD).

Large tree retention: HFRA Section 102(f) states that projects should be carried out in a manner that "(A) focuses largely on small diameter trees, thinning, strategic fuel breaks, and prescribed fire to modify fire behavior, as measured by the projected reduction of uncharacteristically severe wildfire effects for the forest type (such as adverse soil impacts, tree mortality or other impacts); and (B) maximizes the retention of large trees, as appropriate for the forest type, to the extent that the trees promote fire-resilient stands."

The proposed treatments meet this requirement by retaining large trees suitable to the site in mature stands, and reducing stand density that has increased since the exclusion of fire. Large trees would be retained where they do not threaten the overall health of the stand. Trees with dwarf mistletoe threaten the overall health of the stand and would either not be retained or would

be girdled. The HFRA states that the large tree retention requirement must not prevent agencies from reducing wildland fire risk to communities, municipal water supplies, and at-risk Federal land.

COMPARISON OF ALTERNATIVES

This section provides a summary of the effects and trade-offs of No Action Alternative, verses implementing either the Proposed Action or Alternative 2. It compares the three alternatives in terms of how they meet project objectives (purpose and need as stated in Chapter 1) and how they address concerns/issues identified during public scoping. Information in the table is focused on activities and effects where different levels of effects or outputs can be distinguished quantitatively or qualitatively among alternatives.

Table 2-10: Comparison of Alternatives in Relation to Management Objectives and/or Issues Identified by the Public

Objective or Issue	No Action	Alternative 1 Proposed Action	Alternative 2
Overall Purpose To conduct restoration activities within the North Fork Mill Creek planning area to effectively reduce fuel loadings	No hazardous fuels reduction treatment would be implemented. High fuel loadings would remain throughout the planning area. All fuel loadings are capable of sustaining a stand-replacing fire in the area.	Hazardous fuel reduction treatments would be implemented on **2802 acres** (42% of planning area). Surface fuels would be reduced to 15 tons per acre. Flame length and rate of spread in the event of a fire start would be decreased, allowing suppression forces to safely and effectively contain and control a fire in the area.	Hazardous fuel reduction treatments would be implemented on **1276 acres** (19% of planning area). Surface fuels would be reduced to 15 tons per acre. Flame length and rate of spread in the event of a fire start would be decreased, allowing suppression forces to safely and effectively contain and control a fire in the area.
Objective Reduce risk of loss of healthy large diameter/remnant ponderosa pine, Douglas-fir, and western larch trees	No treatments would occur in Douglas-fir dominated forests of concern, located on the warm, dry/moist grand fir Douglas-fir habitat associations. No additional protection would be offered to large diameter/remnant trees.	Most of the fuels reduction treatment proposed occurs within the Douglas-fir dominated forests of concern, located on the warm, dry/moist grand fir Douglas-fir habitat associations. About **1432 acres** of this type would change from what is currently dense, mostly closed canopy forest to a semi-open condition, which offers more protection to large diameter/remnant trees.	A small representation of the fuels reduction treatment proposed occurs within the mixed conifer stands located on the warm, dry/moist grand fir Douglas-fir habitat associations. About **166 acres** of this type would change from what is currently dense, mostly closed canopy forest to a semi-open condition, which offers more protection to large diameter/remnant trees.
Objective Restore stand health to improve resiliency to insects and disease	The dense, multi-canopied Douglas-fir and grand fir dominated forests in the area are perfect conditions for the proliferation of root disease and particularly favorable to dwarf mistletoe on Douglas-fir. Most of the stands in the	Dwarf mistletoe populations would reduce with the proposed treatments. Thinning and small patch openings would reduce root-to-root contact and promote the growth of species in the stands that are resistant or have an	Dwarf mistletoe populations would reduce with the proposed treatments. Thinning would reduce root-to-root contact and promote the growth of species in the stands that are resistant or have an increased tolerance to root

Objective or Issue	No Action	Alternative 1 Proposed Action	Alternative 2
	watershed have some level of root disease present. Highly susceptible species for root rot include Douglas-fir, grand fir, mountain hemlock, and white fir.	increased tolerance to root disease. Trees with improved vigor would be more resistant to root disease as well as the commonly associated insects.	disease in a limited capacity with fewer patch openings associated with Alternative 1.
Objective Maintain the health and vigor of established Douglas-fir understories within stands previously partially harvested	The degree of mistletoe infection in the younger Douglas-fir trees (<120 years) varies from very low levels in some stands to very high levels in others. Generally, where heavily infected Douglas-fir overstory exists, the infection level in the adjacent and understory trees is also high and would be expected to continue to increase as long as the source of infection exists.	Vigor of established Douglas-fir understories would improve in the treated stands in proportion to the treated overstory stands. This alternative treats approximately **1,432 acres** of currently dense, mostly closed canopy warm, dry/moist grand fir Douglas-fir forest.	This alternative treats approximately **166 acres** of currently dense, mostly closed canopy warm, dry/moist grand fir Douglas-fir forest.
Objective Decrease the rate of spread of laminated root rot and dwarf mistletoe	In the absence of fire, root decay has become very active, probably outside its range of natural variability in these stands. Fire does not eliminate root disease, but there is evidence that it slows it down, especially when its host is consumed. Dwarf mistletoe spread rate is fastest in the multi-storied stands where mistletoe seeds from infected overstory trees “rain down” on susceptible understory trees.	Alternative 1 would work toward restoring healthy forest conditions on **1234 acres** of mixed conifer stands with a high incidence of root disease and/or dwarf mistletoe. Alternative 1 would treat **584 acres** of hot, dry pine/oak and Douglas-fir stand group containing root disease and/or dwarf mistletoe.	Alternative 2 treats **97 acres** of mixed conifer stands with a high incidence of root disease and/or dwarf mistletoe. Alternative 2 would treat **350 acres** of hot, dry pine/oak and Douglas-fir stand group containing root disease and/or dwarf mistletoe.

Objective or Issue	No Action	Alternative 1 Proposed Action	Alternative 2
Objective Restore wildlife habitat, including the unique aspen stands, within the planning area	Aspen are present in four areas in the North Fork Mill Creek Planning area primarily found in moist areas along stream corridors. Decline of aspen stands is attributed to natural succession (e.g., invasion of conifers), fire suppression, and over browsing by domestic livestock and native ungulates.	Both Alternatives 1 and 2 enhance approximately **45 acres** of aspen/cottonwood stands to restore wildlife habitat. Reducing hazardous fuels and improving forest health, wildlife habitat is restored and/or improved throughout the planning area.	Both Alternatives 1 and 2 enhance approximately **45 acres** of aspen/cottonwood stands to restore wildlife habitat. Reducing hazardous fuels and improving forest health, wildlife habitat is restored and/or improved throughout the planning area. This alternative would improve less wildlife habitat because fewer acres are treated.
Objective Restore wildlife security and aquatic integrity within the planning area while integrating the public's need for access	No restoration projects would be completed within the planning area. Road densities and public access would remain unchanged.	The road proposal includes implementing seasonal closures on approximately 7.6 miles of road, year-round closures on approximately 7.8 miles of road, and obliterating approximately 8.8 miles of road. The culvert proposal includes removing/replacing 12 culverts on and off-Forest on roads that are under Forest Service jurisdiction. Approximately 6.0 miles of horse/hiking trails and approximately 7.5 miles of horse/hiking/biking trails are being proposed for improvement and/or construction. All restoration projects are included in both Alternative 1 and 2.	
Issue <u>Canopy Fuels Reduction</u>: Removing canopy fuels can reduce crown-to-crown fire spread, but the science clearly shows that removing canopy cover can also increase fire hazard by increasing solar insolation which causes fuels to warm and dry and increases wind speeds.	No canopy fuels would be removed. There would be no increase to fire hazard or reduction in the fire rate of spread.	Opening crown spacing reduces the probability of a wildland fire transition from a surface fire to a crown fire. Although opening the crown spacing could increase surface rates of spread, it also makes the fire easier to control. Approximately **2131 acres** would be commercially thinned (canopy fuel reduction) under this alternative.	Approximately **594 acres** would be commercially thinned (canopy fuel reduction) under this alternative.

Objective or Issue	No Action	Alternative 1 Proposed Action	Alternative 2
Issue Large Tree Retention: The Mill Creek watershed has a severe shortage of large diameter old-growth trees.	No large diameter old-growth trees would be removed. No change in existing conditions, as described in the Vegetation Resource section of Chapter 3.	Field visits and GIS data layers do not indicate a shortage of large diameter old-growth trees within the watershed. Within the planning area, large trees would be retained where appropriate as indicated in the stand objective table. Leaving all large trees would not meet the purpose and need for this project due to the infestations of dwarf mistletoe.	Additional large trees would be retained under this alternative because fewer acres are treated. Within the treated acres, large trees would be retained where appropriate as indicated in the stand objective table.
Issue Forest Health: The current plan appears to prescribe 1-2 acre clear cuts to deal with root rot pockets. This treatment will result in significant negative ecosystem and hydrologic impacts.	No root rot pockets would be treated. No change in existing conditions, as described in the Vegetation Resource section of Chapter 3.	The impacts of create 1-2 acre patch openings to treat root rot pockets is addressed by each resource area in Chapter 3. No significant effects to ecosystem or hydrologic function were identified.	Fewer root rot pockets are treated under Alternative 2.
Issue Snags and Down Logs: There is a shortage of large down wood and snags across the landscape due to extensive logging over the past century.	The Forest Plan recommends a 40% biological potential (0.9 snags/acre) for cavity nesting species across the landscape and a 60% biological potential (1.35 snags /acre) in new timber harvest units. The planning area meets the 40% level. The majority of the mature stands within the planning area exceed the 100% biological potential (2.25 snags/acre).	The proposed project area is between 30 and 80 percent snag and down wood levels as outlined in the DecAID Advisor. The 30 percent levels are generally associated with previously harvested areas and the pine/oak habitat. The 80 percent levels are generally located in unharvested portions of the project area and the Surveyor's Ridge LSR. The proposed project would retain snags and down wood at the	Additional snags and down logs would be retained through the planning area because fewer acres are treated. For treatment units, the impacts would be similar to those described in Alternative 1.

Objective or Issue	No Action	Alternative 1 Proposed Action	Alternative 2
		30 to 50 percent level in the planning area. This project would maintain a minimum of 120 linear feet of down woody material and 4 snags/acre would be retained	
Issue Road Density: The current road density in this area is significantly higher than it should be even under the forest plan guidelines.	Current road densities for the planning area are 3.36 mile per square mile total road density and 2.24 miles per square mile for open roads. This is less than the 2.5 miles of open road density of the Forest Plan Standards and Guideline. Open road density in inventoried winter range is 1.91 miles open road density per square mile. This is within the 2.0 miles of open road density of the Forest Plan Standards and Guideline. For Deer/Elk Winter Range, the open road density is .11 miles per square mile. This is within the 1.5 miles of open road density of the Forest Plan Standards and Guideline.	Under Alternatives 1 and 2, road densities for the planning area would be reduced to 2.88 mile per square mile total road density and 1.72 miles per square mile for open roads. Open road density in inventoried winter range is 0.87 miles open road density per square mile. All of these road densities are below the standards and guidelines established in the Forest Plan. For Deer/Elk Winter Range, neither alternative would result in any open roads during the seasonal closure that would exceed the 1.5 miles of open road density of the Forest Plan Standards and Guideline for this allocation.	
Issue Temporary Roads: While we feel that temporary road construction is more appropriate than permanent road construction, temporary roads still channelize water,	No temporary roads would be constructed.	Under Alternatives 1 and 2, temporary roads would be rehabilitated after project implementation. New temporary roads would not exceed a total of 1-mile in the North Fork Mill Creek planning area. Figure 2-2 shows the proposed temporary roads.	

Objective or Issue	No Action	Alternative 1 Proposed Action	Alternative 2
cause erosion, and conduct invasive weeds.			