

# Chapter 2: Alternatives Considered

## Introduction

This chapter describes and compares the alternatives considered for the Hemlock Elk Fuels Reduction and Forest Health Project. The alternatives for the Hemlock Elk Project were developed from the issues identified by the ID Team, the public, and other agencies. The ID Team grouped the alternatives into one of two categories depending upon how they met the Purpose and Need for the project and their feasibility. These categories are “alternatives considered in detail” and “alternatives not considered in detail.” Rationale is given for those alternatives not studied in detail.

This chapter also includes a description and map(s) of the alternatives considered, activities common to all alternatives, and a comparison of these alternatives focusing on the significant issues. This comparison of alternatives provides a basis for choice among the options for the decision maker and the public (40 CFR 1502.14).

## Public Involvement and Scoping Process

The CEQ defines scoping as:

“... an early and open process for determining the scope of issues to be addressed and for identifying the significant issues related to a proposed action” (40 CFR 1501.7)

Among other things, the scoping process is used to invite public participation, to help identify public issues, and to obtain public comment during the EA process. Scoping should begin early and continue until a decision is made. To date, the public has been invited to participate in the following ways.

### Public Mailing

On January 29, 2008, information on the Hemlock Elk Project (including a vicinity map and a map of the proposal) was mailed out (Project File Exhibit B-11). This information was mailed to approximately 290 individuals, agencies, and groups.

### Public Notice

A request for comments on the Hemlock Elk Fuels Reduction and Forest Health Project was published in *The Daily Interlake* on February 2, 2008 (Project File Exhibit B-67). Notification of this project proposal appeared in the January 1, 2008, April 1, 2008, and July 1, 2008, USDA Forest Service’s Schedule of Proposed Actions (SOPA) (Project File Exhibits B-69, B-70, and B-71).

The Swan Lake Ranger District received approximately 45 responses, either in the form of letters, e-mails, or telephone contacts on the Hemlock Elk Project.

On May 5, 2008, a Field Trip to the Hemlock Elk Project Area was held. This Field Trip was scheduled at the request of the Swan Ecosystem Center (SEC). In addition to Forest Service Representatives, six members of the public participated in the Field Trip.

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On May 30, 2008, another Field Trip was conducted in the Hemlock Elk Project Area. On this day, in addition to Forest Service personnel, 17 members of the public participated in the Field Trip (Project File Exhibit B-66).

## Issues

The ID Team reviewed and compiled a list of potential issues based upon comments from the public, organizations, and government agencies. These issues were then evaluated against the following criteria to determine the appropriate method for resolution:

- Is the issue relevant to and within the scope of the purpose and need, the decisions being made, and does it pertain directly to the Proposed Action?
- Is the issue already decided by law, regulation, or existing plans. Is it supported by scientific or factual evidence?
- Could the issue be resolved through design and location of activities in the Proposed Action or mitigated by avoiding the impact of not taking action, minimizing the impact by limiting the action, rectifying the impact by rehabilitation, reducing the impact by maintenance, or compensating for the impact by replacement?

Issues representing an unresolved conflict with the Proposed Action have been brought forward as “major issues” and were used to help formulate the alternatives to the Proposed Action. Project File Exhibit D-1 provides a detailed description of the issues identified during the scoping process and describes how those issues were accounted for during the analysis process.

## Key Issues for Alternative Development

During the issues content analysis and disposition process, the ID Team and District Ranger identified the following “key” issues, for which action alternatives were developed.

### 1. Spread of Noxious Weeds

There were concerns (both internally and externally) that the proposed actions would spread weeds. Examples of concerns about the Proposed Action follow:

- Management activities could increase the risk of weed spread to Sections 16 and 22. These sections are particularly vulnerable since it is moist (many wetlands), largely weed-free, and fairly unroaded.
- How will this project reduce or spread noxious weeds? (Project File Exhibit B-52)

**Issue Indicator:** Acres of winter logging.

### 2. Regeneration Harvest

- With adjacent lands already heavily cut, is it necessary to treat these areas as extensively as what the District has proposed? (Project File Exhibit B-48)
- Some comments received viewed roads and lack of hiding cover as “forest health” problems, and that elements of the proposed action exacerbate these problems by improving roads, building more roads, and reducing wildlife hiding cover through clear-cutting, seed tree cuts, and various forms of salvage logging and thinning (Project File Exhibit B-51).
- Some comments received stated that clearcut logging adjacent to roadless areas would decrease habitat security and could possibly increase grizzly bear deaths. In addition, there was concern that harvest activities could also open up the forest understory and contribute to illegal motorized use. Some comments assert that there are plenty of clearcuts and roads in the Swan Valley but little low elevation secure habitat (Project File Exhibit B-52).

- Some concerns were expressed during scoping that the checkerboard ownership with Plum Creek Timber Company has contributed to the fragmentation of wildlife habitat. This, in turn, led to concerns of whether the proposed action would impact old-growth forests by either building roads in or adjacent to old-growth forest and/or placing seedtree/clearcut units adjacent to old-growth forest (Project File Exhibit B-52).
- Some comments from the public expressed a concern that the commenters would not like to see larger areas of clearcut, as has been done in the past. (Project File Exhibit B-43).
- A particular concern expressed in some comments is the aggressive tree removal in Section 16 of the proposal map. This concern sought assurance that Elk Creek would not be environmentally violated with so much activity in that area (Project File Exhibit B-45).

**Issue Indicator:** Acres of regeneration harvest.

### Other Concerns Evaluated

The team evaluated other concerns that helped frame the scope of the analysis during the scoping process. These concerns were not considered major issues because they were resolved through project design and, therefore, were not used to develop alternatives analyzed in detail. These concerns are addressed within the effects analysis by resource in Chapter 3 of this document.

**Threatened, Endangered, and Sensitive (TES) Wildlife, Fish, and Plant Species:**  
Commenters expressed concern over how the proposed action would affect TES species including grizzly bear, Canada lynx, bull trout, and water howellia. Design Criteria would be incorporated into the EA to address these concerns. In addition, all applicable laws and regulations would be met in the design and implementation of this project (Project File Exhibit B-48).

## Range of Alternatives

Section 102(2)(3) of the NEPA states that all Federal agencies shall “study, develop, and describe appropriate alternatives to recommended courses of action in any proposal which involves unresolved conflict concerning alternative uses of available resources.”

An EA must also “rigorously explore and objectively evaluate all reasonable alternatives.” The courts have established that this direction does not mean that every conceivable alternative must be considered, but all selection and discussion of alternatives must permit a reasoned choice and foster informed decision making and informed public participation.

The range of alternatives may extend beyond the limits set by Forest Plan goals and objectives under the NEPA; however, the NFMA requires that the selected alternative fully comply with the Forest Plan, unless the plan is amended in accordance with 36 CFR 219.10(f).

The range of alternatives presented in this chapter was determined by evaluating public and internal comments and the Purpose and Need for this project. This project is intended to maintain or create resource conditions that are within the range of natural (historical) variability (HRV) – conditions which might be expected to occur under natural disturbance and succession regimes. By moving toward this condition, we can be more assured that the forest and ecosystem remain in a healthy and sustainable condition over time. The vulnerability of the forest to possible severe and undesirable effects of fire, insects, disease, or other unforeseen events would be reduced, creating a forest that is more resilient in the face of inevitable change and future uncertainties, providing for flexibility, and a wide variety of possible future resource and management needs.

Other influences included Forest Plan goals, objectives, existing and desired conditions, standards and guidelines; Federal laws, regulations, and policies; and economic viability. Within these

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parameters, the alternatives developed by the ID Team display a reasonable range of outputs, treatments, costs, management requirements, design criteria, and effects on resources.

In addition to the alternatives considered in detail, the ID Team examined other alternatives during the analysis process. Although these alternatives contributed to a reasonable range, they were eliminated from further consideration for the reasons listed below.

### Alternatives Not Considered in Detail

This section discusses an additional alternative that was considered, but not given detailed study. This alternative was initially proposed to address issues identified during the public scoping and ID Team process, but was not considered further for the reasons explained in the following narrative.

**Harvest More Stands and Treat More Hazardous Fuels:** Based on both public and internal input, an alternative was considered that increased the acreage treated for forest health/fiber production and increased or intensified harvest in areas treated for hazardous fuel reduction. Under this alternative, more extensive harvest was considered in Section 28, of T20N, R17W. This section adjoins the Crazy Horse Fire Area to the south and contains some stands that are beginning to decline due to insects and disease. This section is not within the Wildland Urban Interface (WUI). This area was not carried into any of the action alternatives primarily due to its proximity to the Crazy Horse Fire where vegetation has not yet fully recovered from the effects of the fire which occurred in 2003. Preliminary field reviews indicated that wildlife use and travel in this area had likely increased after the fire. This led to a recommendation to delay harvest in this area until more time for recovery from the effects of the fire had occurred.

Similarly, other stands in the project area were considered for treatment for forest health/fuels in Section 22 of T21N, R17W, and for forest health/timber management in Section 8 of T20N, R17W. These areas were dropped from consideration for a variety of reasons. One stand in Section 8 was dropped as it was found to provide lynx habitat. Other stands in this section were considered for treatment but were deferred primarily to focus treatment on more critical needs within a landscape where extensive harvest, particularly on private lands has occurred. Treatment in Section 22, though in the WUI, was deferred also, primarily due to the relatively young age and generally thrifty condition of the stands in this area coupled with the logistic/economic concerns for the limited treatment that was considered necessary at this time.

Within the WUI, additional harvest or more intense harvest was considered in some stands. Based on preliminary public input and field reconnaissance, the proposed action reduced treatment recommendations in some of these areas where existing landowner treatments had already moderated fuels concerns, and/or where specific site reconnaissance indicated that less intense prescriptions could meet project objectives.

For these reasons, an alternative to treat more extensively and intensively within the project area was not considered in detail.

## Alternatives Considered in Detail

### Alternative A – No Action

This alternative represents the existing condition in the Hemlock Elk Project Area. Under this alternative, none of the activities proposed for the Hemlock Elk Project would occur. No vegetative treatments, fuel reduction activities, temporary road and access management, and planting activities to aid in vegetation recovery, or other activities associated with the proposed action would occur at this time. Ongoing activities such as recreation, public firewood gathering, fire suppression, and normal road maintenance would continue. Activities identified in Chapter 3 as current and foreseeable actions would occur.

## Activities Common to the Action Alternatives

### Vegetation Management

**Clearcut with Reserves:** This treatment would remove nearly all trees from the site to facilitate regeneration of a new age class and increase species diversity. These treatment areas are primarily even-aged lodgepole pine with minimal amounts of other species or structural diversity. All western larch, western white pine, and ponderosa pine would be reserved, where feasible and where not acting as an insect or disease vector, to provide seed sources and long-term structural diversity. Regeneration would occur from a combination of natural seeding and planted seedlings. Mechanical treatments and/or prescribed fire would be used to reduce fuels, recycle nutrients, and prepare the site for regeneration. This treatment is proposed for **58 acres** in Alternative B, **58 acres** in Alternative C, and **0 acres** in Alternative D.

The NFMA and Forest Service Handbook direction dictate that clearcutting must be justified as the optimum method to meet management objectives when prescribed. Five areas are proposed for clearcutting in this project. Clearcutting was determined to be the optimum regeneration method for meeting management objectives for each of these areas by the project Silviculturist. Criteria used to make this determination included; species composition relative to management direction and availability of desired species for seed sources, presence of disease infections which would be transmitted to the regenerated stand or where non-susceptible species conversion is necessary, and stands subject to windthrow if residual trees were retained. Appendix A in the Silviculture Project File discusses the criteria which applied to specific treatment areas.

**Patch Clearcut with Reserves:** This treatment is identical to the Clearcut with Reserves treatment in all respects except spatially. Patch clearcutting refers to treating only a portion of the stand or treatment area. In this project, approximately one-third of the total stand identified for patch clearcutting would be treated. This treatment is proposed for **16 acres** in Alternatives B and C and **0 acres** in Alternative D.

**Seed Tree with Reserves:** A portion of the existing overstory western larch, ponderosa pine, western white pine, and Douglas-fir would be retained and reserved at a density of 5 to 15 trees per acre in order to facilitate regeneration of these desired species. This density is designed to provide seed sources and long-term structural diversity, while not interfering with the successful regeneration of desired species. The majority of trees targeted for removal are in the co-dominant and intermediate crown classes and are primarily lodgepole pine, Douglas-fir, and various

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shade-tolerant species. Mechanical treatments and/or prescribed fire would be used to reduce fuels, recycle nutrients, and prepare the site for regeneration. This treatment is proposed on **129 acres** in Alternatives B and C and **0 acres** in Alternative D.

**Thin From Below - Commercial:** The existing tree density would be reduced from current levels to a target residual density ranging from 70 to 120 square feet of basal area per acre. This equates to approximately 50 to 150 trees per acre depending on species and site variables. Thinning from below implies that trees in the suppressed and intermediate crown classes would be removed first, while most of the co-dominant and nearly all dominant crown class trees would be retained. The purpose of this treatment is to enlarge the growing space of desirable trees and reduce tree competition for limited site resources allowing for improved tree growth and vigor, enhanced forest health, and manipulation of fuel continuity. Mechanical treatments and/or prescribed fire would be used to reduce fuels and recycle nutrients. This treatment is proposed for **404 acres** in Alternatives B and C, and **511 acres** in Alternative D.

**Sanitation:** In these treatment areas, the existing stand structure would generally remain intact following treatment. However, these areas would be modified by removal of scattered overstory and understory trees that are heavily infested with larch dwarf mistletoe. The intent of this treatment is to improve stand health by reducing the spread of larch dwarf mistletoe. Reducing the density of understory trees would remove infected trees and reduce fuel continuity. Mechanical treatments would be used to reduce fuels and recycle nutrients. This treatment is proposed on **51 acres** in all alternatives.

**Salvage Harvest:** in these treatment areas, the existing stand structure would generally remain intact following treatment. However, these areas would be modified by removal of dead, dying, or damaged trees. This treatment is designed to recover economic value and manipulate fuel loadings. Primarily lodgepole pine affected by mountain pine beetle and wind events would be removed. Mechanical treatments would be used to reduce fuels and recycle nutrients. This treatment is proposed on **10 acres** in Alternatives B and C and **30 acres** in Alternative D.

**Thin From Below - Non-Commercial:** This treatment is proposed on areas where the majority of trees to be removed do not meet minimum Forest Service sawlog specifications. Existing tree density would be reduced from current levels to a target residual density ranging from 100 to 200 trees per acre. Thinning from below implies that trees in the suppressed and intermediate crown classes would be removed first, while most of the co-dominant and nearly all dominant crown class trees would be retained. The purpose of this treatment is to enlarge the growing space of desirable trees and reduce tree competition for limited site resources allowing for improved tree growth and vigor, enhanced forest health, and manipulation of fuel continuity. Mechanical treatments and/or prescribed fire would be used to reduce fuels and recycle nutrients. When feasible, post, pole, chips, or other products may be used from these treatments in addition to, or in lieu of, on-site slash disposal. This treatment is proposed for **10 acres** in all action alternatives.

**Pre-Commercial Thinning:** In this treatment, the existing immature tree density would be reduced to a target of approximately 50 to 300 trees per acre. The primary purpose of this treatment is to concentrate growth on the most desirable trees and reduce fuel continuity. This treatment would focus on the removal of sapling and pole-sized trees generally not greater than 5 inches in diameter at breast height (DBH). Hand piling and pile burning would be used to reduce fuels and recycle nutrients. This treatment is proposed on **61 acres** in all alternatives.

## Fuels Reduction Treatments

A number of prescribed treatments are designed to reduce natural and activity generated fuels within the proposed treatment areas. These treatments include mechanical methods and the use of prescribed fire. Mechanical treatments could include a combination of the following; whole tree yarding, slashing, excavator piling, and/or chipping/masticating. Prescribed fire treatments could include pile burning and/or understory burning. See the Fire and Fuels Section of this document for more detailed information related to fuels treatments.

**Fuels Treatments within the WUI:** Fuel reduction treatments are proposed on **321 acres** in Alternatives B and C and **300 acres** in Alternative D.

**Fuels Treatments outside the WUI:** Fuel reduction treatments are proposed on **418 acres** in Alternatives B and C and **363 acres** in Alternative D.

## Site Preparation

Depending on existing vegetation and ground conditions, site preparation may be prescribed to help create favorable conditions to help ensure adequate regeneration. These treatments are often prescribed in both artificial and natural regeneration situations and typically address competing vegetation, seed bed preparation, fuel accumulations, and duff reduction. Site preparation can be accomplished through hand, mechanical, or prescribed fire methods. Hand methods usually involve creating favorable conditions at the time of planting using hand tools. Mechanical treatments are often accomplished during harvest operations or shortly afterwards and involve scarification and seed bed preparation through the use of mechanized equipment. Prescribed fire can also be used to recycle nutrients, consume excess fuels, reduce competing vegetation, and create a favorable seedbed.

## Reforestation

Where regeneration treatments are proposed, natural and artificial reforestation is planned. Specifically hand planting of desired species is planned for all regenerated acres. Species selection will be based on management direction and site characteristics. Emphasis will be placed on establishing long-lived shade intolerant species such as western larch, western white pine, and ponderosa pine. It is expected that natural regeneration will supplement the planted seedlings.

Species diversity planting would occur in Clearcut with Reserves, Patch Clearcut with Reserves, and Seed Tree with Reserves Units to promote desirable species, including ponderosa pine and western larch. This treatment would occur after site preparation treatments. Hand planting is proposed on **203 acres** in Alternatives B and C and **0 acres** in Alternative D.

## Road Management

Road management activities common to the action alternatives include temporary road construction and road maintenance. No new permanent roads would be constructed with any of the action alternatives.

**Road Maintenance:** This is the ongoing upkeep of a road necessary to meet the approved Road Management Objectives (RMOs). The present focus of RMOs is to meet the current BMPs for each road. Best Management Practices required under timber sale contracts must be completed before timber is hauled.

Road maintenance objectives are to reduce the concentration of sub-surface and surface water runoff, minimize road surface erosion, filter ditch water before entering streams, and decrease the risk of culvert failures during peak runoff events. Road maintenance work could include culvert installation, replacement of existing culverts

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with larger culverts if original pipes are undersized, installation of drainage dips and surface water deflectors, placement of rip-rap to armor drainage structures, aggregate surface replacement, aggregate placement to reinforce wet surface areas, ditch construction and cleaning where needed, and surface grading to restore the drainage efficiency of the road surface. These actions would bring the roads up to current BMP standards, better accommodate traffic, and reduce deferred maintenance needs. Road maintenance would occur on **21.1 miles** in Alternative D and **21.4 miles** in Alternatives B and C.

**Permit Haul Routes:** Permits would be acquired from private industry, organizations, or individuals to facilitate haul from proposed units. Permits would be acquired on **1.5 miles** in Alternatives B and D, and **2.2 miles** in Alternative C.

**Temporary Road Construction:** Temporary roads would be constructed to the minimum standards necessary for log hauling from Roads #9556, 9595, 9553, 10277, 9596, 9591, and 10257. Temporary road surface width would be limited to truck bunk width plus 4 feet. All temporary roads would be reclaimed following their use using drain dips, outsloping, scarifying, seeding, and recontouring. Temporary road construction ranges from **4.5 to 4.8 miles** in the action alternatives.

**Proposed Access across Private Lands:** In all action alternatives, a road easement (**0.7 miles**) would be needed to cross Community Forest lands to access Unit #2. Within this easement, **0.2 miles** of new road construction would also be needed to access Unit #2.

Please refer to Table 2-1 below for a summary by alternative of management activities.

**TABLE 2-1.  
TREATMENT SUMMARY BY ALTERNATIVE**

	Alternative B	Alternative C	Alternative D
<b>Commercial Harvest Treatment Acres and Estimated Board Foot Volume (MBF)</b>			
	<b>Acres</b>	<b>MBF</b>	<b>Acres</b>
	<b>MBF</b>	<b>Acres</b>	<b>MBF</b>
Clearcut with Reserves	58	430	58
Patch Clearcut with Reserves	16	48	16
Seed Tree with Reserves	129	835	129
Thin From Below – Commercial	404	1,676	404
Sanitation	51	102	51
Salvage	10	20	10
<b>Total Harvest Acres and Board Foot Volume</b>	<b>668</b>	<b>3,111</b>	<b>668</b>
	<b>3,111</b>	<b>592</b>	<b>2,292</b>
<b>Non-Commercial Treatment Acres</b>			
Thin From Below	10 acres	10 acres	10 acres
Pre-Commercial Thinning	61 acres	61 acres	61 acres
<b>Total Acres of Commercial and Non-Commercial Treatments</b>	<b>739 acres</b>	<b>739 acres</b>	<b>663 acres</b>
Hand Planting (Occurring with Regeneration Units)	203 acres	203 acres	0 acres
<b>Logging System Acres</b>			
Tractor	<b>668 acres</b>	<b>668 acres</b>	592 acres
Mechanical Treatment in Thin From Below Non-Commercial Units	10 acres	10 acres	10 acres
Hand Treatments in PCT Units	61 acres	61 acres	61 acres
<b>Total Logging System Acres</b>	<b>739 acres</b>	<b>739 acres</b>	<b>663 acres</b>
<b>Fuels Treatment Acres</b>			
Whole Tree Yard/Excavator Pile/Chip/Burn	465 acres	465 acres	592 acres

**TABLE 2-1.  
TREATMENT SUMMARY BY ALTERNATIVE**

	Alternative B	Alternative C	Alternative D
Whole Tree Yard/Excavator Pile/Chip/Lop and Scatter	10 acres	10 acres	10 acres
Hand Piling and Pile Burning	61 acres	61 acres	61 acres
Whole Tree Yard/Excavator Pile/Burn	203 acres	203 acres	0 acres
<b>Total Acres of Fuel Treatment</b>	<b>739 acres</b>	<b>739 acres</b>	<b>663 acres</b>
Fuels Treatment within Wildland Urban Interface	321 acres	321 acres	300 acres
Fuels Treatment outside Wildland Urban Interface	418 acres	418 acres	363 acres
<b>Road Management</b>			
Haul Routes (BMPs to be applied to meet Timber Sale Requirements)	21.4 miles	21.4 miles	21.1 miles
Permit Haul Routes	1.5 miles	2.2 miles	1.5 miles
Temporary Road Construction	4.8 miles	4.7 miles	4.5 miles
Total New Private Land Easement Access	0.7 miles	0.7 miles	0.7 miles
Private Land Access New Construction	0.2 miles	0.2 miles	0.2 miles
<b>Resource Enhancement Projects</b>	<b>11 Projects to Improve Values (See narrative below)</b>		

## Resource Enhancement Projects

Resource enhancement projects identified during project design are shown in the table below. These projects were identified to improve other resource values within the project area. Please refer to Map 2-1 at the end of this chapter for a display of the project locations. These projects, while in the project analysis area, are not needed to mitigate effects of the proposed action or any of the alternatives. These projects represent site specific resource enhancement opportunities that, through this decision, would be authorized to occur. The implementation of these projects could occur as stand alone projects and or could be associated with the proposed actions through stewardship contracting. Additional detail on the projects and potential funding sources follow.

**TABLE 2-2.  
RESOURCE ENHANCEMENT PROJECTS**

Ground Location	Project # On Map	Project Description
Roads #10291 and #9850 in T20N, R17W, Section 12 and Road #10291 in T20N, R17W, Section 7.	#1	Improve water quality and sediment sources on Spotted Calf Creek (tributary to Cold Creek). Drainage problems would be corrected by replacing culverts and installing cross drains into the road to dissipate water from ditches. The roads are currently closed to traffic year-round. The portion of Road 10291 that is currently used to access Trail 301 would remain accessible to stock and foot traffic.
Road #9792 in T20N, R17W, Section 6.	#2	Revegetate and stabilize the old road prism of Road #9792 to reduce erosion. Using hand tools, planting of willows and laying of excelsior blanket or jute mesh would occur on the site below the road fill. Hand tools would also be used to divert water off of the road prism.
Road #9767 at Cold Creek Drainage	#3	Remove native timber bridge abutments and fill from old abandoned bridge to stabilize stream banks and reduce erosion. Road is closed year-round.

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**TABLE 2-2.  
RESOURCE ENHANCEMENT PROJECTS**

Ground Location	Project # On Map	Project Description
Road #9591 in T20N, R17W, Section 6.	#4	Provide fish passage on Spotted Calf Creek for brook trout, the only species present. Project would replace existing culvert with a larger, counter-sunk pipe.
Road #9590 in Section 28 of the Windfall Drainage	#5	Correct poorly designed stream crossings (3 locations) and provide fish passage for brook trout, the only species present. Project would remove 4 culverts on Windfall Creek and its perennial tributaries and reslope the road prism to prevent erosion. This road is currently closed year-round.
Road #888C in T21N, R17W, Section 9.	#6	Provide fish passage on Teepee Creek (unnamed tributary to Swan River) for brook trout, the only species present. Project would clear beaver-plugged culvert and if problem persists, remove the culvert altogether. This road is currently closed year-round.
Road #10289 in T20N, R17W, Section 4.	#7	Replace undersized culvert on "Tributary One" (tributary to Cold Creek) to stabilize the site and prevent further erosion. This road is currently closed year-round.
Road #10257 in Section 28 of the Windfall Drainage	#8	Install sediment reduction devices along wetlands and ponds where existing road encroaches into the riparian areas. This road is currently closed year-round.
Road #561F in Section 34 of the Glacier Drainage	#9	Remove native bridge abutments and fill from old abandoned bridge to stabilize stream banks and reduce potential erosion.
Units 11 and 12	No Number	Conduct a light prescribed underburn in the aspen groves (clones) to stimulate suckering and promote aspen regeneration. The underburn will be designed to retain the existing mature aspen trees. If sprouting occurs, and the area is heavily browsed, it may be necessary to fence all or a portion of the aspen enhancement project area.
Throughout Project Area	No Number	Noxious weed spraying on roads not included on haul routes to reduce risk of weed spread. (Weeds on haul routes would be required to be treated under the project contract).

Several sources of funding exist for resource enhancement projects. Many items have the potential to be funded with Knutson-Vandenberg (KV) funds, while other items could be funded with Congressionally-approved funds or Stewardship dollars. Implementation would be based on annual budgets and program direction. It is anticipated that this project may be offered under a Stewardship Contract. Actual authority to offer under such a contract comes from the Regional Forester on a case-by-case basis. If approved as a Stewardship offering, these items will be included in Stewardship Projects, but inclusion of projects in the final award will depend on the bid value received for the project. Some, none, or all of the projects may be implemented through Stewardship contracting depending on market conditions at the time of offer. Implementation through direct project funding will be based on annual budgets and program direction. If funding were not available, the improvements from these projects would not be accomplished.

## Design Criteria

Table 2-15 located at the end of this chapter describes the Design Criteria applied to this project to protect resources.

## Monitoring

Monitoring and evaluation compared the results being achieved to those projected in the Forest Plan. Monitoring is conducted on a sample basis to evaluate the overall progress in implementing the Forest Plan, the assumptions on which the Forest Plan is based, and to provide a feedback loop for determining effectiveness of project and mitigation implementation (USDA Forest Service 1987a). For this project, monitoring and evaluation would be conducted as described in Appendix A of this document. Those monitoring components not specifically discussed in this appendix tier to the monitoring described in the Forest Plan.

## Activities Specific to the Action Alternatives

Features unique to each alternative are described below. Maps displaying each alternative are found at the end of this chapter (Maps 2-2, 2-3, and 2-4).

### Alternative B – Proposed Action (Map 2-2)

**Intent:** Alternative B was developed to respond to the Purpose and Need for the Hemlock Elk Project.

The Proposed Action focuses on reducing hazardous fuel buildup and improving forest health in the Hemlock Elk Project Area by using various vegetative treatments, both commercial and non-commercial. Features associated with this alternative include the following:

- Treatments that would remove commercial products, including sawlogs, post and poles, pulp, and chips on a total of about **668 acres**.
- Treatments on **321 acres** within the Wildland Urban Interface (WUI).
- Road maintenance to meet BMP standards on approximately **21.4 miles** of haul roads as required for Timber Sale Contract.
- An estimated **4.8 miles** of temporary road construction to access harvest units as show in Table 2-3 below.
- An estimated **0.7 miles** of road easement across private lands to access Unit #2.
- Approximately **0.2 miles** of new road construction across private lands to access Unit #2.

<b>TABLE 2-3. TEMPORARY ROADS NEEDED FOR ALTERNATIVE B</b>		
<b>Unit</b>	<b>Access Needs</b>	<b>Miles</b>
1	Access via new NFS temporary road beginning from PCTC Road in T21N R17W Section 27	0.38
7	Access via new NFS temporary road beginning from Road #9595	0.11
10	Access via new NFS temporary road beginning from Road #9586	0.34
11, 12	Access via new NFS temporary road beginning from Road #9556	0.19
15	Access via new NFS temporary road beginning from Road #10277	0.39
15	Access via new NFS temporary road beginning from Road #10277	0.27
16	Access via new NFS temporary road beginning from Road #9591	0.03
18a	Access via new NFS temporary road beginning from Road #9591	0.35
19	Access via new NFS temporary road beginning from Road #9591	0.17
19, 20	Access via new NFS temporary road beginning from Road #9591	0.50

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**TABLE 2-3.  
 TEMPORARY ROADS NEEDED FOR ALTERNATIVE B**

<b>Unit</b>	<b>Access Needs</b>	<b>Miles</b>
21, 22, 23, 24b	Access via new NFS temporary road beginning from Road #9591	0.72
23, 24b	Access via new NFS temporary road beginning from Road #9591	0.32
24b	Access via new NFS temporary road beginning from Road #9591	0.27
24a	Access via new NFS temporary road beginning from Road #9591	0.03
25, 26, 27, 28	Access via new NFS temporary road beginning from Road #10257	0.57
26	Access via new NFS temporary road beginning from Road #10257	0.13
<b>TOTAL MILES OF TEMPORARY ROAD NEEDED FOR ALTERNATIVE B</b>		<b>4.77</b>

Alternative B timber harvest and associated activities are summarized in the table below.

**TABLE 2-4.  
 SUMMARY OF PROPOSED TREATMENT ACTIVITIES FOR ALTERNATIVE B**

<b>Commercial Harvest Treatment Acres</b>	
Clearcut with Reserves	58 acres
Patch Clearcut with Reserves	16 acres
Seed Tree with Reserves	129 acres
Thin From Below – Commercial	404 acres
Sanitation	51 acres
Salvage	10 acres
<b>Total Harvest Acres</b>	<b>668 acres</b>
<b>Non Commercial Treatment Acres</b>	
Thin From Below	10 acres
Pre-Commercial Thinning	61 acres
<b>Total Acres of Commercial and Non-Commercial Treatments</b>	<b>739 acres</b>
Hand Planting (Occurring within Regeneration Units)	203 acres
<b>Logging System Acres</b>	
Tractor	668 acres
Mechanical Treatment in Thin From Below Non-Commercial Unit	10 acres
Hand Treatments in Pre-Commercial Thinning Units	61 acres
<b>Total Logging System Acres</b>	<b>739 acres</b>
<b>Fuels Treatment Acres</b>	
Whole Tree Yard/Excavator Pile/Chip/Burn	465 acres
Whole Tree Yard/Excavator Pile/Chip/Lop and Scatter	10 acres
Hand Piling and Pile Burning	61 acres
Whole Tree Yard/Excavator Pile/Burn	203 acres
<b>Total Acres of Fuel Treatment</b>	<b>739 acres</b>
Fuels Treatment within Wildland Urban Interface	321 acres
Fuels Treatment outside Wildland Urban Interface	418 acres

**TABLE 2-4.  
 SUMMARY OF PROPOSED TREATMENT ACTIVITIES FOR ALTERNATIVE B**

Road Management	
Haul Routes (BMPs to be applied to meet Timber Sale Requirements)	21.4 miles
Permit Haul Routes	1.5 miles
Temporary Road Construction	4.8 miles
Total New Private Land Easement Access	0.7 miles
Private Land Access New Construction	0.2 miles

**TABLE 2-5.  
 PROPOSED TREATMENT ACTIVITIES FOR ALTERNATIVE B**

Unit No.	Unit Acres	Alternative B Treatment	Logging System	Hazardous (Fuels) Reduction	Forest Plan Direction (MA)
1	21	Thin from Below-Commercial	Tractor	Whole Tree Yard/Excavator Pile/Chip/Burn	MA 12
2	10	Salvage	Tractor	Whole Tree Yard/Excavator Pile/Chip/Burn	MA 12
3a	4	Pre-Commercial Thinning	Hand	Hand Piling and Pile Burning	MA 15C
3b	8	Pre-Commercial Thinning	Hand	Hand Piling and Pile Burning	MA 15C
5a	10	Sanitation	Tractor	Whole Tree Yard/Excavator Pile/Chip/Burn	MA 15C
5b	41	Sanitation	Tractor	Whole Tree Yard/Excavator Pile/Chip/Burn	MA 15C
6	9	Pre-Commercial Thinning	Hand	Hand Piling and Pile Burning	MA 15C
7	20	Thin From Below-Commercial	Tractor	Whole Tree Yard/Excavator Pile/Chip/Burn	MA 15C
9	22	Thin From Below-Commercial	Tractor	Whole Tree Yard/Excavator Pile/Chip/Burn	MA 15
10	24	Clearcut with Reserves	Tractor	Whole Tree Yard/Excavator Pile/Burn	MA 15
11	33	Seed Tree with Reserves	Tractor	Whole Tree Yard/Excavator Pile/Burn	MA 15C
12	29	Pre-Commercial Thinning	Hand	Hand Piling and Pile Burning	MA 15C
13	11	Pre-Commercial Thinning	Hand	Hand Piling and Pile Burning	MA 15C
14	15	Seed Tree with Reserves	Tractor	Whole Tree Yard/Excavator Pile/Burn	MA 15C
15	134	Thin From Below-Commercial	Tractor	Whole Tree Yard/Excavator Pile/Chip/Burn	MA15C
16	38	Seed Tree with Reserves	Tractor	Whole Tree Yard/Excavator Pile/Burn	MA 15C
17	7	Thin From Below-Commercial	Tractor	Whole Tree Yard/Excavator Pile/Chip/Burn	MA 15C
18a	23	Thin From Below-Commercial	Tractor	Whole Tree Yard/Excavator Pile/Chip/Burn	MA15C
18b	2	Thin From Below-Commercial	Tractor	Whole Tree Yard/Excavator Pile/Chip/Burn	MA 15C
19	38	Thin From Below-Commercial	Tractor	Whole Tree Yard/Excavator Pile/Chip/Burn	MA 15C
20	12	Clearcut with Reserves	Tractor	Whole Tree Yard/Excavator Pile/Burn	MA 15C
21	22	Clearcut with Reserves	Tractor	Whole Tree Yard/Excavator Pile/Burn	MA 15C
22	18	Seed Tree with Reserves	Tractor	Whole Tree Yard/Excavator Pile/Burn	MA 15C
23	100	Thin From Below-Commercial	Tractor	Whole Tree Yard/Excavator Pile/Chip/Burn	MA 15C
24a	9	Thin From Below-Commercial	Tractor	Whole Tree Yard/Excavator Pile/Chip/Burn	MA 15C
24b	28	Thin From Below-Commercial	Tractor	Whole Tree Yard/Excavator Pile/Chip/Burn	MA15C
25	16	Patch Clearcut with Reserves	Tractor	Whole Tree Yard/Excavator Pile/ Burn	MA 15C
26	10	Thin From Below Non-Commercial	Mechanical	Whole Tree Yard/Excavator Pile/Chip/Lop and Scatter	MA 15C

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**TABLE 2-5.  
 PROPOSED TREATMENT ACTIVITIES FOR ALTERNATIVE B**

Unit No.	Unit Acres	Alternative B Treatment	Logging System	Hazardous (Fuels) Reduction	Forest Plan Direction (MA)
27	3	Seed Tree with Reserves	Tractor	Whole Tree Yard/Excavator Pile//Burn	MA 15C
28	22	Seed Tree with Reserves	Tractor	Whole Tree Yard/Excavator Pile/Burn	MA 15C
<b>TOTAL</b>	<b>739 acres</b>				

**Alternative C  
 (Map 2-3)**

**Intent:** Alternative C was developed to respond to Issue #2, the spread of noxious weeds.

This alternative was developed based upon concerns that management activities could increase the risk of weed spread to vulnerable areas of the project area. Sections 16 and 22 are considered vulnerable since in places they are moist (many wetlands), comparatively weed free, and fairly unroaded. This concern is addressed by proposing winter logging in some units. Features associated with this alternative include the following:

- Units **18a, 18b, 19, 20, 21, 22, 23, 24a, 24b, 25, 26, and 27** are proposed for winter logging.
- Treatments would remove commercial products, including sawlogs, post and poles, pulp, and chips on a total of about **668 acres**.
- Treatments on **321 acres** within the WUI.
- Road maintenance to meet BMP standards on approximately **21.4 miles** of haul roads as required for the timber sale contract.
- An estimated **4.7 miles** of temporary road construction to access harvest units as show in Table 2-6 below.
- An estimated **0.7 miles** of road easement across private lands to access Unit #2
- Approximately **0.2 miles** of new road construction across private lands to access Unit #2.

Alternative C timber harvest and associated activities are summarized in the table below. A permutation of Alternative C is the consideration of forwarder logging with less temporary road construction on the same unit pool described above. This permutation was discussed to alleviate concerns that suitable winter logging conditions may not always be available in the project area.

**TABLE 2-6.  
 TEMPORARY ROADS NEEDED FOR ALTERNATIVE C**

Unit	Access Needs	Miles
1	Access via new NFS temporary road beginning from PCTC Road in T21N R17W Section 27	0.38
7	Access via new NFS temporary road beginning from Road #9595	0.11
10	Access via new NFS temporary road beginning from PCTC Road in T20N R17W Section 9	0.18
10	Access via new NFS temporary road beginning from PCTC Road in T20N R17W Section 9	0.12
11, 12	Access via new NFS temporary road beginning from Road #9556	0.19
15	Access via new NFS temporary road beginning from Road #10277	0.39
15	Access via new NFS temporary road beginning from Road #10277	0.27
16	Access via new NFS temporary road beginning from Road #9591	0.03
18a	Access via new NFS temporary road beginning from Road #9591	0.35

**TABLE 2-6.  
 TEMPORARY ROADS NEEDED FOR ALTERNATIVE C**

Unit	Access Needs	Miles
19, 20	Access via new NFS temporary road beginning from Road #9591	0.50
19	Access via new NFS temporary road beginning from Road #9591	0.17
21, 22, 23, 24b	Access via new NFS temporary road beginning from Road #9591	0.72
23, 24b	Access via new NFS temporary road beginning from Road #9591	0.32
24b	Access via new NFS temporary road beginning from Road #9591	0.27
24a	Access via new NFS temporary road beginning from Road #9591	0.03
25, 26, 27, 28	Access via new NFS temporary road beginning from Road #10257	0.57
26	Access via new NFS temporary road beginning from Road #10257	0.13
<b>Total Miles of Temporary Roads Needed for Alternative C</b>		<b>4.73</b>

**TABLE 2-7.  
 SUMMARY OF PROPOSED TREATMENT ACTIVITIES FOR ALTERNATIVE C**

<b>Commercial Harvest Treatment Acres</b>	
Clearcut with Reserves	58 acres
Patch Clearcut with Reserves	16 acres
Seed Tree with Reserves	129 acres
Thin From Below – Commercial	404 acres
Sanitation	51 acres
Salvage	10 acres
<b>Total Harvest Acres</b>	<b>668 acres</b>
<b>Non Commercial Treatment Acres</b>	
Thin From Below	10 acres
Pre-Commercial Thinning	61 acres
<b>Total Acres of Commercial and Non-Commercial Treatments</b>	<b>739 acres</b>
Restoration Planting (Occurring within Regeneration Units)	203 acres
<b>Logging System Acres</b>	
Tractor	668 acres
Mechanical Treatment Thin From Below Non-Commercial Unit	10 acres
Hand Treatments in Pre-Commercial Thinning Units	61 acres
<b>Total Logging System Acres</b>	<b>739 acres</b>
<b>Fuels Treatment Acres</b>	
Whole Tree Yard/Excavator Pile/Chip/Burn	465 acres
Whole Tree Yard/Excavator Pile/Chip/Lop and Scatter	10 acres
Hand Piling and Pile Burning	61 acres
Whole Tree Yard/Excavator Pile/Burn	203 acres
<b>Total Acres of Fuel Treatment</b>	<b>739 acres</b>
Fuels Treatment within Wildland Urban Interface	321 acres
Fuels Treatment outside Wildland Urban Interface	418 acres

**Hemlock Elk Fuels Reduction and Forest Health Environmental Assessment  
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**TABLE 2-7.  
SUMMARY OF PROPOSED TREATMENT ACTIVITIES FOR ALTERNATIVE C**

Road Management	
Haul Routes (BMPs to be applied to meet timber sale requirements)	21.4 miles
Permit Haul Routes	2.2 miles
Temporary Road Construction	4.7 miles
Total New Private Land Easement Access	0.7 miles
Private Land Access New Construction	0.2 miles

**TABLE 2-8.  
PROPOSED TREATMENT ACTIVITIES FOR ALTERNATIVE C**

Unit No.	Unit Acres	Alternative C Treatment	Logging System	Hazardous (Fuels) Reduction	Forest Plan Direction (MA)
1	21	Thin from Below-Commercial	Tractor	Whole Tree Yard/Excavator Pile/Chip/Burn	MA 12
2	10	Salvage	Tractor	Whole Tree Yard/Excavator Pile/Chip/Burn	MA 12
3a	4	Pre-Commercial Thinning	Hand	Hand Piling and Pile Burning	MA 15C
3b	8	Pre-Commercial Thinning	Hand	Hand Piling and Pile Burning	MA 15C
5a	10	Sanitation	Tractor	Whole Tree Yard/Excavator Pile/Chip/Burn	MA 15C
5b	41	Sanitation	Tractor	Whole Tree Yard/Excavator Pile/Chip/Burn	MA 15C
6	9	Pre-Commercial Thinning	Hand	Hand Piling and Pile Burning	MA 15C
7	20	Thin From Below-Commercial	Tractor	Whole Tree Yard/Excavator Pile/Chip/Burn	MA 15C
9	22	Thin From Below-Commercial	Tractor	Whole Tree Yard/Excavator Pile/Chip/Burn	MA 15
10	24	Clearcut with Reserves	Tractor	Whole Tree Yard/Excavator Pile/Burn	MA 15
11	33	Seed Tree with Reserves	Tractor	Whole Tree Yard/Excavator Pile/Burn	MA 15C
12	29	Pre-Commercial Thinning	Hand	Hand Piling and Pile Burning	MA 15C
13	11	Pre-Commercial Thinning	Hand	Hand Piling and Pile Burning	MA 15C
14	15	Seed Tree with Reserves	Tractor	Whole Tree Yard/Excavator Pile/Burn	MA 15C
15	134	Thin From Below-Commercial	Tractor	Whole Tree Yard/Excavator Pile/Chip/Burn	MA15C
16	38	Seed Tree with Reserves	Tractor	Whole Tree Yard/Excavator Pile/Burn	MA 15C
17	7	Thin From Below-Commercial	Tractor	Whole Tree Yard/Excavator Pile/Chip/Burn	MA 15C
*18a	23	Thin From Below-Commercial	Tractor	Whole Tree Yard/Excavator Pile/Chip/Burn	MA15C
*18b	2	Thin From Below-Commercial	Tractor	Whole Tree Yard/Excavator Pile/Chip/Burn	MA 15C
*19	38	Thin From Below-Commercial	Tractor	Whole Tree Yard/Excavator Pile/Chip/Burn	MA 15C
*20	12	Clearcut with Reserves	Tractor	Whole Tree Yard/Excavator Pile/Burn	MA 15C
*21	22	Clearcut with Reserves	Tractor	Whole Tree Yard/Excavator Pile/Burn	MA 15C
*22	18	Seed Tree with Reserves	Tractor	Whole Tree Yard/Excavator Pile/Burn	MA 15C
*23	100	Thin From Below-Commercial	Tractor	Whole Tree Yard/Excavator Pile/Chip/Burn	MA 15C
*24a	9	Thin From Below-Commercial	Tractor	Whole Tree Yard/Excavator Pile/Chip/Burn	MA 15C
*24b	28	Thin From Below-Commercial	Tractor	Whole Tree Yard/Excavator Pile/Chip/Burn	MA15C
*25	16	Patch Clearcut with Reserves	Tractor	Whole Tree Yard/Excavator Pile/ Burn	MA 15C
*26	10	Thin From Below - Non-Commercial	Mechanical	Whole Tree Yard/Excavator Pile/Chip/Lop and Scatter	MA 15C
*27	3	Seed Tree with Reserves	Tractor	Whole Tree Yard/Excavator Pile/Burn	MA 15C

**TABLE 2-8.  
 PROPOSED TREATMENT ACTIVITIES FOR ALTERNATIVE C**

Unit No.	Unit Acres	Alternative C Treatment	Logging System	Hazardous (Fuels) Reduction	Forest Plan Direction (MA)
28	22	Seed Tree with Reserves	Tractor	Whole Tree Yard/Excavator Pile/Burn	MA 15C
<b>TOTAL</b>	<b>739 acres</b>				

\*Units to be winter logged.

### Alternative D (Map 2-4)

**Intent:** Alternative D was developed to respond to Issue #2, regeneration harvest.

This alternative was developed to address the concern about the amount of proposed regeneration harvest on Forest Service lands in combination with past regeneration harvest on private lands and the cumulative effects of these activities. This alternative proposes no regeneration harvest in the project area. A number of unit specific proposed treatment changes were made as a result of proposing no regeneration harvests. Where intermediate treatments could still meet all or some of the land management objectives, proposed treatments were changed from regeneration to intermediate treatments. In some situations, intermediate treatments could not meet stand objectives and therefore the units were dropped from this alternative. Intermediate treatments were not considered to be viable options based on past harvest, insect and/or disease conditions, and wind-throw concerns. Features associated with this alternative include the following:

- **Units #14, #16, and #25** are dropped. Proposed treatments changed for the following units:
  - Unit 10 changed from Clearcut with Reserves to Salvage
  - Unit 11 changed from Seed Tree with Reserves to Thin From Below-Commercial
  - Unit 20 changed from Clearcut with Reserves to Thin From Below-Commercial
  - Unit 21 changed from Clearcut with Reserves to Thin From Below-Commercial
  - Unit 22 changed from Seed Tree with Reserves to Thin From Below-Commercial
  - Unit 27 changed from Seed Tree with Reserves to Salvage
  - Unit 28 changed from Seed Tree with Reserves to Thin From Below-Commercial
- Treatments that would remove commercial products, including sawlogs, post and poles, pulp, and chips on a total of about **592 acres**.
- Treatments on **300 acres** within the WUI.
- Road maintenance to meet BMP standards on approximately **21.1 miles** of haul roads as required for timber sale contract.
- An estimated **4.5 miles** of temporary road construction to access harvest units as show in Table 2-9 below.
- An estimated **0.7 miles** of road easement across private lands to access Unit #2
- Approximately **0.2 miles** of new road construction across private lands to access Unit #2.

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**TABLE 2-9.  
 TEMPORARY ROADS NEEDED FOR ALTERNATIVE D**

Unit	Access Needs	Miles
1	Access via new NFS temporary road beginning from PCTC Road in T21N R17W Section 27	0.38
7	Access via new NFS temporary road beginning from Road #9595	0.11
10	Access via new NFS temporary road beginning from Road #9586	0.34
11, 12	Access via new NFS temporary road beginning from Road #9556	0.19
15	Access via new NFS temporary road beginning from Road #10277	0.39
15	Access via new NFS temporary road beginning from Road #10277	0.27
18a	Access via new NFS temporary road beginning from Road #9591	0.35
19, 20	Access via new NFS temporary road beginning from Road #9591	0.50
19	Access via new NFS temporary road beginning from Road #9591	0.17
21, 22, 23, 24b	Access via new NFS temporary road beginning from Road #9591	0.73
23, 24b	Access via new NFS temporary road beginning from Road #9591	0.32
24b	Access via new NFS temporary road beginning from Road #9591	0.27
24a	Access via new NFS temporary road beginning from Road #9591	0.03
26, 27, 28	Access via new NFS temporary road beginning from Road #10257	0.27
26	Access via new NFS temporary road beginning from Road #10257	0.13
<b>Total Miles of Access Needed for Alternative D</b>		<b>4.45</b>

**TABLE 2-10.  
 SUMMARY OF PROPOSED TREATMENT ACTIVITIES FOR ALTERNATIVE D**

<b>Commercial Harvest Treatment Acres</b>	
Clearcut with Reserves	0 acres
Patch Clearcut with Reserves	0 acres
Seed Tree with Reserves	0 acres
Thin From Below – Commercial	511 acres
Sanitation	51 acres
Salvage	30 acres
<b>Total Harvest Acres</b>	<b>592 acres</b>
<b>Non Commercial Treatment Acres</b>	
Thin From Below	10 acres
Pre-Commercial Thinning	61 acres
<b>Total Acres of Commercial and Non-Commercial Treatments</b>	<b>663 acres</b>
Hand Planting (Occurring within Regeneration Units)	0 acres
<b>Logging System Acres</b>	
Tractor	592 acres
Mechanical Treatment in Thin From Below Non-Commercial Units	10 acres
Hand Treatments in Pre-Commercial Thinning Units	61 acres
<b>Total Logging System Acres</b>	<b>663 acres</b>
<b>Fuels Treatment Acres</b>	
Whole Tree Yard/Excavator Pile/Chip/Burn	592 acres
Whole Tree Yard/Excavator Pile/Chip/Lop and Scatter	10 acres

**TABLE 2-10.**  
**SUMMARY OF PROPOSED TREATMENT ACTIVITIES FOR ALTERNATIVE D**

Hand Piling and Pile Burning	61 acres
Whole Tree Yard/Excavator Pile/Burn	0 acres
<b>Total Acres of Fuel Treatment</b>	<b>663 acres</b>
Fuels Treatment within Wildland Urban Interface	300 acres
Fuels Treatment outside Wildland Urban Interface	363 acres
<b>Road Management</b>	
Haul Routes (BMPs to be applied to meet Timber Sale Requirements)	21.1 miles
Permit Haul Routes	1.5 miles
Temporary Road Construction	4.5 miles
Total New Private Land Easement Access	0.7 miles
Private Land Access New Construction	0.2 miles

**TABLE 2-11.**  
**PROPOSED TREATMENT ACTIVITIES FOR ALTERNATIVE D**

Unit No.	Unit Acres	Alternative D Treatment	Logging System	Hazardous (Fuels) Reduction	Forest Plan Direction (MA)
1	21	Thin from Below-Commercial	Tractor	Whole Tree Yard/Excavator Pile/Chip/Burn	MA 12
2	10	Salvage	Tractor	Whole Tree Yard/Excavator Pile/Chip/Burn	MA 12
3a	4	Pre-Commercial Thinning	Hand	Hand Piling and Pile Burning	MA 15C
3b	8	Pre-Commercial Thinning	Hand	Hand Piling and Pile Burning	MA 15C
5a	10	Sanitation	Tractor	Whole Tree Yard/Excavator Pile/Chip/Burn	MA 15C
5b	41	Sanitation	Tractor	Whole Tree Yard/Excavator Pile/Chip/Burn	MA 15C
6	9	Pre-Commercial Thinning	Hand	Hand Piling and Pile Burning	MA 15C
7	20	Thin From Below-Commercial	Tractor	Whole Tree Yard/Excavator Pile/Chip/Burn	MA 15C
9	22	Thin From Below-Commercial	Tractor	Whole Tree Yard/Excavator Pile/Chip/Burn	MA 15
10	17	Salvage	Tractor	Whole Tree Yard/Excavator Pile/Chip/Burn	MA 15
11	33	Thin From Below-Commercial	Tractor	Whole Tree Yard/Excavator Pile/Chip/Burn	MA 15C
12	29	Pre-Commercial Thinning	Hand	Hand Piling and Pile Burning	MA 15C
13	11	Pre-Commercial Thinning	Hand	Hand Piling and Pile Burning	MA 15C
15	134	Thin From Below-Commercial	Tractor	Whole Tree Yard/Excavator Pile/Chip/Burn	MA15C
17	7	Thin From Below-Commercial	Tractor	Whole Tree Yard/Excavator Pile/Chip/Burn	MA 15C
18a	23	Thin From Below-Commercial	Tractor	Whole Tree Yard/Excavator Pile/Chip/Burn	MA15C
18b	2	Thin From Below-Commercial	Tractor	Whole Tree Yard/Excavator Pile/Chip/Burn	MA 15C
19	38	Thin From Below-Commercial	Tractor	Whole Tree Yard/Excavator Pile/Chip/Burn	MA 15C
20	12	Thin From Below-Commercial	Tractor	Whole Tree Yard/Excavator Pile/Chip/Burn	MA 15C
21	22	Thin From Below-Commercial	Tractor	Whole Tree Yard/Excavator Pile/Chip/Burn	MA 15C
22	18	Thin From Below-Commercial	Tractor	Whole Tree Yard/Excavator Pile/Chip/Burn	MA 15C
23	100	Thin From Below-Commercial	Tractor	Whole Tree Yard/Excavator Pile/Chip/Burn	MA 15C
24a	9	Thin From Below-Commercial	Tractor	Whole Tree Yard/Excavator Pile/Chip/Burn	MA 15C

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## Alternatives Considered

**TABLE 2-11.  
PROPOSED TREATMENT ACTIVITIES FOR ALTERNATIVE D**

Unit No.	Unit Acres	Alternative D Treatment	Logging System	Hazardous (Fuels) Reduction	Forest Plan Direction (MA)
24b	28	Thin From Below-Commercial	Tractor	Whole Tree Yard/Excavator Pile/Chip/Burn	MA15C
26	10	Thin From Below - Non-Commercial	Mechanical	Whole Tree Yard/Excavator Pile/Chip/Lop and Scatter	MA 15C
27	3	Salvage	Tractor	Whole Tree Yard/Excavator Pile/Chip/Burn	MA 15C
28	22	Thin From Below-Commercial	Tractor	Whole Tree Yard/Excavator Pile/Chip/Burn	MA 15C
<b>TOTAL</b>	<b>663 acres</b>				

## Comparison of Alternatives

This section provides a comparison of the alternatives in terms of:

- How the alternatives meet the Purpose and Need for the proposal;
- How the alternatives respond to the key issues;
- The potential environmental consequences associated with the implementation of the alternatives.

(Some activities are listed more than once because they meet more than one Purpose and Need.)

**TABLE 2-12.  
COMPARISON OF ALTERNATIVES – HOW THEY RESPOND TO THE PURPOSE AND NEED**

Purpose and Need Statement	Alt. A	Alt. B	Alt. C	Alt. D
<b>Hazardous Fuels Reduction</b>				
Reduce the associated risk of high-severity landscape wildfire risk within the Wildland Urban Interface (WUI) as identified in the Seeley Swan Fire Plan ( <i>Indicator: Acres treated within the WUI</i> ).	0	321	321	300
Reduce the associated risk of high-severity wildfire risk outside the Wildland Urban Interface (WUI) ( <i>indicator: Acres treated outside the WUI</i> ).	0	418	418	363
Provide a safer environment for the public and firefighters should a wildfire occur within the proposed treatment areas.	No	Yes	Yes	Yes
Increase the probability of stopping wildfires on NFS lands before they burn onto private lands.	No	Yes	Yes	Yes
<b>Forest Health</b>				
Restore and maintain forest health (restore historical tree species composition, structure, pattern, and reduce the risk for insect and disease infestations [ <i>Indicator: Acres treated – Clearcut with Reserves, Patch Clearcut with Reserves, Seed Tree with Reserves, Thin From Below (commercial and non-commercial), Sanitation, Salvage, Pre-commercial Thinning, and Hand Planting</i> ]).	0	739	739	663

**TABLE 2-13.**  
**COMPARISON OF ALTERNATIVES – HOW THEY RESPOND TO THE KEY ISSUES**

Indicator	Alt. A	Alt. B	Alt. C	Alt. D
Spread of Noxious Weeds <i>(Indicator: Acres of Winter Logging)</i>	0	0	281	0
Regeneration Harvest <i>(Indicator: Acres of Regeneration Harvest)</i>	0	203	203	0

## Comparison of Environmental Effects

**TABLE 2-14.**  
**COMPARISON OF ENVIRONMENTAL EFFECTS BY ALTERNATIVE**

Environmental Consequence	Alt. A	Alt. B	Alt. C	Alt. D
<b>Soils – Meets Soil &amp; Water Standards</b>				
Detrimental soil disturbance resulting from alternative implementation <i>(Indicator: Units exceeding 15% detrimental oil disturbance)</i>	2	4	4	3
Meets Forest Service Regional Soil Quality <i>(Indicator: Does or does not meet standard)</i>	No	Yes	Yes	Yes
<b>Hydrology</b>				
Road Maintenance to meet BMPs <i>(Indicator: Miles of existing roads brought to BMP standards)</i>	0	21.4	21.4	21.1
<b>Fisheries – T&amp;E and Sensitive Species</b>				
Bull Trout <i>(Indicator: BA Determination)</i>	--	The proposed action May affect, not likely to adversely affect. Resource enhancements are covered under a programmatic BO and are considered “may affect-likely to adversely affect” for individuals due to short term impacts, but will not jeopardize any populations.		
Cutthroat Trout <i>(Indicator: BE Determination)</i>	--	May impact individuals or habitat, but will not likely result in a trend towards federal listing of reduced viability for the population or species.		
Protect and improve fisheries habitat <i>(Indicator: Does the alternative improve fisheries habitat?)</i>	No	Yes	Yes	Yes
<b>Wildlife– T&amp;E Species</b>				
Grizzly Bear <i>(Indicator: BA Determination)</i>	--	May affect, not likely to adversely affect		
Grizzly Bear– Improves grizzly bear security habitat and increases grizzly bear core security habitat within the Meadow Smith BMU Subunit <i>(Indicator: Does the alternative improve grizzly bear security?)</i>	No change	No change	No change	No change
Canada Lynx <i>(Indicator: BA Determination)</i>	--	May affect, not likely to adversely affect		
Gray Wolf <i>(Indicator: BA Determination)</i>	--	May affect, not likely to adversely affect		
<b>Wildlife– Sensitive Species</b>				
Black-Backed Woodpecker, Fisher, Western Big-Eared Bat, Western Toad, Wolverine <i>(Indicator: BE Determination)</i>	--	May impact individuals or habitat, but will not likely contribute to a trend towards Federal listing or loss of viability to the population or species.		

**Hemlock Elk Fuels Reduction and Forest Health Environmental Assessment  
Alternatives Considered**

**TABLE 2-14.  
COMPARISON OF ENVIRONMENTAL EFFECTS BY ALTERNATIVE**

<b>Environmental Consequence</b>	<b>Alt. A</b>	<b>Alt. B</b>	<b>Alt. C</b>	<b>Alt. D</b>
Bald eagle, common loon, flammulated owl, harlequin duck northern bog lemming, northern leopard frog, peregrine falcon (Indicator: BE Determination)	--	Not affected by this project.		
<b>Old Growth Associated Wildlife/Snag Dependent Wildlife Species</b>				
Meets Forest Plan standards for snag and large woody debris retention. (Indicator: Does or does not meet)	Meets	Meets	Meets	Meets
<b>Wildlife – Commonly Hunted Big Game</b>				
Meets Forest Plan direction for summer range habitat.	Yes	Yes	Yes	Yes
<b>Forest Vegetation</b>				
Stand composition changed towards greater percentage of western larch, western white pine, and ponderosa pine. (Indicator: Acres of Treatment by Alternative)	0	739	739	663
Forest structure modified through density reduction, resulting in larger stand diameters, increased growing space and decreased competitive stress.	No	Yes	Yes	Yes
Change in Seral Stage Distribution (Indicator: Acres converted to early seral stage).	0	203	203	0
Insect and Disease Conditions affected through reduced stand densities and increased representation of resistant species (Indicator: Acres Treated)	0	739	739	663
Reduce forest fuels buildup adjacent to public and private lands (Indicator - Acres of treatment within WUI).	0	321	321	300
Reduce forest fuels buildup adjacent to public and private lands (Indicator: Acres of treatment outside of WUI)	0	428	428	363
Level of Risk of Noxious Weed Establishment and Spread	Slight risk above current level	Highest relative risk due to the highest number of acres treated.	Moderate risk due to winter logging	Lowest relative risk due to the smallest number of acres treated.
<b>Recreation</b>				
Visual Resource – meets Forest Plan VQOs	Yes	Yes	Yes	Yes
Restricts existing recreation opportunities	No	No	No	No
<b>Heritage Resource</b>				
Number of sites affected	0	0	0	0

**TABLE 2-14.  
 COMPARISON OF ENVIRONMENTAL EFFECTS BY ALTERNATIVE**

Environmental Consequence	Alt. A	Alt. B	Alt. C	Alt. D
<b>Social and Economic</b>				
Direct Employment	0	25.1	25.1	18.5
Total Jobs (Direct and Indirect)	0	58.8	58.8	43.3
<b>Products</b>				
Sawlogs (MBF)	0	3111	3111	2292

## Management Requirements and Design Criteria

The measures identified in the following table serve to further reduce impacts to the specific resources identified. Most are considered design criteria and are included in all action alternatives.

Several abbreviations are used in the responsibility section of Table 2-15. The following explains those abbreviations:

DR	District Ranger	BT	Botanist
SA	Sale Administrator	TMC	Timber Marking Crew
SP	Sale Prep	NWM	Noxious Weed Manager
WB	Wildlife Biologist	LEO	Law Enforcement Officer
FMO	Fire Management Officer	IDT	Interdisciplinary Team Members
ENG	Engineer	ARCH	Archaeologist
SILV	Silviculturist	HYD	Hydrologist
DRC	District Road Coordinator	TP	Timber Sale Purchaser
RF	Resource Forester	RA	Range Administrator
FAFMO	Fuels Assistant Fire Management Officer	SS	Soils Scientist
FISH	Fisheries Biologist		

**TABLE 2-15.  
MANAGEMENT REQUIREMENTS AND DESIGN CRITERIA**

OBJECTIVE	TASK	RESPONSIBILITY	DUE DATE
<b>Grizzly Bear Security and SVGBCA Compliance</b>	Comply with Swan Valley Grizzly Bear Conservation Agreement (SVGBCA). The Hemlock Elk Subunit is active from 2009 through 2011. Commercial use, defined as major forest management activities (including road construction and timber harvest), is not permitted in an Inactive subunit except during the denning period or during a short "window" in the summer. The Hemlock Elk Subunit is Inactive in 2008 and becomes Inactive again in 2012.	WB, SA, SP	Pre - & Post - Sale
<b>Grizzly Bear Security</b>	Comply with SVGBCA rotation schedule. Implementation (sale layout and preparation) of the Hemlock Elk Project is expected to begin in 2008. Harvest operations are expected to begin in 2009 and are anticipated to be completed within a 3-year time frame. If contract extensions result in sale activities extending beyond 3 years, into the time period when the grizzly bear subunit is Inactive, then standards and guidelines for an Inactive grizzly bear subunit will be followed (as per Swan Valley Grizzly Bear Conservation Agreement).	WB, SA, SP	Pre & Post - Sale

**TABLE 2-15.  
MANAGEMENT REQUIREMENTS AND DESIGN CRITERIA**

OBJECTIVE	TASK	RESPONSIBILITY	DUE DATE
<b>Grizzly Bear Security</b>	In order to avoid the potential disturbance of grizzly bear in important Spring Habitat, management activities that are planned in Spring Habitat, which is defined as areas within designated Linkage Zones, below 5,200 feet, will not occur within the Spring Period (April 1 thru June 15). This timing restriction would apply to the following treatment units:  Units 1, 19, 20, 21, 22, 23, 25, 26, 27, and 28.	SP, SA, TMC, WB	Pre & Post - Sale
<b>Grizzly Bear Security</b>	Lay out Seed Tree Units so that no point in the unit is more than 600 feet from cover; in other words, a bear in the unit would be able to find cover, anywhere in the unit, within 600 feet or less.	SP, WB	Pre & Post - Sale
<b>Wildlife Security</b>	Where it exists, leave visual screening adjacent to open roads in proposed cutting units.	SP, SA, TMC, WB	Pre - & Post - Sale
<b>Wildlife – TES Species</b>	Include provisions in the contract to cease activity or otherwise protect populations and individuals of threatened, endangered, or sensitive species. This allows for modification of the project should an unforeseen issue(s) be identified during operations. Standard contractual requirements used in all contracts provide for modification or termination of the contract to avoid impacts and protect TES species.	WB, SA, SILV	Contract Prep & During Harvest Activities
<b>Wildlife – T&amp;E Species</b>	Public motorized access would be restricted on temporary roads and roads normally closed to use.	WB, SA, DRC	Pre - & Post - Sale & During Harvest Activities
<b>Wildlife– T&amp;E Species</b>	Contractors working under contract would be prohibited from carrying firearms on normally closed roads within the Project Area on National Forest lands, Plum Creek Timber Company lands, or State lands (SVGBCA).	SA, LEO, WB	Pre & Post Sale, During Harvest
<b>Wildlife – T&amp;E Species</b>	All temporary roads constructed on NFS lands will be reclaimed after use.	SA, DRC, WB	Post Sale
<b>Wildlife - Security</b>	Vegetation and/or rock barriers will be retained around berms and gates, where needed, to maintain closure effectiveness.	DRC, SA, WB	Pre & Post - Sale, During Harvest Activities
<b>Wildlife – Security</b>	If berms are removed for access to treatment units, temporary gates will be installed. Berms will be reinstalled when sale activities are complete.	SB, SA, DRC	Pre & Post - Sale, During Harvest
<b>Public Safety</b>	Contracts will require the contractor to clearly post signs warning the public of nearby activities and truck hauling traffic associated with the treatments.	SA, DRM	Pre & Post - Sale, During Harvest Activities
<b>Public Safety</b>	The District Assistant Fire Management Officer (Fuels) or designated liaison will notify nearby landowners prior to fuel reduction activities commencing on NFS lands that are adjacent to their properties.	FAFMO	Pre - Sale, During Harvest Activities
<b>Special Use Permits</b>	All permitted improvements, including power and phone service lines and water transmission lines (authorized by special use permits) will be clearly marked and protected during project implementation.	SA, TMC, IF, FMO, SP, RF	Pre & Post - Sale
<b>Protect Site and Soil Productivity</b>	Reuse existing skid trails where practical. Carefully select trails for the least environmental degradation and optimal efficiency.	SA, SP, SS	Pre & Post - Sale, During Harvest Activities

**TABLE 2-15.  
MANAGEMENT REQUIREMENTS AND DESIGN CRITERIA**

OBJECTIVE	TASK	RESPONSIBILITY	DUE DATE
<b>Protect Site and Soil Productivity</b>	Select appropriate logging contractors for the task at hand. Invest some time instructing contractors new to light-on-the land and soil restoration techniques.	SA, SP, SS	During Harvest Activities
<b>Protect Site and Soil Productivity</b>	Limit ground-based equipment to slopes of 35% or less. Yarding and forwarding on short pitches (maximum 100 feet) over 35% slope is allowed; however, ground-based equipment should cable yard accessible steep slopes.	SA, SP, SS	During Harvest Activities
<b>Protect Site and Soil Productivity</b>	Use cable harvesting systems on steep slopes (greater than 35%). Maintain corridors as far apart as feasible. Cable systems are highly effective when employed correctly. Specifically, this system drastically reduces compaction and soil displacement.	SA, SP, SS	During Harvest Activities
<b>Protect Site and Soil Productivity</b>	Skidder/forwarder trails should be no fewer than <b>100 feet</b> apart except where converging at junctions or landings. Maintain narrow trails.	SA, SP, SS	Pre & Post - Sale, During Harvest Activities
<b>Protect Site and Soil Productivity</b>	Leave as much slash as is feasible under fuel hazard guidelines. Organic matter will ameliorate past and present soil impacts. Where feasible, an average of 8 tons per acre of coarse woody debris would be left on treatment units within the WUI; 8 to 21 tons per acres of coarse woody debris would be left in treatment units outside the WUI.	SA, SP, SS	During Harvest Activities
<b>Protect Site and Soil Productivity</b>	All equipment should stay on designated skid routes, or as designated by the Sales Administrator, with the exception of feller-bunchers and harvesters.	SA, SP, SS	Pre & Post - Sale, During Harvest Activities
<b>Protect Site and Soil Productivity</b>	Minimize harvester trips off of main trails to three passes.	SA, SP, SS	Pre & Post - Sale, During Harvest Activities
<b>Protect Site and Soil Productivity</b>	Where feasible, timber harvesters should place slash in front of the vehicle and work on a slash mat.	SA, SP, SS	During Harvest Activities
<b>Protect Site and Soil Productivity</b>	Work only when soil is dry or frozen or snow-packed. Stop work when you detect trenching or mud. If you can form a fairly strong clod with the soil in the topmost 6 inches, then the site is too moist for work. For snow or frozen soil:  0 inches of frozen soil – need 10 inches of machine packed snow 2 inches of frozen soil – need 6 inches of machine packed snow 4 inches of frozen soil – no snow cover necessary	SA, SP, SS	During Harvest Activities
<b>Protect Site and Soil Productivity</b>	If necessary, pre-pack snow on designated routes before work commences. This allows soil to freeze and the snow to solidify.	SA, SP, SS	Pre & Post - Sale, During Harvest Activities

**TABLE 2-15.  
MANAGEMENT REQUIREMENTS AND DESIGN CRITERIA**

OBJECTIVE	TASK	RESPONSIBILITY	DUE DATE
<b>Protect Site and Soil Productivity</b>	In regeneration harvest units, for biomass removal, leave green slash on the forest floor for at least one wet season to allow nutrients to leach out of the foliage and into the soil. Leave the appropriate amount of coarse woody debris. A forwarder will be required in regeneration harvest units.	SA, SP, SS	Post – Sale During Harvest Activities
<b>Protect Site and Soil Productivity</b>	All temporary roads constructed for this project that utilize existing road templates would be reclaimed by removing any installed culverts or temporary bridges, by placing large woody material on the template (where material is available), and by seeding exposed soils with the native plant mix as specified by the Forest Botanist. In addition, all newly constructed temporary roads would be reclaimed after use, as soon as logistically practicable. The reclaiming of new temporary roads would include re-contouring the entire road template to natural ground contour, and to the extent feasible, placing the top soil back on the soil surface.	SA, SS	During Harvest Activities, Post-Sale
<b>Improve Soil Condition</b>	<p>Conduct Restoration Techniques on <b>Units 6 and 14</b>. These techniques consist of:</p> <ul style="list-style-type: none"> <li>-mechanical ripping on temporary roads and landings</li> </ul> <p>(See specific recommendations for mechanical ripping in the Soils Specialist Report)</p> <ul style="list-style-type: none"> <li>-placing slash on old and new trails at a rate of 25 to 40 tons per acres where feasible</li> <li>-on skid trails and other moderately disturbed soils throughout the unit, leaving an average of 8 tons per acre of coarse woody debris in treatment units within the WUI; leaving 8 to 21 tons per acre of coarse woody debris in treatment units outside the WUI. Where available, 32 pieces average per acre 9 to 20 inches diameter and 15 pieces average per acre greater than 20 inches diameter would be left.</li> </ul> <p><b>Units 5b and 12</b> will be monitored to see if proposed activities exceed the Region 1 Soil Quality Standards. If after implementing the proposed activities there is 15 percent or more detrimental disturbance, then restoration activities described above would occur to move the units back towards improved condition.</p>	SA, TP	During Harvest Activities, Post-Sale
<b>Water Quality</b>	All drainage features will be put in place and functioning before, during, and after activities.	HYD, SA, SP, DRM	Pre - & Post - Harvest, During Harvest Activities
<b>Water Quality</b>	If activities carry over into another operating season or are delayed because of incumbent weather, all 'jump ups' or other temporary transportation features would be cleared from roadside ditches to prevent damage to the roads.	HYD, SA, SP, DRM	Pre - & Post - Harvest, During Harvest Activities
<b>Water Quality</b>	All activities will meet Montana Best Management Practices and the State Streamside Management Zone Law, therefore will comply with State Water Quality Laws and Federal Soil and Water Quality Handbook.	HYD, SA, SP	Pre - & Post - Harvest, During Harvest Activities
<b>Protect Fisheries</b>	No vegetation management would be conducted within INFISH Riparian Habitat Conservation Areas	SA, SP, FMO,	Pre - & Post - Harvest,

**TABLE 2-15.  
MANAGEMENT REQUIREMENTS AND DESIGN CRITERIA**

OBJECTIVE	TASK	RESPONSIBILITY	DUE DATE
<p><b>Habitat</b></p>	<p>(RHCA's) except as specifically designed within Unit 1(See Fish Report). No activity would occur within 300' of any fish-bearing stream, or 150' of any perennial non-fish bearing stream, or 100' from any intermittent stream in Glacier Creek. Designate the following RHCA buffers for treatment units:</p> <p>Unit 2 - 300 feet from Elk Creek's side channel</p> <p>Unit 3a - 100 feet from small Cold Creek tributary and wetland on eastern edge</p> <p>Unit 3b - 150 feet from wetland on eastern edge; 150 feet from wetlands on western edge and 100 feet from stream that connects the wetlands</p> <p>Unit 5a - 150 feet from all wetlands along eastern edge; 100 feet from the stream that connects the wetlands</p> <p>Unit 5b - On both east and west sides – 150 feet from all wetlands and 100 feet from streams that connect the wetlands; no stream upstream (south) of the eastern wetland, no buffer needed there, (i.e., SE corner of unit needs no buffer)</p> <p>Unit 6 - 150 feet from wetland on SE corner; if the wetland exists on SE portion (unconfirmed), it will need 100 foot buffer; 300 feet from wetland on east side of unit, which is at beginning of a tributary stream</p> <p>Unit 7 - 150 feet from wetland on north edge of unit; no buffer needed on dry draw in center of unit</p> <p>Unit 9 - 100' from tributary on south border</p> <p>Unit 10 - 100 feet from each tributary on north border and center of unit and west border</p> <p>Unit 16 - 300 feet from Elk Creek; 300 feet from wetland on north border;150 feet from wetland near sharp turn on Road #9587 on SW border; 100 feet from wetland on SW border just north of previous wetland; 100 feet from wetland in center of unit</p> <p>Unit 17 - 300 feet from Elk Creek; 150 feet from wetland near sharp turn on Road 9587 and 100 feet from wetland just north of that</p> <p>Unit 18a - 150 feet from each large wetland in SE portion; 100 feet from smaller wetland situated just west of big wetland</p>	<p>FAFMO, FISH</p>	<p>During Harvest Activities</p>

**TABLE 2-15.  
MANAGEMENT REQUIREMENTS AND DESIGN CRITERIA**

OBJECTIVE	TASK	RESPONSIBILITY	DUE DATE
	Unit 18b - 150 feet from big wetland on western edge and 150 feet from wetland on eastern edge Unit 19 - 300 feet from Elk Creek; all wetlands around perimeter will require 150 feet buffer Unit 20 - 300 feet from Elk Creek; three wetlands on eastern edge need 150 feet; small wetland at extreme SW corner needs 100 feet Unit 21 - 300 feet from Elk Creek; 150 feet from tributary along SW edge; 100 feet from wetland at confluence of Units 21, 22, and 23 Unit 22 - 100 feet from wetland of confluence of Units 21, 22, 23 Unit 23 - 300 feet from Elk Creek; 150 feet from all the wetlands and lakes within or near the unit except the following two: a 300 foot buffer is needed for both wetlands right beside each other in SE corner of Section 16; a 100 foot buffer is needed for small wetland in center of unit Unit 24a - 150 feet from both large wetlands on south edge Unit 24b - 300 feet from twin wetlands in SE corner of Section 16; 300 feet from wetland on Section line, in NE area of unit; 150 feet from two large units on north boundary; 100 feet from wetland in center of unit; no buffer needed on dry draw in center of unit Unit 25 - 300 feet from Windfall Creek; 150 feet from tributary stream along NE edge of unit; 150 feet from all wetlands in a string on SE edge of unit Unit 26 - 150 feet from all wetlands on western edge; no buffer needed on dry draw on eastern edge Unit 27 - 150 feet from wetlands on eastern border		
<b>Protect Fisheries Habitat</b>	Unit 1 has a distinct topographical break along the western side of the Swan River Valley. No activity would be conducted within 150' of the stream or the top of the break, whichever is further.	SA, SP, FMO, FAFMO, FISH	Pre - & Post - Harvest, During Harvest Activities
<b>Protect Groundwater Quality</b>	No activity within 50' of any wetland less than 1 acre or 150' of any wetland greater than 1 acre would be conducted.	SA, SP, FMO, FAFMO, FISH	Pre - & Post - Harvest, During Harvest Activities
<b>Protect Fisheries Resource</b>	The following treatment units require NO RHCA buffer: Units 11, 12, 13, 14, 15, 28	SA, SP, FMO, FAFMO, FISH	Pre - & Post - Harvest, During Harvest Activities

**TABLE 2-15.  
MANAGEMENT REQUIREMENTS AND DESIGN CRITERIA**

OBJECTIVE	TASK	RESPONSIBILITY	DUE DATE
<b>Minimize sedimentation</b>	During removal of old bridge abutments on Cold Creek and Kraft Creek, heavy equipment would be restricted to just one crossing of the stream. Wash the equipment prior to implementation to minimize sediments entering the channel.	FISH, HYD	During Implementation
<b>Minimize sedimentation</b>	Install and remove culvert on temporary road to Unit 10 when stream is dry.	SA	During Implementation
<b>Minimize disturbance to bull trout</b>	During all culvert replacements/removals and the bridge abutment removal in Cold Creek Watershed, restrict activity to a period between July 15 and August 31. No activity would take place at night.	ENG, FISH	During Implementation
<b>Forest Vegetation</b>	Prepare detailed site specific silvicultural prescription for all treatment areas requiring vegetation manipulation.	SILV	Prior to presale activities
<b>Forest Vegetation</b>	Consult with Project Silviculturist where treatment deviations are required during contract execution, as a result of changed or unidentified conditions that materially affect the intended treatment as described in the detailed site specific silvicultural prescription. As needed, the silvicultural prescription will be modified and re-approved by a certified silviculturist.	SILV, TSA, SP, FMO	Pre, During, and Post Harvest Activities
<b>Forest Vegetation (Leave Tree Protection)</b>	Contractor will take all reasonable care to avoid damage to the roots, bole, and crown of trees to be reserved from cutting. No more than 5 percent of the trees designated to be reserved should be damaged beyond recovery by the Contractor's operations. Any tree damaged beyond recovery, (will die within one year due to damage), can be removed or otherwise treated by the Contractor as instructed by the Forest Service.	TP, TSA, SILV	Pre, During, and Post Harvest Activities
<b>Forest Vegetation (Leave Tree Protection)</b>	All hardwood trees will be reserved where feasible.	SILV, SA, TP, SP	Pre, During, and Post-harvest Activities
<b>Forest Vegetation (Down Woody Material)</b>	In treatment units, the minimum retention for down woody material shall be consistent with forest plan direction as outlined by potential vegetation groups where available and will be averaged across unit acres. An average of 8 tons per acre of coarse woody debris would be left on treatment units within the WUI; 8 to 21 tons per acres of coarse woody debris would be left in treatment units outside the WUI. Where available, 32 pieces average per acre 9 to 20 inches diameter and 15 pieces average per acre greater than 20 inches diameter would be left. This amount of down woody material can be converted to tons per acre. Generally down woody material to be left would be further than 150 feet from private land boundaries.	SILV, SA, TP, SP	Pre, During, and Post Harvest Activities
<b>Forest Vegetation (Snag Retention)</b>	In treatment units, where available, a minimum average of 6 snags per acre that are 12 to 20 inches DBH would be left and all snags greater than 20 inches would be left. If existing snag densities are below these densities, substitute live trees would be left. All standing dead cull western larch, ponderosa pine, and Douglas-fir trees 16 inches DBH or greater may be retained. Generally, snags to be left would be further than 150 feet from open roads and private land boundaries. Snags that pose a safety hazard to the Contractor's operation would be removed.	SILV, SA, TP, SP	Pre, During, and Post Harvest Activities

**TABLE 2-15.  
MANAGEMENT REQUIREMENTS AND DESIGN CRITERIA**

OBJECTIVE	TASK	RESPONSIBILITY	DUE DATE
<b>Preserve TES Plant Populations and Their Habitats</b>	Sensitive plant surveys were partially completed during the 2007 field season. If new occurrences of sensitive or threatened plant species are discovered during activities or surveys conducted prior to ground disturbance, contractual requirements provide for modification of the contract to avoid impacts and protect their habitat. Special treatment zones would be created or unit boundaries would be relocated to avoid negative impacts. Avoid disturbance of sensitive plant populations observed during sale activities through cooperation between Sale Administrators and loggers. Any sensitive plant species observed during sale activity would be given protective measures as afforded by standard contract clause CT6251.	BT, SA, SP, FMO	Pre- & Post Sale & during Harvest Activities
<b>Preserve TES Plant Populations and Their Habitats</b>	Comply with Forest Plan Amendment 20 (Conservation Measures for the Threatened Plant, Water Howellia) and the Conservation Strategy for Howellia aquatilis. If wet areas are identified as "occupied howellia habitat" within treatment units, establish a 300 foot buffer around occupied howellia ponds where no ground disturbance would occur, regardless of activity. The 300 foot buffer begins where riparian vegetation ends.	SA, BT	Pre - & Post Sale & During Harvest Activities
<b>Preserve TES Plant Populations and Their Habitats</b>	Establish a 150-foot buffer zone for potentially unoccupied howellia ponds, where no ground disturbance would occur. If sensitive or threatened plant species are discovered during activities, steps would be taken to minimize impact and protect their habitat.	SA, BT	Pre - & Post Sale & During Harvest Activities
<b>Preserve TES Plant Populations and Their Habitats</b>	Protect occupied howellia ponds 54, 55, 119, and 120 located near haul routes, Roads #561, 9595, and 9553. If ground disturbing BMP related activities occur within 300 feet to the north and south of these ponds, natural filtration zones, sediment retention structures, or straw bales would be applied to ensure limited sediment deposition into these ponds. See Project File Exhibit H-2 for specific locations of ponds.	SP, SA, BT	Pre - & Post Sale & During Harvest Activities
<b>Preserve TES Plant Populations and Their Habitats</b>	Protect unoccupied howellia ponds u-021, u-022, u-049, and u-097 located near haul routes, Roads # 9553, 9591, 10257, and 10289. If ground disturbing BMP activities occur in the vicinity of these ponds, natural filtration zones, sediment retention structures, or straw bales would be applied to ensure limited sediment deposition into these ponds. See Project File Exhibit H-1 for specific locations of ponds.	SP, SA, BT	Pre - & Post Sale & During Harvest Activities
<b>Protect Aspen Groves</b>	Protect aspen groves in Units 11 and 12 from disturbance and noxious weeds. Using standard INFISH buffers, no vegetation treatments or ground disturbance would occur within 50' of groves less than 1 acre, and 150' for groves more than 1 acre.	SA, BT	Pre - & Post Sale & During Harvest Activities
<b>Control Spread of Noxious Weeds</b>	Re-establish vegetation on bare ground created at log landings and roadsides with soil disturbance with a Montana-Certified weed free grass ground cover (seed mix of native plants will be specified by the Forest Botanist), as soon as feasible after disturbance to provide for site protection until native species are established.	SA, BT, DRC	Post - Sale

**TABLE 2-15.  
MANAGEMENT REQUIREMENTS AND DESIGN CRITERIA**

OBJECTIVE	TASK	RESPONSIBILITY	DUE DATE
<b>Control Spread of Noxious Weeds</b>	Off-road equipment use associated with timber harvest and road maintenance would be power scrubbed or steam cleaned on the undercarriage and chassis to remove all soil, plant parts, seeds, vegetative matter, or other debris that could contain or hold seeds before transport to and from the project area. All subsequent move-ins of equipment to the project area would be treated in the same manner as the initial move in. "Off-road equipment" includes all logging and construction machinery, except for log trucks, chip vans, service vehicles, water trucks, pickup trucks, cars, and similar vehicles. During periods of operations with snow cover or frozen ground, washing of equipment as described above is only required upon entering the project area but not when leaving.	SA, TP	Pre-Harvest
<b>Control Spread of Noxious Weeds</b>	Obliteration and revegetation of new temporary roads would occur to discourage future access and create a vegetation community which would resist infestations. When use of the temporary road is no longer needed for the project, soil would be pulled back over the road template, recontouring the road prism including all cut and fill slopes to the natural ground contour to the extent feasible. Revegetate with native shrubs or native seed mix (specified by the Forest Botanist) as soon as feasible after disturbance to provide for site protection until native species are established. The first 100 feet where the temporary road meets a traveled road should have heavier placement of slash and large woody debris when practical where these roads meet a road open to public motorized use to discourage the spread of weeds by unauthorized entry. Roads would be obliterated as soon as access is no longer needed.	SA, TP	Pre - & Post Sale & During Harvest Activities
<b>Control Spread of Noxious Weeds</b>	Herbicides would be sprayed within the road prism along designated haul routes (Exhibit P-1) before log hauling begins and after all purchaser activities are completed. The road prism is defined as the road and associated toe of the fill to the top of the cut slope, including the running surface and turnouts. However, when a contiguous patch of weeds extends beyond the road prism, it shall be treated (via force account or other means). Treatments would only occur during the periods from June 1 to July 15 or September 1 to September 30. Treatment of invasive plants would be consistent with the strategy outlined in the NIWC and Finding of No Significant Impact (May 2001). Specific roads and mileage would be prepared in consultation with the Forest Weeds Coordinator.	SA, NWM	Pre - & Post - Sale
<b>Protect Heritage Resources</b>	Modify contractual requirements to provide for protection of heritage resources and modify the contract to avoid impacts to heritage resource if cultural resources are discovered during ground disturbing activities.	SA, ARCH, SP	Pre & Post Sale, During Harvest Activities
<b>Preserve Scenic Values</b>	Unit boundaries would be designed so they undulate and/or feather; straight lines are minimized or non-existent.	SA, SILV, TMC	Pre & Post Sale, During Harvest Activities
<b>Preserve Scenic Values</b>	Units would be designed to blend with the characteristic landscape.	SA, SILV, TMC	Pre & Post Sale, During Harvest Activities