Appendix 1

Details of the Selected Alternative

Discussion of specific vegetation management treatments and associated activities of the **Selected Alternative** are discussed below.

Vegetation Management

A. Clearcut with Reserves: This treatment will remove nearly all targeted 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 will be reserved, where feasible and where not acting as an insect or disease vector, to provide seed sources and long-term structural diversity. Regeneration will occur from a combination of natural seeding and planted seedlings. Mechanical treatments and/or prescribed fire will be used to reduce fuels, recycle nutrients, and prepare the site for regeneration. This treatment will occur on **60 acres**.

The NFMA and Forest Service Handbook direction dictate that clearcutting must be justified as the optimum method to meet management objectives when prescribed. Three areas are selected for clearcutting in this project. The Project Silviculturist determined that clearcutting was the optimum regeneration method for meeting management objectives for each of these areas. 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 of the Silviculturist's Report for the Hemlock Elk Project (Project File G-1) discusses the criteria that will be applied to specific treatment areas.

B. 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 two 3-acre stands identified for Patch Clearcutting will be treated. This treatment will occur on **6 acres.**

C. Seed Tree with Reserves: A portion of the existing overstory western larch, ponderosa pine, western white pine, and Douglas-fir will 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 shade-tolerant species. Mechanical treatments and/or prescribed fire will be used to reduce fuels, recycle nutrients, and prepare the site for regeneration. This treatment will occur on **54 acres** in the Selected Alternative.

D. Thin From Below - Commercial: The existing tree density will 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 will be removed first, while most of the co-dominant and nearly all dominant crown class trees will 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 will be used to reduce fuels and recycle nutrients. This treatment will occur on **293 acres** in the Selected Alternative.

E. **Sanitation:** In this treatment area, the existing stand structure will generally remain intact following treatment. However, these areas will 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 will remove infected trees and reduce fuel continuity. Mechanical treatments will be used to reduce fuels and recycle nutrients. This treatment will occur on **41 acres** in the Selected Alternative.

F. **Pre-Commercial Thinning:** In this treatment, the existing immature tree density will 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 will 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 will be used to reduce fuels and recycle nutrients This treatment will occur on **44 acres.**

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 will include a combination of the following; whole tree yarding, slashing, excavator piling, and/or chipping/masticating. Prescribed fire treatments will include pile burning and/or understory burning. See the Fire and Fuels Section of Hemlock Elk EA for more detailed information related to fuels treatments.

A. **Fuels Treatments within the WUI:** Fuel reduction treatments will occur on **223 acres** in the Selected Alternative.

B. **Fuels Treatments outside the WUI:** Fuel reduction treatments will occur on **275 acres** in the Selected Alternative.

Site Preparation

Depending on existing vegetation and ground conditions, site preparation will 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 will 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 may 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 will 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 will occur after site preparation treatments. Hand planting will occur on **120 acres** in the Selected Alternative.

TABLE 1-1
PROPOSED TREATMENT ACTIVITIES FOR THE SELECTED ALTERNATIVE

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
3a	4	Pre-Commercial Thinning	Hand	Hand Piling and Pile Burning	MA 15C
5b	41	Sanitation	Forwarder	In-Woods Processing	MA 15C
9	22	Thin From Below-Commercial	Tractor	Whole Tree Yard/Excavator Pile/Chip/Burn	MA 15
10	26	Clearcut with Reserves	Forwarder	Excavator Pile/Burn/In-Woods Processing	MA 15
11	33	Seed Tree with Reserves	Forwarder	Excavator Pile/Burn/In-Woods Processing	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	Forwarder	In-Wood Processing	MA15C
17	7	Thin From Below-Commercial	Tractor	Whole Tree Yard/Excavator Pile/Chip/Burn	MA 15C
20	12	Clearcut with Reserves	Forwarder	Excavator Pile/Burn/In-Woods Processing	MA 15C
21	22	Clearcut with Reserves	Forwarder	Excavator Pile/Burn/In-Woods Processing	MA 15C
22	18	Seed Tree with Reserves	Forwarder	Excavator Pile/Burn/In-Woods Processing	MA 15C
23	87	Thin From Below-Commercial	Forwarder	In-Woods Processing	MA 15C
25	3	Patch Clearcut with Reserves	Forwarder	Excavator Pile/ Burn/In-Woods Processing	MA 15C
25	3	Patch Clearcut with Reserves	Forwarder	Excavator Pile/ Burn/In-Woods Processing	MA 15C
27	3	Seed Tree with Reserves	Forwarder	Excavator Pile/Burn/In-Woods Processing	MA 15C
28	22	Thin From Below-Commercial	Tractor	Whole Tree Yard/Excavator Pile/Burn	MA 15C
TOTAL	**498 acres**				

Road Management

Road management activities for the Selected Alternative include temporary and forwarder road construction and road maintenance. No new permanent roads will be constructed with the Selected Alternative.

A. 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 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 will bring the roads up to current BMP standards, better accommodate traffic, and reduce deferred maintenance needs. Road maintenance will occur on **20.8 miles** in the Selected Alternative.

B. Permit Haul Routes: Permits will be acquired from PCTC to facilitate haul from harvest units. Permits will be acquired on **4.4 miles** in the Selected Alternative.

C. Temporary Road Construction: Temporary roads will be constructed to the minimum standards necessary for log hauling from Roads #90378, 10277, 91297, and 91301. Temporary road surface width will be limited to truck bunk width plus 4 feet. All temporary roads will be reclaimed following their use using drain dips, outsloping, scarifying, seeding, and recontouring. For the Selected Alternative, approximately **1.3 miles** of temporary road will be constructed.

D. Forwarder Road Construction: Forwarder roads will be constructed for forwarding logs with a tractor from the felled location to a landing, where they are loaded on trucks and hauled away using PCTC Road #90230. This will occur on an estimated **0.4 miles.** This forwarder road will be reclaimed following its use using drain dips, outsloping, scarifying, seeding, and recontouring.

TABLE 1-2.
TEMPORARY ROADS NEEDED FOR THE SELECTED ALTERNATIVE

Unit	Access Needs	Miles
1	Access via new NFS temporary road beginning from PCTC Road #90378 in T21N R17W Section 27	0.4
15	Access via new NFS temporary road beginning from Road #10277	0.4
20	Access via new NFS temporary road beginning from PCTC Road #91297 in T20N R17W Section 17	0.1
21, 22, 23	Access via new NFS temporary road beginning from PCTC Road #91301 in T20N R17W in Section 21	0.3
27, 28	Access via new NFS temporary road beginning from Road #10257	0.1
	Total Miles of Temporary Roads Needed for the Selected Alternative	**1.3**

TABLE 1-3.
FORWARDER ROADS NEEDED FOR THE SELECTED ALTERNATIVE

Unit	Access Needs	Miles
10	Access via new NFS forwarder road beginning from PCTC Road #90230 in T20N R17W Section 9	0.1
25	Access via new NFS forwarder road beginning from temporary road in Unit 27	0.3
	Total Miles of Forwarder Road Needed for the Selected Alternative	**0.4**

E. Proposed Access across Private Lands: In the Selected Alternative, a trail easement (**0.7 miles**) will be pursued to provide the general public non-motorized access to an isolated parcel of NFS land in Section 26 of T21N R17W.

Selected Alternative timber harvest and associated activities are summarized in Table A1-4 below.

TABLE 1-4.
SUMMARY OF PROPOSED TREATMENT ACTIVITIES FOR SELECTED ALTERNATIVE

Commercial Harvest Treatment Acres	
Clearcut with Reserves	60 acres
Patch Clearcut with Reserves	6 acres
Seed Tree with Reserves	54 acres
Thin From Below – Commercial	293 acres
Sanitation	41 acres
Total Harvest Acres	**454 acres**
Non Commercial Treatment Acres	
Pre-Commercial Thinning	44 acres
Total Acres of Commercial and Non-Commercial Treatments	**498 acres**
Restoration Planting (Occurring within Regeneration Units)	120 acres

TABLE 1-4.
SUMMARY OF PROPOSED TREATMENT ACTIVITIES FOR SELECTED ALTERNATIVE

Logging System Acres	
Tractor	72 acres
Forwarder	382 acres
Hand Treatments in Pre-Commercial Thinning Units	44 acres
Total Logging System Acres	**498 acres**
Fuels Treatment Acres	
Whole Tree Yard/Excavator Pile/Chip/Burn	50 acres
Whole Tree Yard/Excavator Pile/Burn	22 acres
Hand Piling and Pile Burning	44 acres
Excavator Pile/Chip/Burn	262 acres
Excavator Pile/Burn	120 acres
Total Acres of Fuel Treatment	**498 acres**
Fuels Treatment within Wildland Urban Interface	223 acres
Fuels Treatment outside Wildland Urban Interface	275 acres
Road Management	
Haul Routes (BMPs to be applied to meet timber sale requirements)	20.8 miles
Permit Haul Routes	4.4 miles
Temporary Road Construction	1.3 miles
Forwarder Road Construction	0.4 miles
Proposed Non-Motorized Trail Access	0.7 miles

Resource Enhancement Projects

Resource enhancement projects identified during project design are shown in the table below. Please refer to Map 3 at the end of this appendix for a display of the project locations.

These projects are not needed to mitigate impacts of the Selected Alternative, but are specific resource enhancements that will be beneficial to a variety of resources. These projects represent site-specific resource enhancement opportunities that, through this decision, are authorized to occur. The implementation of these projects will occur as stand alone projects and/or may be associated with the Selected Alternative through Stewardship Contracting. Additional detail on the projects and potential funding sources follow below.

TABLE 1-5.
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.

TABLE 1-5.
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 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. 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

Appendix 2 of this document describes the Design Criteria applied to this project to protect resources.

Monitoring

Monitoring and evaluation compares the end 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 will be conducted as described in Appendix 3. Those monitoring components not specifically discussed in this appendix tier to the monitoring described in the Forest Plan.