Appendix B

Project Design Criteria

These design criteria for the Five Rivers Landscape Management Project were developed to ensure that standards and guides of the 1990 Siuslaw Forest Plan (SFP) as amended by the 1994 Northwest Forest Plan (NFP) are met. Where applicable, pertinent standards and guides from these Plans are cited. The design criteria apply to Alternatives 1 and 2, unless otherwise specified. Appropriate specialists will be consulted before any design criteria for proposed activities are changed.

I. Design Criteria Common to All Activities

1. Coho salmon

   a. Reduce the density or adverse effects of existing system or nonsystem roads in the Lobster-Five Rivers Watershed by at least an equivalent mileage or adverse effect of proposed new permanent roads. Roads to be decommissioned or effects to be reduced will be identified before or at the same time new permanent roads are built.

   b. Reduce the density or adverse effects of existing system or nonsystem roads in the Lobster-Five Rivers Watershed by at least an equivalent mileage or adverse effect of temporary roads not decommissioned in the same dry season they are built. Roads to be decommissioned or effects to be reduced will be identified before or at the same time new temporary roads to remain for more than one dry season are built. Roads to be decommissioned that serve a sale unit may be decommissioned up to five years after the sale closes. The National Marine Fisheries Service has identified any temporary road not built, used, and decommissioned in the same dry season (July 1- September 15) as a semipermanent road.

2. Northern spotted owl and marbled murrelet habitat

   a. Comply with the standards of the 13 May 1997 biological opinion addressing the effects of implementing the Northwest Plan standards and guides on designated murrelet critical habitat (USDI 1996) for all thinning and individual hazard-tree removals that may affect critical habitat or suitable habitat of the marbled murrelet.

   b. Except for hazard trees, do not remove individual known nest trees or trees with nesting structure from areas where, in the opinion of the unit biologist, the loss of such a tree would limit nesting. A known nest tree may be removed only when it is a hazard tree and when the tree is unoccupied by nesting birds or young.

   c. For all projects affecting listed species, include a wildlife biologist in their planning and design.
3. Bald eagle, northern spotted owl, and marbled murrelet disturbance

Pending final terms and conditions issued by the U.S. Fish and Wildlife Service, implement the following criteria:

a. Do not implement any project within 0.25 miles or a 0.5-mile sight-distance of a known bald eagle nest site between January 1 and August 31.

b. Do not treat any area within 0.25 miles of a spotted owl nest site or activity center of any known pair, or within 0.25 miles of an occupied murrelet site, during the critical nesting period. The distance and timing may be modified by the unit wildlife biologist, based on site-specific information, but all changes must be appropriately documented and the Fish and Wildlife Service notified before they are implemented.

c. Do not begin activities associated with projects within 0.25 miles of occupied or unsurveyed suitable marbled murrelet habitat between April 1 and September 15 until two hours after sunrise; end activities two hours before sunset.

d. Do not use blasting for part of any proposed action from March 1 through September 30.

e. Restrict helicopter operations to August 6 through February 28 to reduce potential disturbance to listed species such as the northern spotted owl and the marbled murrelet.

4. Other requirements

a. Follow Siuslaw Plan standards and guides (FW-114 through FW-118) to meet water-quality standards outlined in the Clean Water Act for protecting Oregon waters, and apply practices as described in General Water Quality Best Management Practices, Pacific Northwest Region, November 1988. Design criteria, including these practices, are incorporated throughout the project, such as in project location, design, contract language, implementation, and monitoring. The State has agreed that compliance with these practices will ensure compliance with State Water Quality Standards (Forest Service Manual 1561.5, R-6 Supplement 1500-90-12).

b. For projects requiring heavy equipment, develop a spill plan and assure materials will be available to prevent and control the entry of fuel, hydraulic oil, or other chemicals into streams. Have a “spill response kit” on the project whenever equipment is operating; it must be sufficient to absorb 34 gallons of oil, designed to float on the surface, while absorbing oil and repelling water. The kit will meet or exceed the physical properties of a “New Pig Products Spill Kit #408” (SFP: FW-119, 120, 122).

c. The literature was searched for the project planning area for possible heritage resources (historical or archaeological sites). No known sites were identified that could be affected by this project. In accordance with the Siuslaw National Forest’s 1995 Programmatic Agreement with the State Historic Preservation Office (SHPO), conduct field inventories by certified heritage technicians and receive concurrence from the State Office after project
design, but before the two actions are implemented on previously undisturbed ground. These actions include building new road to access private land in the Green River subwatershed and placing large wood in streams. Riparian planting will not be allowed in areas identified as homestead building sites. Other actions will all be on previously disturbed ground and will not require field inventories. Should any heritage resources be discovered as a result of any project activities, the site will be preserved or treated in accordance with the National Historic Preservation Act.

d. Follow the Vegetation Management Analysis to guide the managing of competing and unwanted vegetation. The plan was developed in compliance with the Record of Decision for the “Managing Competing and Unwanted Vegetation” FEIS (November 1988) and the subsequent Mediated Agreement.

II. Commercial Thinning and Postharvest Activities

1. Thin and harvest operations

*Proposed, Endangered, Threatened, and Sensitive (PETS) Species:*

a. Base thinning prescriptions in the late-successional reserves on the management triggers, criteria, and appropriate activities outlined in table 7 of the Late-Successional Reserve Assessment, Oregon Coast Province-Southern Portion (USDA 1997).

b. Do not fall individual trees exceeding 20 inches dbh except to create openings, provide other habitat structure such as downed logs, reduce spread of laminated root rot, eliminate safety hazard from a standing tree, or in cutting minimal yarding corridors. Where trees larger than 20 inches dbh are felled, they will be left in place to contribute toward meeting the coarse woody debris objective.

c. Units proposed for heavy thinning (30 to 40% minimum average canopy cover) are estimated to comprise 12% of all commercial thinning. In this thinning regime, base time frames and corresponding thinning areas (in percent acres) accordingly: October 1 - February 28, 8%; March 1- June 30, 0%; July 1 - August 5, 12%; August 6 - September 30, 80%.

d. Units proposed for light-to-moderate thinning (40% or greater minimum average canopy cover) are estimated to comprise 88% of all commercial thinning. In this thinning regime, base time frames and corresponding thinning areas (in percent acres) accordingly: October 1 - February 28, 22%; March 1- June 30, 5%; July 1 - August 5, 38%; August 6 - September 30, 35%.

e. Add provisions (such as CT6.25 and CT9.52) to contracts to protect any of these species that may be discovered when the project is implemented. The Forest wildlife biologist will determine the need for reinitiating consultation with the U.S. Fish and Wildlife Service, and the Forest fish biologist will determine the need for reinitiating consultation with the National Marine Fisheries Service (SFP: FW-035, 037).
f. Include applicable hourly and seasonal operating restrictions in the contract.

g. Provide a minimal 100-foot buffer to protect the loose-flowered bluegrass *Poa laxiflora* conservation-strategy population (#44) adjacent to the bottom of unit 305 from harvest operations. Consult with the Forest botanist before sale layout for assistance in locating the unit boundary.

**Survey and Manage Species:**

a. Conduct surveys before contracts are awarded or work begins. Because the survey-and-manage species list and survey protocols change over time (for example, new information is being developed by species specialists), review the species list and survey protocols before conducting surveys.

b. Follow current management recommendations for known sites of survey and manage species.

c. As a minimum starting point in developing protection buffers for terrestrial mollusks, use the following: buffer radius, rounded up to the nearest five feet = 2(average stand height) X (pretreatment % canopy - posttreatment % canopy)/pretreatment % canopy. Considering microsite conditions (slope, aspect, microclimate), adjust buffer up to 30% to protect key habitat features, such as deciduous trees, accumulations of coarse wood, and shade.

**Stand and Species Diversity (NFP: p. C-12):**

a. Emphasize variable spacing in distributing leave trees to mimic natural stands.

b. Retain western hemlock, western redcedar, Pacific yew, and native hardwoods in stands, to maintain existing species diversity. Buffer wet areas, hardwood clumps, and other unique features to maintain existing stand diversity.

c. Retain trees with unique phenotypical differences (such as large limbs) compared to the rest of the stand for future wildlife habitat. Up to 5% of the trees are expected to be in this category.

d. After retaining trees identified in “b” and “c” above, favor the largest, healthiest trees in selecting leave trees.

e. In the thinning stands in pathway B, retain 30 to 40% canopy cover (40 trees/acre) except within ¼ mile of known northern spotted owl or marbled murrelet sites, where the canopy cover will be kept above 40%. All heavily thinned stands must retain a canopy cover greater than 30%.
Snags (NFP: 2; p. C-14):

a. Where safe and feasible, retain existing snags that provide suitable wildlife habitat.


Streams and Riparian Vegetation

a. Implement protective vegetation leave areas or buffers around all streams, potentially unstable areas, and wet sites to maintain stream temperature, maintain stream-adjacent slope stability (including headwalls), and protect riparian vegetation. These areas will not be harvested.

b. Determine width of buffers based on site-specific factors such as stream order, presence or absence of conifers, and slope-stability conditions. Buffers will generally include the inner gorge adjacent to streams, the active flood plain, and one or two conifer rows above the slope break (SFP: FW-087, -088, -089, -112).

c. Limit skyline corridors to between 10 and 15 feet wide. Where skyline corridors pass through riparian buffers, remove no more than 20% of the canopy in a given 1,000-foot reach of stream (SFP: FW-091).

d. Directionally fell trees away from buffers to protect riparian vegetation from damage. Trees accidentally felled into buffers may be removed if stream sedimentation or damage to riparian vegetation can be avoided (SFP: FW-091).

e. Locate post-harvest canopy openings farther than 200 feet from flood plains and stream valley floors to maintain conifer in the stream-influence zone.

f. To reduce sedimentation from aggregate-surfaced roads during wet weather, apply mitigating actions such as requiring “constant reduced tire pressure” (tires are inflated to the tire manufacturer’s recommended minimum pressure), avoiding blading of ditches, monitoring roads during periods of heavy rain, and using straw bales to trap sediment where needed to log haul routes.

g. To minimize soil disturbance, use standing skyline cable or aerial logging systems for all thinning sales. Ground-based logging systems such as harvesters may be used if they operate from roads.

h. Where cable yarding is planned, design logging systems to yard away from stream channels to minimize soil disturbance on stream-adjacent slopes. If this strategy is not feasible, maintain full suspension of logs over streams (SFP: FW-091, -092).
Soils and Woody Debris

a. **Do not use** whole-tree yarding unless it’s agreed to by an interdisciplinary team. Decisions on whether to implement whole-tree yarding will be made case by case.

b. **Retain** existing logs in stands to benefit soil nutrient cycling; moss, fungi, and lichen habitat; travel corridors for small mammals; and foraging sites for various animal species.

c. **Retain** limbs and tops in stands on sites where little or no ground vegetation exists to reduce potential for soil erosion and enhance soil nutrient cycling.

d. Where applicable to reduce potential for theft of dead and down structural material, **close** roads as soon as possible after harvest.

e. Outside of areas designated for full log suspension and lateral yarding, **use** one-end log suspension on all areas designated for cable yarding systems to reduce soil displacement and compaction (SFP: FW-107).

f. Where slopes are greater than 60% immediately below side-cast roads or roads to be decommissioned, **retain** two rows of conifers (where feasible) to maintain slope stability (SFP: FW-112).

*Temporary (Nonsystem) Roads and Landings (NFP: RF-2 & 5, p. C-32, C-33):*

a. A team comprising planners and engineers will review road project sites before preparing road design plans for timber sale contracts. Planners and engineers will review any changes in design plans before incorporating them into contracts.

b. **Do not reuse** existing temporary roads where road stability is a major concern.

c. **Limit** new temporary spur roads to stable ridges to minimize soil disturbance. No new permanent system roads will be built. Where operationally and economically feasible, **design** logging systems to minimize the need for new temporary roads (SFP: FW-162, 163).

d. **Do not designate** temporary roads (new or reopen) or system roads as specified construction or reconstruction unless recommended by an interdisciplinary team and **approved** by the line officer.

e. If the horizontal alignment of temporarily reopened roads needs adjustment, favor the cut bank side of the road prism to minimize disturbance to side-cast areas and established vegetation.

f. **Scatter** slash created through road building in the stands.
Appendix B
FRLMP Design Criteria

... (rest of the text)
b. Follow the silviculture prescription guidelines when marking around laminated-root-rot areas.

c. To help document possible pockets of laminated root rot, include “Treatment of Stumps” (CT6.412) in the timber sale contract.

2. Post-harvest “Essential” KV activities

These treatments focus on incorporating management elements for understory planting in commercially thinned units. Refer to the Silviculture Prescription in the project file for unit-specific information.

**Stand and Species Diversity (NFP: p. C-12):**

a. **Underplant** pathway B acres where residual trees approximate 40 tpa. These acres are the highest priority for underplanting.

b. **Plant** about 3 to 5% of thinned and harvested acres in natural or created openings of from one-half to one acre.

c. **Underplant** shade-tolerant conifers (western hemlock and western redcedar) and hardwoods (red alder, Oregon big-leaf maple, cascara, and other native hardwoods). If necessary, **fell** conifer trees required for coarse woody debris to provide more light.

d. **Implement** animal control measures such as tubing or capping to benefit tree survival and growth.

e. **Release** planted trees from red alder or brush as needed for up to 10 years after the sale is closed to benefit tree survival and growth.

3. Post-harvest mitigation activities

These treatments focus on incorporating management elements for fire and fuels, coarse woody debris, snags and wildlife trees, stand and species diversity, and noxious weeds. Each commercially thinned unit, regardless of the sale contract used, must meet the payment to counties, roads and trails, and collect KV funds for its allotment of snag and coarse woody debris mitigation before any collections for the salvage sale fund.

**Fire and Fuel Management:**

a. **Follow** Fire Management Plan for LSR RO268 for all wildfire suppression or presuppression prevention programs. **Treat** all fuels (logging residue) according to the guidelines of the Oregon Smoke Management Plan.
b. Design fuel treatment activities to meet Aquatic Conservation Strategy objectives and to minimize disturbance to riparian vegetation. Refer to the Northwest Forest Plan (FM-1, 3, 4, 5; pp. C-35, 36) for additional information.

c. Where fuel borders county roads and system roads maintained open for general use, provide fuel breaks to reduce the risk of human-caused fire. Measure fuel breaks from the edge of the road into the thinned units. System roads such as 32, 3210, 3225, 3250, 3259, 3505, 3510, 37, 3705, and 58 will require a minimum 25-foot fuel break for each side of the road bordered by fuel (about 40 acres total).

d. Create fuel breaks by (in the order of least to most expensive cost) leaving untreated buffers adjacent to roads, directional felling of trees away from roads, underburning adjacent to roads, and hand piling and burning slash adjacent to roads. High cut banks (with no slash) can be considered adequate fuel breaks.

e. If scattering of landing piles will not adequately address the fire hazard, burn landing slash within 25 feet of open system roads.

f. Where practical, close project-maintained system roads (roads kept open only for the duration of the commercial thinning project) to vehicle traffic during the dry season where landing piles and other logging slash borders these roads. Determine case-by-case if road closure alone will adequately address the fire hazard. If these roads are to be kept open during the dry season, consider reducing the fuel loading through prescribed burning to address the fire hazard.

g. After harvest operations are completed on any given unit, conduct fuel treatments where necessary and as soon as practical to minimize exposure to fire hazard.

h. To reduce the potential for fire spread and the difficulty in controlling it, place coarse woody debris in small pockets of heavier concentration rather than scattering it more evenly across units. Where large amounts of coarse wood will be created or where thinned units are close to each other, place heavier concentrations of coarse wood on north slopes and lower 1/3 slopes.

i. To reduce the potential for wildfire, do not fell trees for coarse woody debris in designated fuel breaks unless the tops are kept outside of the breaks.

**Coarse Woody Debris Mitigation (NFP: 8, 9; p. C-15; C-12 & 13):**

a. Provide coarse woody debris by using the following prescriptions based on the Late-Successional Reserve Assessment, Oregon Coast Province, Southern Portion (R0268), version 1.3, p. 66-69: pathway A plantations—Alternative 4; pathway B plantations—Alternatives 2 and 3; pathway C plantations—Alternative 3; plantations outside pathways and in late-successional reserve—Alternative 3.
b. **Maintain** these trees-per-acre (tpa) prescriptions for coarse woody debris: pathway 3B, 30 tpa; pathways 5B, 7B, and 8B, 15 tpa; pathway C, 5 tpa; plantations outside pathways and in LSR, 5 tpa; and 0 tpa in plantations outside of pathways and LSR.

c. **Defer** creating coarse wood in pathway B units until five years after the sale contract is closed to allow for canopy recovery. At that time, **monitor** the canopy cover before the trees are felled to ensure canopy cover remains at or above the 30 to 40% range.

c. **Use** trees that blow down within 5 years after harvest towards meeting the woody debris allotment.

d. **Fell** trees for woody debris in areas that would enhance density variability within stands.

e. To reduce the potential for Douglas-fir bark beetle infestations, **fell** trees to provide woody debris outside of the adult beetle flight season (May through June 15).

**Creating Snag and Wildlife Trees (NFP: 2; p. C-14):**

a. To mitigate for past losses of mature snags, **top** mature trees or **inoculate** them with native fungi (*Phellinus pini* and *Fomitopsis canjanderi*) in natural stands adjacent to commercially thinned managed stands. **Top or inoculate** about 1,240 trees to ensure subwatersheds contain at least 1.4 snags/acre or 10% above their existing number.

b. In thinned portions of plantations, **inoculate** about 6,500 (including 20% mitigation for past harvest practices) trees with native fungi (*Phellinus pini* and *Fomitopsis cajanderi*) to ensure subwatersheds average 2.4 snags/acre. Inoculation will allow for continued tree growth and increase snag diameter while providing cavity habitat. Inoculation numbers are based on the net acres of managed stands commercially thinned.

c. **Do not create** snags and wildlife trees through tree topping between March 1 and September 30, to avoid potential disturbance to spotted owls and murrelets.

d. **Do not cut** trees that appear to contain red tree vole or raptor nests.

e. **Do not create** snags where they appear likely to fall over or slide into public-traveled roads, to avoid increasing hazardous conditions in the range of the roadway and theft of snag material for firewood.

**Noxious Weed Prevention and Mitigation:**

a. To prevent the spread of noxious and undesirable weeds, **maintain** canopy cover to the extent possible when reopening and building roads or stabilizing and closing them. **Seed** disturbed sites lacking canopy cover (landings and roads) with available native grass and forb species.
b. To prevent spread of noxious weeds, include provision “Cleaning of Equipment”, C6.343 (Option 2) in the timber sale contract for all ground-based equipment associated with logging operations.

c. Develop noxious weed treatment prescriptions for harvested units and their adjacent areas from information obtained from previous monitoring. Limit treatments to manual, mechanical, and biological methods (including additional seeding). The funding source for treatments will be KV mitigation collections.

*Original Logging-Spur-Road Stabilization (Original Logging Roads Not Used for Commercial Thinning Operations):*

a. Where warranted, place existing logging spurs not used for thin and harvest operations but within ¼-mile of commercial thinning units in the KV plan to become eligible for KV funds. Use these funds (if available) to hydrologically stabilize the roads, where warranted. If KV funds are not available, another funding source will need to be identified.

b. Generally apply road-decommissioning design criteria to these roads.

c. Where log culverts were used, retain logs in streams.

d. Remove failing sidecast material where the potential for material entering streams is moderate to high.

4. Post-harvest enhancement activities

*Stand and Species Diversity (NFP: p. C-12):*

a. Plant shade-tolerant conifers (western hemlock and western redcedar) and hardwoods (red alder, Oregon big-leaf maple, cascara, and other native hardwoods) in suitable areas outside of those required for essential KV. If necessary, fell additional trees to provide more light. Felled trees will contribute toward the downed wood requirement.

b. Plant hardwoods (and possibly western redcedar) in root-rot-infested patches to reduce effects of the disease.

c. Use animal control measures such as tubing or capping to benefit survival and growth rates of planted trees.

d. Release planted trees from alder and brush as needed for up to 5 years after the sale is closed to benefit survival and growth.
Creating Snag and Wildlife Trees (NFP: 2; p. C-14):

a. In unthinned portions of plantations, inoculate about 4,200 trees with native fungi (Phellinus pini and Fomitopsis cajanderi) to ensure subwatersheds average 2.4 snags/acre. Inoculation will allow for continued tree growth and increase snag diameter while providing cavity habitat.

b. Do not create snags and wildlife trees through tree topping between March 1 and September 30, to avoid potential disturbance to spotted owls and murrelets.

c. Do not cut trees that appear to contain red tree vole or raptor nests.

d. Do not create snags where they appear likely to fall over or slide into public-traveled roads, to avoid increasing hazardous conditions in the range of the roadway and theft of snag material for firewood.

Tables 1 and 2 identify KV projects for Alternatives 1 and 2. The tables list the projects in order of priority and identify some as essential or for mitigation. Those not identified as essential or for mitigation are non-essential or enhancement projects. Estimated costs are included.
## Table 1. Alternative 1 KV projects

<table>
<thead>
<tr>
<th>Prioritized action</th>
<th>Essential</th>
<th>Mitigation</th>
<th>Unit of measure</th>
<th>Unit number</th>
<th>Cost/unit</th>
<th>Total cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heavy thin, plant</td>
<td>Yes</td>
<td></td>
<td>Acres</td>
<td>312</td>
<td>645</td>
<td>201,240</td>
</tr>
<tr>
<td>Heavy thin, release</td>
<td>Yes</td>
<td></td>
<td>Acres</td>
<td>312</td>
<td>300</td>
<td>93,600</td>
</tr>
<tr>
<td>Plant openings</td>
<td>Yes</td>
<td></td>
<td>Acres</td>
<td>92</td>
<td>645</td>
<td>59,340</td>
</tr>
<tr>
<td>Release openings</td>
<td>Yes</td>
<td></td>
<td>Acres</td>
<td>92</td>
<td>300</td>
<td>27,600</td>
</tr>
<tr>
<td>Stream shade monitoring</td>
<td></td>
<td>Yes</td>
<td>Miles</td>
<td>6</td>
<td>2,000</td>
<td>12,000</td>
</tr>
<tr>
<td>Snag creation by mature-tree topping</td>
<td></td>
<td>Yes</td>
<td>Trees</td>
<td>1,241</td>
<td>100</td>
<td>124,100</td>
</tr>
<tr>
<td>Snag creation by plantation-tree inoculation</td>
<td></td>
<td>Yes</td>
<td>Trees</td>
<td>1,302</td>
<td>35</td>
<td>45,570</td>
</tr>
<tr>
<td>Downed wood creation</td>
<td></td>
<td>Yes</td>
<td>Trees</td>
<td>25,065</td>
<td>5</td>
<td>125,325</td>
</tr>
<tr>
<td>Nonsystem road decommissioning</td>
<td></td>
<td>Yes</td>
<td>Feet</td>
<td>8,500</td>
<td>3</td>
<td>25,500</td>
</tr>
<tr>
<td>Noxious weed control</td>
<td></td>
<td>Yes</td>
<td>Acres</td>
<td>58</td>
<td>135</td>
<td>7,830</td>
</tr>
<tr>
<td>Understory planting</td>
<td></td>
<td></td>
<td>Acres</td>
<td>1,185</td>
<td>645</td>
<td>764,325</td>
</tr>
<tr>
<td>Understory release</td>
<td></td>
<td></td>
<td>Acres</td>
<td>296</td>
<td>300</td>
<td>88,800</td>
</tr>
<tr>
<td>Snag creation by plantation-tree inoculation</td>
<td></td>
<td></td>
<td>Trees</td>
<td>5,209</td>
<td>35</td>
<td>182,315</td>
</tr>
<tr>
<td>Noncommercial thinning</td>
<td></td>
<td></td>
<td>Acres</td>
<td>1,847</td>
<td>275</td>
<td>507,925</td>
</tr>
<tr>
<td>Snag creation by plantation-tree inoculation</td>
<td></td>
<td></td>
<td>Trees</td>
<td>4,250</td>
<td>35</td>
<td>148,750</td>
</tr>
<tr>
<td>Riparian natural conifer release</td>
<td></td>
<td></td>
<td>Acres</td>
<td>100</td>
<td>400</td>
<td>40,000</td>
</tr>
<tr>
<td>Riparian planting</td>
<td></td>
<td></td>
<td>Acres</td>
<td>50</td>
<td>800</td>
<td>40,000</td>
</tr>
<tr>
<td>Riparian release</td>
<td></td>
<td></td>
<td>Acres</td>
<td>50x2</td>
<td>400</td>
<td>40,000</td>
</tr>
<tr>
<td>Riparian plant, walk-in</td>
<td></td>
<td></td>
<td>Acres</td>
<td>50</td>
<td>900</td>
<td>45,000</td>
</tr>
<tr>
<td>Riparian release, walk-in</td>
<td></td>
<td></td>
<td>Acres</td>
<td>50x2</td>
<td>500</td>
<td>50,000</td>
</tr>
<tr>
<td>Large wood for streams</td>
<td></td>
<td></td>
<td>Project</td>
<td>2</td>
<td>150,000</td>
<td>300,000</td>
</tr>
<tr>
<td>Meadow maintenance</td>
<td></td>
<td></td>
<td>Acres</td>
<td>51</td>
<td>400</td>
<td>20,400</td>
</tr>
<tr>
<td>Meadow creation</td>
<td></td>
<td></td>
<td>Acres</td>
<td>14</td>
<td>1,125</td>
<td>15,750</td>
</tr>
<tr>
<td>System road decommission</td>
<td></td>
<td></td>
<td>Miles</td>
<td>53</td>
<td>1,992</td>
<td>107,200</td>
</tr>
<tr>
<td>Green River bridge maintenance</td>
<td></td>
<td></td>
<td>Project</td>
<td>1</td>
<td>2,000</td>
<td>2,000</td>
</tr>
</tbody>
</table>

| Total                                       |           |            |                 |             |           | 3,074,570  |

---

*a* Snag creation-plantation tree inoculation mitigation = 20% of total inoculation inside commercially thinned portions of plantations.

*b* Nonsystem road decommissioning includes original logging spurs not used for commercial thinning but needing some stabilization work to eliminate chronic stream sedimentation or the potential for stream sedimentation.

*c* Tree inoculation 1 = total tree inoculation inside commercially thinned portions of plantations minus 20% mitigation.

*d* Tree inoculation 2 = total tree inoculation inside plantations, but outside commercially thinned portions of plantations.
Table 2. Alternative 2 KV projects

<table>
<thead>
<tr>
<th>Prioritized action</th>
<th>Essential</th>
<th>Mitigation</th>
<th>Unit of measure</th>
<th>Unit number</th>
<th>Cost/unit</th>
<th>Total cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heavy thin, plant</td>
<td>Yes</td>
<td></td>
<td>Acres</td>
<td>82</td>
<td>645</td>
<td>52,890</td>
</tr>
<tr>
<td>Heavy thin, release</td>
<td>Yes</td>
<td></td>
<td>Acres</td>
<td>82</td>
<td>300</td>
<td>24,600</td>
</tr>
<tr>
<td>Heavy thin, plant, walk-in</td>
<td>Yes</td>
<td></td>
<td>Acres</td>
<td>206</td>
<td>734</td>
<td>151,204</td>
</tr>
<tr>
<td>Heavy thin release, walk-in</td>
<td>Yes</td>
<td></td>
<td>Acres</td>
<td>206</td>
<td>380</td>
<td>78,280</td>
</tr>
<tr>
<td>Plant openings</td>
<td>Yes</td>
<td></td>
<td>Acres</td>
<td>92</td>
<td>645</td>
<td>27,600</td>
</tr>
<tr>
<td>Release openings</td>
<td>Yes</td>
<td></td>
<td>Acres</td>
<td>92</td>
<td>300</td>
<td>50,400</td>
</tr>
<tr>
<td>Stream shade monitoring</td>
<td>Yes</td>
<td></td>
<td>Miles</td>
<td>6</td>
<td>2,000</td>
<td>12,000</td>
</tr>
<tr>
<td>Snag creation by mature-tree topping</td>
<td>Yes</td>
<td></td>
<td>Trees</td>
<td>1,241</td>
<td>100</td>
<td>124,100</td>
</tr>
<tr>
<td>Snag creation by plantation-tree inoculation</td>
<td>Yes</td>
<td></td>
<td>Trees</td>
<td>1,256</td>
<td>35</td>
<td>43,960</td>
</tr>
<tr>
<td>Downed wood creation</td>
<td>Yes</td>
<td></td>
<td>Trees</td>
<td>24,655</td>
<td>5</td>
<td>123,275</td>
</tr>
<tr>
<td>Noxious weed control</td>
<td>Yes</td>
<td></td>
<td>Acres</td>
<td>26</td>
<td>135</td>
<td>3,510</td>
</tr>
<tr>
<td>Understory planting</td>
<td></td>
<td></td>
<td>Acres</td>
<td>1,150</td>
<td>645</td>
<td>741,750</td>
</tr>
<tr>
<td>Understory release</td>
<td></td>
<td></td>
<td>Acres</td>
<td>287</td>
<td>300</td>
<td>86,100</td>
</tr>
<tr>
<td>Understory plant, walk-in</td>
<td></td>
<td></td>
<td>Acres</td>
<td>35</td>
<td>734</td>
<td>25,690</td>
</tr>
<tr>
<td>Understory release, walk-in</td>
<td></td>
<td></td>
<td>Acres</td>
<td>9</td>
<td>380</td>
<td>3,420</td>
</tr>
<tr>
<td>Snag creation by plantation-tree inoculation 1</td>
<td></td>
<td></td>
<td>Trees</td>
<td>5,026</td>
<td>35</td>
<td>175,910</td>
</tr>
<tr>
<td>Noncommercial thinning</td>
<td></td>
<td></td>
<td>Acres</td>
<td>1,634</td>
<td>275</td>
<td>449,350</td>
</tr>
<tr>
<td>Noncommercial thinning, walk-in</td>
<td></td>
<td></td>
<td>Acres</td>
<td>209</td>
<td>330</td>
<td>68,970</td>
</tr>
<tr>
<td>Snag creation by plantation-tree inoculation 2</td>
<td></td>
<td></td>
<td>Trees</td>
<td>4,104</td>
<td>35</td>
<td>143,640</td>
</tr>
<tr>
<td>Riparian natural conifer release</td>
<td></td>
<td></td>
<td>Acres</td>
<td>100</td>
<td>400</td>
<td>40,000</td>
</tr>
<tr>
<td>Riparian plant</td>
<td></td>
<td></td>
<td>Acres</td>
<td>50</td>
<td>800</td>
<td>40,000</td>
</tr>
<tr>
<td>Riparian release</td>
<td></td>
<td></td>
<td>Acres</td>
<td>50x2</td>
<td>400</td>
<td>40,000</td>
</tr>
<tr>
<td>Riparian plant, walk-in</td>
<td></td>
<td></td>
<td>Acres</td>
<td>50</td>
<td>900</td>
<td>45,000</td>
</tr>
<tr>
<td>Riparian release, walk-in</td>
<td></td>
<td></td>
<td>Acres</td>
<td>50x2</td>
<td>500</td>
<td>50,000</td>
</tr>
<tr>
<td>Large wood for streams</td>
<td></td>
<td></td>
<td>Project</td>
<td>2</td>
<td>150,000</td>
<td>300,000</td>
</tr>
<tr>
<td>Meadow maintenance</td>
<td></td>
<td></td>
<td>Acres</td>
<td>51</td>
<td>400</td>
<td>20,400</td>
</tr>
<tr>
<td>Meadow creation</td>
<td></td>
<td></td>
<td>Acres</td>
<td>14</td>
<td>1,125</td>
<td>15,750</td>
</tr>
<tr>
<td>System-road decommission</td>
<td></td>
<td></td>
<td>Miles</td>
<td>53</td>
<td>1,992</td>
<td>107,200</td>
</tr>
<tr>
<td>Green River bridge maintenance</td>
<td></td>
<td></td>
<td>Project</td>
<td>1</td>
<td>2,000</td>
<td>2,000</td>
</tr>
</tbody>
</table>

Total: 3,046,999

---

*a* Snag creation-plantation tree inoculation mitigation = 20% of total inoculation inside commercially thinned portions of plantations.

*b* Tree inoculation 1 = total tree inoculation inside commercially thinned portions of plantations minus 20% mitigation.

*c* Tree inoculation 2 = total tree inoculation inside plantations, but outside commercially thinned portions of plantations.
III. Road Decommissioning and Closure

1. Road Decommissioning (NFP: RF-3c, 5, & 6; p. C-32, 33):

a. Review, using a team of planners and engineers, the road project sites before preparing design plans for road-decommissioning contracts. Any changes in design plans will be reviewed by planners and engineers before being incorporated into contracts.

b. Design fill-removal activities to minimize sediment entering stream channels. The objective is to restore stream processes and floodplain access by removing all fill material on the valley floor. Excavate slopes to approximate 1.5:1, where practical; do not encroach on natural slopes. Allow disturbed slopes to revegetate naturally or use erosion control measures (such as tree limbs and tops, native seed mixtures or plants), where a moderate to high potential for surface erosion exists. Where feasible, restore the natural flood plain. Consult with watershed and/or fisheries staff where technical feasibility or economics limit meeting fill removal objectives (SFP: FW-123).

c. Place material excavated from stream crossings and unstable side-cast road fills, and asphalt surfacing material on stable areas at least 60 feet away from stream channels or active flood plains. Suitable areas include roadbeds adjacent to cutbanks, or on previously designated waste areas (if locally available). Remove any alder or conifer from the cut bank before placing excavated material, to enhance soil-to-soil contact and long-term soil stability. Contour waste piles to approximate 1.5:1 to 2:1 slopes and allow to revegetate naturally. Seed piles with a mixture of native species where a moderate to high potential exists for surface erosion, or where noxious weed infestation is likely. Avoid using straw except in extreme circumstances (SFP: FW-117, 171).

d. Place woody debris, if locally available, in stream channels where sediment is expected to erode from channels at amounts that equal or exceed three (3) cubic yards. This strategy will help reduce sediment rates as streams adjust to gradients during the next year’s high flows.

e. Install water bars on both sides of excavated stream banks to route surface water away from newly excavated slopes (SFP: FW-123).

f. Stabilize unstable areas (such as road side-cast material) before a road is decommissioned, to prevent fine sediment from entering stream channels. Excavate side-cast fill material adjacent to stream crossings, where fill material could fail, enter streams, or both. Focus on areas where downhill slopes adjacent to roads are greater than 60%, and road fills are within 200 feet slope-distance of streams (SFP: FW-108, 117).

g. Design water bars to facilitate proper drainage of surface water and to prevent ponding. Place water bars in areas where drainage will not destabilize road fills. To keep streams within their channels when culverts are obstructed, build water bars immediately above existing culverts to become the overflow point. Use the Siuslaw National Forest Water Bar Construction Guide to determine water-bar spacing and design (SFP: FW-123).
h. **Decompress** surfaces of decommissioned roads where necessary, to allow water to percolate through the soil and accelerate the recovery of woody vegetation. Although subsoiling is the preferred method, use ripping if subsoiling is not feasible or economical. Consult a geotechnical specialist to determine feasibility of subsoiling (SFP: FW-162).

i. **Transport** off-site culverts removed from stream crossings and ditches to be recycled, reused, or disposed of at a landfill.

j. **Do not apply** specified reconstruction to roads that will be decommissioned.

2. **Road Closure (ML1):**

a. **Close** roads placed in ML1 status by one of three methods: growing roadside vegetation, placing an earthen mound or other natural material at or near the road entrance, or installing a guard rail. Closure type will be determined case by case.

b. **Stabilize** closed roads by reopening culvert inlets where necessary, repairing water bars, or building additional water bars. **Build** drain dips immediately above stream crossings, to ensure water is kept within stream channels when culvert inlets are obstructed. **Harden** drain dips with rock to minimize sedimentation of streams when culverts fail.

c. **Design** and **place** water bars based on specifications for decommissioned roads.

d. **Excavate** failing side-cast fill material at stream crossings and at other areas where material could enter streams. **Focus** on areas where downhill slopes adjacent to roads are greater than 60% and road fills are within 200 feet slope-distance of streams.

IV. **Hydrologic Function and Water-Quality Restoration** (NFP: RA-1 & FW-1; WR-1, 3; p. C-37)

Wildlife biologists, with technical assistance from U.S. Fish and Wildlife Service biologists, will **select** trees to be placed in streams for enhancing hydrologic function and water quality. First priority for tree selection will be to **use** suitable hazard trees or trees blown down across ATM roads. To protect interior forest habitat, existing or potential nesting structure, and neighboring trees with nesting structure from incidental damage, **use** the following criteria to **select** additional trees for placement in streams:

1. **Select** trees that will be dispersed within the first two lines of trees along the periphery of permanent openings such as road rights-of-ways and power line corridors, or along the periphery of nonpermanent openings such as plantation edges;
2. **Select** trees that will be less than or equal to 36 inches in diameter at breast height and lack existing or potential nesting structure (that is, for murrelets, limbs or other platforms greater than or equal to four inches in diameter);
3. In general, **select** individual trees; however, on rare occasions, **select** small groups of no more than three trees where appropriate;
4. Select trees (or small groups of trees defined above) that will be spaced about 100 feet apart; and
5. To the greatest extent possible, select trees to avoid any damage to existing or potential nesting structure in the stand during felling and removal operations.

The following trees will not be selected for removal:
   a. Trees with potential nesting platforms;
   b. Known nest trees;
   c. The largest trees in areas where the number of large trees is limited;
   d. Trees with the best opportunity to develop future nesting structure.

To evaluate the effectiveness and feasibility of tree selection criteria associated with large wood for stream enhancement, the Forest Service will request technical assistance from the U.S. Fish and Wildlife Service before felling or removing any standing trees not posing an immediate hazard. This technical assistance may include meetings and field reviews as needed and would be both before and during the tree selection process. Additional assistance may also be needed during felling and helicopter operations.

   a. To avoid artificially anchoring large wood in streams, large wood length should be at least 1.5 times bank-full width, and large wood diameters (measured at breast height on a tree) should approximate 2 times bank-full depth.

   b. Place logs in streams by helicopter only from August 6 through February 28 to reduce potential disturbance to listed species, such as the northern spotted owl and the marbled murrelet.

   c. If ground-based equipment is used, place large woody debris (partial- and whole-tree length) in streams during the summer-to-fall low-flow period to minimize disturbance to fish and to lessen safety risks (SFP: FW-117).

   d. Plant western redcedar or other shade-tolerant conifer and willow or other native hardwoods in designated riparian areas. Plant trees within 200 feet of stream channels. Include, at least, a fish biologist and a silviculturist in selecting planting sites. Implement animal control measures such as tubing or capping to benefit tree survival and growth. Maintain planted trees as needed for up to 5 years after the sale is closed to facilitate tree survival and growth.

   e. Where buffers contain a dense conifer component, thin (but do not harvest) these areas within 5 years after harvest operations are completed, to accelerate developing large wood for streams. Develop thinning prescriptions governed by stream shading requirements and slope stability concerns. Use a silviculturist and a hydrologist or fish biologist in preparing prescriptions. Fell some trees across stream channels to provide additional stream structure; other trees may become snags.
V. Other Activities

1. Treatment of Managed Stands 5 to 15 Years Old (NFP: p. C-12):

The project area contains an estimated 4,082 acres of stands currently ranging from 5 to 15 years old. Of these stands, 1,300 acres have been thinned, about 2,366 acres will be thinned, and about 416 acres will be left to develop on their own.

About 1,847 acres are within 0.25 miles of proposed thinning and harvest units and will be eligible for KV fund collections (revenue collected from the sale of timber). If KV funds are insufficient, other appropriated funds will be needed to fully fund these treatments. Other appropriated funds will need to be available to treat the remaining 519 acres.

   a. Leave felled trees on the ground and use a variable tree-density pattern. Omit understory planting at this time. Thinning prescriptions will retain 100 to 200 trees per acre.

   b. Leave about 3% of the area in each stand as untreated 3/4-acre clumps. Clumps are expected to total about 70 acres for all stands. A wildlife biologist and silviculturist will determine clump locations.

   c. Protect all western hemlock, western redcedar, Pacific yew, cascara, willow, big-leaf maple, chinquapin, and wild cherry.

   d. Protect any red alder clumps needed to help stabilize stream channels or other disturbance sites. Consider selective felling of alder near streams if it would benefit the growth and development of nearby conifer.

   e. Maintain about 20 red alder per acre where available.

2. Stocking Control:

   a. Conduct manual release of conifer during June and July when treatments are most effective.

   b. Follow the terms and conditions associated with the appropriate disturbance biological opinion.

3. Creating Early-Seral Habitat, Maintaining Existing Meadows, and Managing Noxious Weeds:

   a. Create early-seral habitat in existing plantations in matrix. Where available, use existing laminated root-rot pockets as a core area for early-seral habitat. Follow guidelines in the silviculture prescription to determine appropriate boundaries of early-seral habitat when using root-rot pockets.
b. Remove encroaching conifers, woody vegetation, and other unwanted vegetation such as noxious weeds and non-native plants from existing meadows to maintain meadow habitats. This activity will be coordinated by a wildlife biologist, a botanist, and a fish biologist.

c. Control non-native or unwanted vegetation in meadows during periods identified to be most effective for the target species. Use biological methods over manual methods, if they are available and more effective in controlling unwanted vegetation.

4. Roadside Hazard Trees:


b. Evaluate hazard trees by including a road manager, a wildlife biologist, and a silviculturist (or another person trained in hazard-tree identification) along ATM roads and timber-sale haul routes to determine which trees, snags, or both need to be felled or topped to remove roadside hazards. Give priority to using felled or topped materials in place for coarse woody debris or for stream restoration before selecting them as saw logs, wood fiber, or firewood.

5. ATM Road Maintenance: Remove conifers and hardwoods on ATM road cut banks or road fills through sales or service contracts. Where possible, use planned commercial thinning sales as a means for removal before using a “road corridor” sale.

6. Green River Bridge: Maintain the Green River bridge investment.

7. Waste Areas:

a. Use an interdisciplinary process to determine sites for waste areas.

b. Place material removed from road failure sites in stable areas at least 60 feet away from stream channels. When necessary, use previously designated waste areas. Contour waste piles should approximate 1.5:1 to 2:1 slopes. Allow piles to revegetate naturally or use erosion control measures where a moderate to high potential exists for surface erosion, or where noxious weed infestation is likely. Avoid using straw except in extreme circumstances (SFP: FW-117, 171).

c. Level and seed long-term (multiyear use) waste areas after each season of use. Short-term (one-time use) waste areas should be shaped or graded to contour, seeded, and--where other resource objectives are not compromised--planted with appropriate tree species.
VI. Special-Use Road Permits

1. Private Road Permit: Roseburg Forest Products will be granted a private road special-use permit (FS-2700-4c) to construct, maintain, and use a road across National Forest land in section 26, T15S, R10W. This permit will serve to mitigate the loss of access to their property located in sections 25 and 26 because of decommissioning road 3231. The new road will be about 1/2-mile long and on or near a ridge system.

Limits for the road design include maximum 12-foot-wide aggregate running surface, average 20-foot clearing limit, and leaving cut trees on site as coarse woody debris.

2. Hauling Permits: The existing Forest System roads that access private land may be used for private hauling of timber. Road-use permits (FS-7700-41) may be issued to allow hauling after any required consultation with the US Fish and Wildlife Service and the National Marine Fisheries Service for actions proposed by private land owners is completed.

VII. Monitoring Objectives

Typically, about 5% of Forest funds is used for monitoring Forest projects. The Team regards the management study as an opportunity to use the funds intended for monitoring on the Forest more effectively. Because of its identified monitoring strategies and priorities, the management study is expected to be a high priority for Forest funding relative to other Forest projects.

Monitoring items include those required for implementation and effectiveness monitoring. Implementation monitoring determines if the project design criteria and both the Northwest and Siuslaw Plans standards and guides were followed. Effectiveness monitoring evaluates whether applying the management activities achieved the desired goals, and if the objectives of the standards and guides were met. Findings resulting from project observations and monitoring are expected to help influence designing future projects and developing future monitoring plans.

1. Implementation Monitoring

Forest Plan Standards and Guides

Before the contract is advertised, review project contracts for consistency with the standards and guides of both the Northwest and Siuslaw Plans and project design criteria.

USFWS Biological Opinion Terms and Conditions

The standards common to all actions described on pages 3 to 5 of the habitat modification biological opinion are incorporated as terms and conditions (p. 32). The Fish and Wildlife Service believes that incidental take for listed species has been minimized if these standards are adhered to, to the extent that additional terms and conditions are not required.
Appendix B
FRLMP Design Criteria

Contract and Operations

Involve appropriate specialists when developing contracts (for example, with plan-in-hand reviews) or conducting District operations work to ensure activities are implemented as designed. The appropriate specialists will also participate periodically during contract work, especially when unusual circumstances arise that may require a contract modification.

2. Effectiveness Monitoring

Management Study

Refer to Appendix A of the final EIS, tables A-3 through A-5 for monitoring information.

Vegetation Management

    a. Monitor treated stands as part of the Forest Monitoring Plan, Vegetation Condition section. Focus observations on tree survival and growth and on planted trees.

    b. Monitor trees planted in the understory for survival and growth, as part of the Forest Monitoring Plan, Vegetation Condition section.

    c. Monitor created snags and wildlife trees as part of the Forest Monitoring Plan, Wildlife Habitat section. This site offers opportunities to observe effects of fungal injection. Observations will focus on the location and rate of decay, and use by cavity nesters.

    d. Observe all thinned stands to determine if residual trees are being damaged by Douglas-fir bark beetles. This activity will be tiered to the Forest insect and disease monitoring program.

    e. Evaluate riparian leave areas as to their effectiveness in maintaining stream shading.

    f. Observe areas treated for controlling noxious weeds the first year after treatment and as needed thereafter to determine if additional treatments are necessary.

    g. For a period of three years after harvest, annually monitor high and moderate risk (to weed infestation) thinned and harvested units to determine effectiveness of preventive strategies. Monitoring information will be used to develop prescriptions for future noxious-weed treatments in and adjacent to units.

    h. Conduct a field review of the buffered loose-flowered bluegrass population adjacent to the bottom of unit 305 one year after the unit is harvested to evaluate post-harvest population status and response.
Road Treatments

a. **Field-review** excavated slopes from road stabilization activities and note areas where eroded materials enter stream channels. Make observations after the first major rainfall and seasonally thereafter until vegetation reoccupies disturbed sites (about 2 to 5 years). If the surface is eroding and could adversely affect fish habitat, take steps to eliminate or reduce erosion.

b. **Observe** road surface treatments such as water bars to determine effectiveness and effects on the stability of the outer portion of the road prism.

c. **Review** the effectiveness of road closures to determine whether another form or location of closure will be required at or near road entrances.

d. **Tier** monitoring to the Forest Monitoring Plan, Aquatic Resources section.

Fish Habitat Treatments

a. **Use** Oregon Department of Fish and Wildlife and U.S. Forest Service stream surveys to assess changes from measured baseline data in fish habitat characteristics of streams where large wood was added.

b. **Tier** monitoring to the Forest Monitoring Plan, Aquatic Resources section.