Appendix A: Project Design Criteria

Indian Creek Landscape Management Project

Draft Environmental Assessment

Siuslaw National Forest

Central Coast Ranger District and Oregon Dunes National Recreation Area

Lane County, Oregon
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Introduction

Design criteria for actions identified in the Indian Creek Landscape Management Project were developed to meet project goals and to ensure the project is consistent with the standards and guides of the 1990 Siuslaw Forest Plan (SFP), as amended by the 1994 Northwest Forest Plan (NFP). Other requirements were followed, including those described in consultation documents for federally listed species or designated critical habitat and those in the 1997 Late-Successional Reserve Assessment (LSRA), Oregon Coast Province—Southern Portion. Forest Service direction, regulations, and standards and guides for resource protection may change over time. If changes occur prior to completion of any project actions, then the actions should be modified to reflect mandatory changes.

The design criteria apply to the Alternative 2, unless otherwise specified. Invasive plant species treatment methods and design criteria can be found in Appendix F: Invasive Plant Species Treatment and Project Design Criteria. Appropriate specialists would be consulted before any design criteria for proposed activities are changed.

The objectives of this project are linked to the project needs identified in the EA, Chapter 1. The actions proposed to attain these objectives are listed in Chapter 2 of the EA.

Table A-1. Project objectives and corresponding actions to attain these objectives

<table>
<thead>
<tr>
<th>Project Objectives</th>
<th>Actions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Speed the development of large (32 to 45&quot; diameter at breast height or DBH) and</td>
<td>Thin plantations (stands) by commercial means. Release dominant trees. In commercially thinned stands, create small openings—gaps, where over-story canopy cover is less than 20 percent—so a few trees have a lot of room to grow into giant (&gt;45&quot; DBH) trees with large limbs. Inoculate some trees with fungi that create cavities.</td>
</tr>
<tr>
<td>giant (&gt;45&quot; DBH) trees. Trees with unique characteristics, such as large limbs or</td>
<td></td>
</tr>
<tr>
<td>cavities, are especially important.</td>
<td></td>
</tr>
<tr>
<td>Improve habitat diversity in stands by increasing tree diversity.</td>
<td>Plant and develop small trees in commercially thinned stands.</td>
</tr>
<tr>
<td>Maintain or restore adequate numbers of snags and down wood in commercially thinned</td>
<td>Maintain un-thinned areas (skips/clumps) in stands that naturally create dead wood, and create snags and down wood within stands.</td>
</tr>
<tr>
<td>stands. Create snags in adjacent mature conifer stands.</td>
<td></td>
</tr>
<tr>
<td>Maintain dispersal habitat for the northern spotted owl.</td>
<td>Maintain &gt; 40 percent canopy cover in about 46 percent of commercially thinned stands.</td>
</tr>
<tr>
<td>Maintain suitable habitat for the northern spotted owl. Create up to 1 acre gaps.</td>
<td>Maintain &gt; 60 percent canopy cover in about 54 percent of commercially thinned stands.</td>
</tr>
<tr>
<td>Protect or improve water quality, fish habitat, riparian habitat, and soil</td>
<td>Protect domestic waters sources. Minimize adverse impacts from road and logging activities. Remove fish-migration barriers from roads. Remove culverts and fills from unneeded roads. Maintain and create future sources of large, in-stream wood. Maintain and create down wood. Add large wood to some streams.</td>
</tr>
<tr>
<td>productivity.</td>
<td></td>
</tr>
<tr>
<td>roads and manage long-term access.</td>
<td></td>
</tr>
<tr>
<td>Produce timber and meet late-successional objectives in the matrix land allocation.</td>
<td>Treat portions of plantations in the matrix land allocation similar to adjacent late-successional reserve.</td>
</tr>
</tbody>
</table>
1. Criteria Common to All Actions

1.1. Fisheries

The Project Design Criteria in this section have been designed to have no effect on coho salmon. The Indian Creek project Fisheries BE is the primary source of this information. Table A-2 compares stream-buffer prescriptions of past, similar projects—such as the Lobster Landscape Management Project—with those prescribed for the proposed Project.

Table A-2. Comparing Project buffer prescriptions to past, similar projects

<table>
<thead>
<tr>
<th>Project Stream type</th>
<th>Buffer prescriptions used for past, similar projects</th>
<th>Buffer prescriptions under the Project designed to have no effect on coho</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coho habitat</td>
<td>Retain at least two rows of conifer and at least 30 feet between the thinning unit and stream.</td>
<td>Retain at least two rows of conifer and at least a 100-foot, no-thin buffer between the thinning unit and stream.</td>
</tr>
<tr>
<td>Streams upstream of coho habitat with high potential to transport wood via fluvial processes into coho habitat</td>
<td>Retain at least two rows of conifer and at least 30 feet between the thinning unit and stream.</td>
<td>Retain at least two rows of conifer and at least a 75-foot, no-thin buffer (within 1,000 feet of coho habitat) between the thinning unit and stream.</td>
</tr>
<tr>
<td>Debris flow tributaries with a moderate to high probability of delivering wood to coho habitat</td>
<td>Retain at least two rows of conifer and at least 30 feet between the thinning unit and stream.</td>
<td>Retain at least two rows of conifer and at least 75 feet between the thinning unit and stream.</td>
</tr>
<tr>
<td>Perennial, non-coho habitat</td>
<td>Retain at least two rows of conifer and at least 30 feet between the thinning unit and stream.</td>
<td>Retain at least two rows of conifer and at least 30 feet between the thinning unit and stream.</td>
</tr>
<tr>
<td>Intermittent</td>
<td>Retain at least one row of conifer and at least 15 feet between the thinning unit and stream.</td>
<td>Retain at least one row of conifer and at least 15 feet between the thinning unit and stream.</td>
</tr>
<tr>
<td>Gap Placement</td>
<td>Locate gaps at least 100 feet away from stream channels.</td>
<td>Locate gaps at least 200 feet from coho critical habitat, and at least 150 feet from all other stream channels.</td>
</tr>
</tbody>
</table>

1.1.1. Generally limit the season of operation for in-stream work—such as replacing or removing culverts in roads—generally July 1 through September 15. Obtain a waiver from the State, where needed, to conduct the work outside the in-stream work period.

1.1.2. Proposals to modify stream crossings from hard (e.g., pavement) to soft (e.g., aggregate) would require an evaluation by aquatic specialists to determine if the modification changes the level of effect on aquatic resources. The evaluation would include a determination that the proposed changes do not retard or prevent attainment of Aquatic Conservation Strategy objectives.

1.2. Wildlife

1.2.1. The district wildlife biologist will be contacted if a nest, or Threatened, Endangered, or Sensitive species is observed in the project area, so that adequate management actions can be incorporated, when needed.
1.2.2. Compliance with the US Forest Service goal of supporting recovery of threatened or endangered species (FSM 2602;) requires that a wildlife biologist participates in the planning and design of all projects that potentially affect listed species to assure actions are consistent with current consultation. A wildlife biologist would help design actions to make effects determinations to threatened or endangered species that are consistent with consultation, and to minimize potential adverse effects to other species.

1.2.3. Northern Spotted Owl and Marbled Murrelet.
Design criteria must include the most current requirements from the U.S. Fish and Wildlife Service (USFWS) for federally listed wildlife. These requirements would be described in a biological opinion (BO) or a corresponding letter of concurrence (LOC).

1.2.4. The proposed action includes all field processes needed to plan, evaluate, prepare and complete activities regardless of funding source(s), as well as activities conducted on private lands under the Wyden Authority. Such processes include, but are not limited to: road construction; falling, bucking and yarding; loading; hauling; site preparation; burning; brushing; piling; scarification; planting; and coarse woody debris and snag creation. A wildlife biologist would participate in the planning and design of all projects affecting listed species.

Table A-3. Breeding periods for the Northern Spotted Owl and Marbled Murrelet used in the analysis of project activities

<table>
<thead>
<tr>
<th>SPECIES</th>
<th>BREEDING PERIOD</th>
<th>CRITICAL BREEDING PERIOD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Northern Spotted Owl</td>
<td>March 1 – September 30</td>
<td>March 1 – July 7</td>
</tr>
<tr>
<td>Marbled Murrelet</td>
<td>April 1 – September 15</td>
<td>April 1 – August 5</td>
</tr>
</tbody>
</table>

- For spotted owls, burning within the disruption distance of an occupied or potential nest patch between March 1 and July 7 is prohibited. If the current nest tree is not known, the disruption distance would be measured from the edge of a 300 meter buffer (nest patch) around the known spotted owl site. For murrelets, burning within the disruption distance of occupied or unsurveyed suitable habitat, or unsurveyed nesting structure, between April 1 and August 5 prohibited.

- No blasting would occur during these species’ entire breeding period (Table A-3) as part of any proposed activity (Disturbance/Disruption distances Table A-4).

- Use of Chinook 47d helicopters is prohibited within the disruption distance of spotted owl occupied nest locations or potential nest patches during the breeding period (March 1 – September 30). If the current nest tree is not known, the disruption distance would be measured from the edge of a 300 meter buffer (nest patch) around the known or potential site. Use of Chinook 47d helicopters is prohibited within the disruption distance of occupied murrelet habitat, unsurveyed suitable murrelet habitat, and unsurveyed murrelet nesting structure during the entire breeding period (April 1 – September 15).

- Use of helicopters, other than Chinook 47d helicopters, is prohibited within the disruption distance (Table A-4) of spotted owl occupied nest locations or potential nest patches during the critical breeding period (March 1 – July 7). If the current nest tree is not known, the disruption distance would be measured from
the edge of a 300 meter buffer (nest patch) around the known or potential site. Use of helicopters, other than Chinook 47d helicopters, is prohibited within the disruption distance of occupied murrelet habitat, unsurveyed suitable murrelet habitat, and unsurveyed murrelet nesting structure during the critical breeding period (April 1 – August 5).

- Individual Tree Removal for danger trees or other trees to be removed as part of project activities (i.e. culvert replacement, road re-alignment etc.) does not include the removal of individual trees with spotted owl or murrelet nesting structure including known nest trees. A known spotted owl nest tree or a murrelet nest tree from occupied murrelet habitat may be removed only when it is an immediate danger and when the tree is not currently being used by nesting owls or murrelets or their young and would be covered under an emergency consultation.

- No known nest trees would be removed, without further consultation with USFWS. Trees confirmed to be a hazard that could contain nest structure (not a known nest tree) would be examined by a district biologist, and would only be removed outside of the breeding season, or determined through survey protocols to be inactive, or consulted on separately.

- To minimize the risk of attracting predators to activity areas, all garbage (especially food products) would be contained or removed daily from the vicinity of any activity.

**Specific to the Spotted Owl**

- No activity would occur within the disruption distance for that activity from a known site or potential nest patch. The different types of activities and associated disturbance sources or types are listed below in Table A-4. If current nest tree is not known, disruption distance would be measured from the edge of a 300 meter buffer (nest patch) around the known site.

- Harvest within a known nest patch or predicted nest patch is prohibited.

**Table A-4:** Disturbance and disruption distances for spotted owls during the breeding period. Distances are measured from the edge of the 300 meter nest patch, unless the nest tree is known, in which case the distance is measured from that tree. Disruption distances have both a spatial and temporal component.

<table>
<thead>
<tr>
<th>Disturbance Source (Activity)</th>
<th>Disturbance Distances During the Nesting Season (Mar 1 – Sep 30)</th>
<th>Disruption Distances During the Early “Critical” Nesting Season (Mar 1–Jul 7)</th>
<th>Disruption Distances During the Late Nesting Season (Jul 8–Sep 30)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Light maintenance of roads, campgrounds, and administrative facilities</td>
<td>0.25 mile [NLAA when distance is beyond disruption distances]</td>
<td>NA (^1)</td>
<td>NA</td>
</tr>
<tr>
<td>Log hauling on open roads</td>
<td>0.25 mile</td>
<td>NA (^1)</td>
<td>NA</td>
</tr>
<tr>
<td>Activity</td>
<td>Distance</td>
<td>Sound Level</td>
<td>Footnote</td>
</tr>
<tr>
<td>------------------------------------------------------------------------</td>
<td>----------</td>
<td>-------------</td>
<td>--------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Chainsaws (includes felling hazard/danger trees)</td>
<td>0.25 mile</td>
<td>65 yards^2</td>
<td>NA</td>
</tr>
<tr>
<td>Heavy equipment for road construction, road repairs, bridge construction, culvert replacements, etc.</td>
<td>0.25 mile</td>
<td>65 yards^2</td>
<td>NA</td>
</tr>
<tr>
<td>Pile-driving (steel H piles, pipe piles) Rock Crushing and Screening Equipment</td>
<td>0.25 mile</td>
<td>120 yards^3</td>
<td>NA</td>
</tr>
<tr>
<td>Blasting</td>
<td>1 mile</td>
<td>0.25 mile^5</td>
<td>100 yards^4 (injury)</td>
</tr>
<tr>
<td>*Helicopter: Chinook 47d (described as a large helicopter in the rest of this document)</td>
<td>0.5 mile</td>
<td>265 yards^5</td>
<td>100 yards^6 (hovering only)</td>
</tr>
<tr>
<td>*Helicopter: Boeing Vertol 107, Sikorsky S-64 (SkyCrane)</td>
<td>0.25 mile</td>
<td>150 yards^7</td>
<td>50 yards^6 (hovering only)</td>
</tr>
<tr>
<td>*Helicopters: K-MAX, Bell 206 L4, Hughes 500</td>
<td>0.25 mile</td>
<td>110 yards^8</td>
<td>50 yards^6 (hovering only)</td>
</tr>
<tr>
<td>*Small fixed-wing aircraft (Cessna 185, etc.)</td>
<td>0.25 mile</td>
<td>110 yards</td>
<td>NA</td>
</tr>
<tr>
<td>Tree Climbing</td>
<td>25 yards</td>
<td>25 yards^9</td>
<td>NA</td>
</tr>
<tr>
<td>Burning (prescribed fires, pile burning)</td>
<td>0.25 mile</td>
<td>0.25 mile^10</td>
<td>NA</td>
</tr>
</tbody>
</table>

Table A-4 (Spotted Owl) Footnotes:

1. NA = not applicable. Based on information presented in Tempel and Gutiérrez (2003, p. 700), Delaney et al. (1999, p. 69), and Kerns and Allwardt (1992, p. 9), we anticipate that the few spotted owls that select nest sites in close proximity to open roads either are undisturbed by or habituate to the normal range of sounds and activities associated with these roads.

2. Based on Delaney et al. (1999, p. 67) which indicates that spotted owl flush responses to above-ambient equipment sound levels and associated activities are most likely to occur at a distance of 65 yards (60 m) or less.

3. Impulsive sound associated with blasts and pile-driving is highly variable and potentially injurious at close distances. We selected a 0.25-mile radius around blast sites as a disruption distance based on observed prairie falcon flush responses to blasting noise at distances of 0.3 – 0.6 miles from blast sites (Holthuijzen et al. 1990, p. 273). We have conservatively chosen a distance threshold of 120 yards for impact pile-driving and rock-crushing operations to avoid potential hearing loss effects and to account for significant behavioral responses (e.g. flushing) from exposure to continuous sounds from impact pile driving. Exposure to peak sound levels that are $>$140 dBA are likely to cause injury in the form of hearing loss in birds (Dooling and Popper 2007, pp. 23-24). We have conservatively selected 100 yards as an injury threshold distance based on sound levels from experimental blasts reported by Holthuijzen et al. (1990, p. 272), which documented peak sound levels from small blasts at 138 – 146 dBA at a distance of 100 m (110 yards).

5. Based on an estimated 92 dBA sound-contour from sound data for the Chinook 47d presented in Newman et al. (1984, Table D.1).

6. Rotor-wash from large helicopters is expected to be disruptive at any time during the nesting season due to the potential for flying debris and shaking of trees located directly under a hovering helicopter. Hovering rotor-wash distance is based on a 300-ft radius rotor-wash zone for large helicopters hovering at $<$ 500 above ground level (from WCB 2005, p. 2 – logging safety guidelines). We reduced the hovering helicopter rotor-wash zone to a 50-yard radius for all other helicopters based on the smaller rotor-span for all other ships.
7. Based on an estimated 92 dBA sound contour from sound data for the Boeing Vertol 107, the presented in the San Dimas Helicopter Logging Noise Report (USFS, 2008, chapters 5, 6).

8. Based on Delaney et al. (1999, p. 74), which concluded that a buffer of 105 m (115 yards) for helicopter overflights would eliminate flush responses from military helicopter overflights. The estimated 92 dBA sound contours for these helicopters is less than 110 yards (e.g., K-MAX (100 feet) (USFS, 2008, chapters 5, 6), and Bell 206 (85-89 dBA at 100 m) (Grubb et al. 2010, p. 1277).

9. Based on Swarthout and Steidl (2001, p. 312) who found that 95 percent of flush responses by spotted owls due to the presence of hikers on trails occurred within a distance of 24 m.


*Aircraft normally use above ground level (AGL) as a unit of measure. For instance, to not cause a disruption by medium and small helicopters during the late breeding season, the AGL would be 350 feet. 350 feet AGL would account for 200 foot tall trees that NSOs would be occupying plus the 50 yards disruption distance.

Specific to the Marbled Murrelet

- Project activities (including associated road construction, site burning, and other disturbances) would not take place within the disruption distance of known occupied or unsurveyed suitable murrelet habitat during the critical nesting season (April 1 – August 5). The different types of activities and associated disturbance sources or types are listed below in Table A-5. The wildlife biologist may increase the distance or modify the timing based on site-specific information. Hauling along existing roads may occur throughout the year.

- During the late breeding season (August 6 – September 15), activities associated with projects (including associated road construction) within the disruption distance of known occupied or unsurveyed suitable murrelet habitat, or potential nesting structure, would not begin until 2 hours after sunrise and would end 2 hours before sunset. The time-of-day restriction does not apply to hauling along existing roads, and to activities beyond the disruption distance (Table A-5).

- Project activities using a helicopter other than Chinook 47d helicopters would not take place within 50 yards hovering distance (Table A-5) of known occupied or unsurveyed murrelet habitat during the late nesting season (August 6 – September 15). The wildlife biologist may increase the distance or modify the timing based on site-specific information.

- Danger/Hazard Tree Removal (In Critical Habitat):
  - Note that all Danger Trees/Hazard Trees along roadsides would be identified, assessed, and treated according to the Forest Service Pacific Northwest Region (Region 6) policy as detailed in FSM 7733, R6/PNW Supplement No. 7730-2007-2, June 8, 2007.
  - Consider both safety and biological significance when identifying hazard trees.
  - Consider topping, limbing, or other measures to conserve potentially valuable marbled murrelet nest trees.
  - Unsurveyed potential murrelet nest trees are not allowed to be removed within the breeding season.
Table A-5: Disturbance and disruption distances for murrelets during the breeding period from the edge of unsurveyed or known occupied stand or nest structure in younger stands

<table>
<thead>
<tr>
<th>Disturbance Source</th>
<th>Disturbance Distances During the Breeding Period (Apr 1 – Sep 15)</th>
<th>LAA Disruption Distances During the Breeding Period (Apr 1 – Sep 15)</th>
<th>LAA Disruption Distances with daily timing restrictions <em>(Aug 6 – Sep 15)</em></th>
</tr>
</thead>
<tbody>
<tr>
<td>Light maintenance of roads, campgrounds, and administrative facilities</td>
<td>0.25 mile</td>
<td>NA&lt;sup&gt;1&lt;/sup&gt;</td>
<td>0 yards with no daily timing restrictions</td>
</tr>
<tr>
<td>Log hauling on open roads</td>
<td>0.25 mile</td>
<td>NA&lt;sup&gt;1&lt;/sup&gt;</td>
<td>0 yards with no daily timing restrictions</td>
</tr>
<tr>
<td>Chainsaws (includes felling hazard/danger trees)</td>
<td>0.25 mile</td>
<td>110 yards&lt;sup&gt;2&lt;/sup&gt;</td>
<td>N/A with daily timing restrictions</td>
</tr>
<tr>
<td>Heavy equipment for road construction, road repairs, bridge construction, culvert replacements, etc.</td>
<td>0.25 mile</td>
<td>110 yards&lt;sup&gt;2&lt;/sup&gt;</td>
<td>N/A with daily timing restrictions</td>
</tr>
<tr>
<td>Pile-driving (steel H piles, pipe piles) Rock Crushing and Screening Equipment</td>
<td>0.25 mile</td>
<td>120 yards&lt;sup&gt;3&lt;/sup&gt;</td>
<td>N/A with daily timing restrictions</td>
</tr>
<tr>
<td>Blasting</td>
<td>1 mile</td>
<td>0.25 mile&lt;sup&gt;3&lt;/sup&gt;</td>
<td>0.25 mile&lt;sup&gt;3&lt;/sup&gt;</td>
</tr>
<tr>
<td>** Helicopter: Chinook 47d (described as a large helicopter in the rest of this document)</td>
<td>0.5 mile</td>
<td>265 yards&lt;sup&gt;5&lt;/sup&gt;</td>
<td>100 yards&lt;sup&gt;6&lt;/sup&gt; (hovering only)</td>
</tr>
<tr>
<td>** Helicopter: Boeing Vertol 107, Sikorsky S-64 (SkyCrane)</td>
<td>0.25 mile</td>
<td>150 yards&lt;sup&gt;7&lt;/sup&gt;</td>
<td>50 yards&lt;sup&gt;6&lt;/sup&gt; (hovering only)</td>
</tr>
<tr>
<td>** Helicopters: K-MAX, Bell 206 L4, Hughes 500</td>
<td>0.25 mile</td>
<td>110 yards&lt;sup&gt;8&lt;/sup&gt;</td>
<td>50 yards&lt;sup&gt;6&lt;/sup&gt; (hovering only)</td>
</tr>
<tr>
<td>** Small fixed-wing aircraft (Cessna 185, etc.)</td>
<td>0.25 mile</td>
<td>110 yards</td>
<td>N/A with daily timing restrictions</td>
</tr>
<tr>
<td>Tree Climbing</td>
<td>110 yards</td>
<td>110 yards&lt;sup&gt;9&lt;/sup&gt;</td>
<td>N/A with daily timing restrictions</td>
</tr>
<tr>
<td>Burning (prescribed fires, pile burning)</td>
<td>1 mile</td>
<td>0.25 mile&lt;sup&gt;10&lt;/sup&gt;</td>
<td>N/A with daily timing restrictions</td>
</tr>
<tr>
<td>Drones</td>
<td>0.25 mile</td>
<td>110 yards from nest structure</td>
<td>110 yards from nest structure</td>
</tr>
<tr>
<td>Other Activities</td>
<td>0.25 mile</td>
<td>110 yards&lt;sup&gt;2&lt;/sup&gt;</td>
<td>N/A with daily timing restrictions</td>
</tr>
</tbody>
</table>

*Example:* Chainsaws are being used adjacent to a murrelet occupied stand during the period of April 1 to September 15, less than 110 yards from the stand. In this scenario (within the disruption distance), murrelets could be disrupted to the point of likely adversely affecting the murrelets or their young. However if the chainsaws were being used further than 110 yards away from the occupied stand during the same time period (within the .25 mile disturbance distance, but beyond the 110 yard disruption distance), this chainsaw use would only slightly disturb murrelets, not disrupt their normal behavior. In this case, the chainsaw use is not likely to adversely affect the murrelets because of the further distance the chainsaw use is away from them.

Table A-5 (Marbled Murrelet) Footnotes:
1. NA = not applicable. We anticipate that the few marbled murrelets that select nest sites in close proximity to open roads either are undisturbed by or habituate to the normal range of sounds and activities associated with these roads (Hamer and Nelson 1998, p. 21).

2. Based on recommendations from murrelet researchers that advised buffers of greater than 100 meters to reduce potential noise and visual disturbance to murrelets (Hamer and Nelson 1998, p. 13, USFWS 2012c, pp. 6-9).

3. Impulsive sound associated with blasts and pile-driving is highly variable and potentially injurious at close distances. We selected a 0.25-mile radius around blast sites as a disruption distance based on observed prairie falcon flush responses to blasting noise at distances of 0.3 – 0.6 miles from blast sites (Holthuijzen et al. 1990, p. 273). We have conservatively chosen a distance threshold of 120 yards for impact pile-driving and rock-crushing operations to avoid potential hearing loss effects and to account for significant behavioral responses (e.g. flushing) from exposure to continuous sounds from impact pile driving.

4. Exposure to peak sound levels that are >140 dBA are likely to cause injury in the form of hearing loss in birds (Dooling and Popper 2007, pp. 23-24). We have conservatively selected 100 yards as an injury threshold distance based on sound levels from experimental blasts reported by Holthuijzen et al. (1990, p. 272), which documented peak sound levels from small blasts at 138 – 146 dBA at a distance of 100 m (110 yards).

5. Based on an estimated 92 dBA sound-contour (approximately 265 yards) for the Chinook 47d (Newman et al. 1984, Table D.1).

6. Because murrelet chicks are present at the nest until they fledge, they are vulnerable to direct injury or mortality from flying debris caused by intense rotor wash directly under a hovering helicopter. Rotor-wash from large helicopters is expected to be disruptive at any time during the breeding season due the potential for flying debris and shaking of trees located directly under a hovering helicopter. Hovering rotor-wash distance is based on a 300-ft radius rotor-wash zone for large helicopters hovering at < 500 above ground level (from WCB 2005, p. 2 – logging safety guidelines). We reduced the hovering helicopter rotor-wash zone to a 50-yard radius for all other helicopters based on the smaller rotor-span for all other ships.

7. Based on an estimated 92 dBA sound contour from sound data for the Boeing Vertol 107 the presented in the San Dimas Helicopter Logging Noise Report (USFS 2008, chapters 5, 6).

8. Based on Delaney et al. (1999, p. 74), which concluded that a buffer of 105 m (115) yards for helicopter overflights would eliminate flush responses from military helicopter overflights. The estimated 92 dBA sound contours for these helicopters is less than 110 yards (e.g., K-MAX (100 feet) (USFS 2008, chapters 5, 6), and Bell 206 (85-89 dBA at 100 m)(Grubb et al. 2010, p. 1277).

9. Based on recommendations from murrelet researchers that advised buffers of greater than 100 meters to reduce potential noise and visual disturbance to murrelets (Hamer and Nelson 1998, p. 13, USFWS 2012c, pp. 6-9).


* Daily timing restrictions: Activities would not begin until two hours after sunrise and would end two hours before sunset.

**Aircraft normally use above ground level (AGL) as a unit of measure. For instance to not cause a disruption by medium and small helicopters during the late breeding season, the AGL would be 350 feet. 350 feet AGL would account for 200 foot tall trees that murrelets would be occupying plus the 50 yards disruption distance.

**Specific to the Bald Eagle**

- No project or associated activities would be implemented between January 1 and August 31 within 0.25 mile or a 0.5-mile sight distance of a known bald eagle nest site, unless the unit biologist verifies that the nest is unoccupied.

- No activity within 0.25 mile or a 0.5-mile sight distance of a bald eagle winter roost would be implemented between October 15 and April 15, unless the roost is verified to be unoccupied by the unit wildlife biologist (Region 6 Bald Eagle Policy Following Delisting and During the Five-Year Monitoring Period).
1.3. Invasive Plants

1.3.1. Manage existing invasive plant infestations following treatment prescriptions and guidelines detailed in the Prevention and Implementation sections of Appendix F.

1.3.2. All heavy equipment (excluding passenger vehicles) shall be clean and free of soil, vegetative matter, or other debris that may contain or hold weed seeds prior to entering National Forest System lands (WO-B/BT 6.36).

1.3.3. Inspect material sources (e.g., rock or soil borrow sites) on site and ensure that they are weed-free before use and transport. Treat weed-infested sources for eradication and strip and stockpile contaminated material before any use of pit material.

1.3.4. Park vehicles and stage equipment in areas that are not infested with invasive species.

1.3.5. Erosion control materials (seed, straw, hay) used must be certified free of weed seed and plant parts. A list of vendors selling certified weed-free material can be found on the Oregon Department of Agriculture’s website http://www.oregon.gov/ODA/PLANT/WEEDS/weedfreeforageprogram.shtml

1.4. Water Quality and Dumpsites

1.4.1. 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 best management practices (BMP) as described in National Best Management Practices for Water Quality Management on National Forest System Lands, Volume 1: National Core BMP Technical Guide (USFS 2012c). Design criteria, including these practices, are incorporated throughout the project, such as in project location, design, contract language, implementation, and monitoring. The BMPs are intended to meet or exceed applicable legal requirements including the Clean Water Act and State water quality regulations. National Core BMPs (Core-BMPs) include, but are not limited to:

- Plan-1, “Forest and Grassland Planning”
- Plan-2, “Project Planning and Analysis”
- Plan-3, “Aquatic Management Zone Planning”
- AqEco-2, “Operation in Aquatic Ecosystems”
- AqEco-4, “Steam Channels and Shorelines”
- Chem-1, “Chemical Use Planning”
- Chem-2 Follow Label Directions
- Chem-3 Chemical Use Near Waterbodies
- Chem-5 Chemical Handling and Disposal
- Chem-6 Chemical Application Monitoring and Evaluation
- Fac-4, “Hazardous Materials”, and
- Fac-7, “Vehicle and Equipment Wash Water”.
- Road-9 “Parking and Staging Areas”
- Road-10 “Equipment Refueling and Servicing”

1.4.2. If the total oil or oil products storage at a work site exceeds 1,320 gallons, or if a single container (e.g., fuel truck or trailer) exceeds a capacity of 660 gallons, the purchaser shall prepare and implement a Spill Prevention Control and Countermeasures (SPCC) Plan. The SPCC plan would
meet applicable EPA requirements (40 CFR 112), including certification by a registered professional engineer. (SFP: FW-119, 120, 122).

1.4.3. Remove debris, including abandoned vehicles, at known dumpsites. If any material at a dumpsite looks suspicious, involve law enforcement personnel prior to removal.

1.5. Heritage Resources

1.5.1. Changes to current unit configurations and/or addition of new project activities, like the establishment of new harvest landings, would require consultation with the Forest Archaeologist in order to protect known and unknown resources.

1.5.2. Should heritage resources be discovered as a result of any project activities, earth-disturbing activities must be suspended in the vicinity of the find, in accordance with federal regulations (NHPA and 36 CFR 800). The Forest Archaeologist must be notified to evaluate the discovery and recommend a subsequent course of action.

1.5.3. Protection buffers developed to protect archaeological sites adjacent to project activity areas must be reviewed prior to project implementation to insure that sites are avoided. This includes the Lyman Medaris gravesite adjacent to the project area.

1.6. Municipal and Domestic Water Systems

1.6.1. The community of Mapleton municipal water supply exists outside the project area boundary.

1.6.2. Protect any domestic water sources, diversion sites, and related facilities that could be affected by project activities. Consult with the hydrologist to determine if affected sites have State water rights; consult with the lands-and-special-uses specialist to determine if sites are under special-use permit. Notify affected water users prior to implementing actions.

1.6.3. Provide sanitation facilities wherever human waste would cause a hazard to human health (SFP: FW-121).

2. Plantation Treatments and Associated Actions

2.1. Thinning and Harvest Actions

2.1.1. Wildlife

2.1.1.1. Commercial thinning prescriptions would preferentially retain shade tolerant conifer tree species over Douglas-fir when they are present. Retain a portion of conifer trees exhibiting forms of decadence or physical damage that may include broken, damaged or missing tops, sweep or crook, forked or multiple tops, decay conks, evidence of animal damage of cavity excavations.

2.1.1.2. Based on past similar projects, commercial thinning is estimated to occur on approximately two-thirds of the original harvest clear cut unit acreage. Unthinned portions are areas that may include headwalls and stream buffers found inside riparian reserves, areas having soil-slope stability issues, areas of concentrated hardwood species, areas where conifer stocking levels fall below positive economic return thresholds, or areas that cannot be feasibly reached with anticipated logging system configurations. In these areas outside of the harvest boundary but within the historic clear cut stand boundary of thinned and deferred stands,
including riparian buffers, create additional snags of up to 10 per acre and 4 pieces of down wood from intermediate and the smallest co-dominant trees available. Areas will be selected to release dominant trees or hardwoods where appropriate.

2.1.1.3. Post-harvest stand structural variability would be increased through snag and coarse woody debris creation. In all units being considered for commercial thinning treatments, approximately four (4) snags per acre would be created by topping representative trees within the treatment area boundary. Additionally, one (1) tree from adjacent tree walls would be topped to create large snag habitat for every ten (10) acres of commercial thinning treatment. For commercial thinning units, up two (2) pieces of coarse woody debris per acre would be created by felling representative trees within treatment boundary.

2.1.1.4. Post-harvest stand species composition would be enhanced by planting a diverse mixture of coniferous tree species. All treatment areas would be evaluated for planting feasibility. Underplant approximately 80 percent of treatment areas with predominantly shade tolerant conifer species.

2.1.1.5. Red Tree Vole platforms may be placed in areas that have no future restoration thinning planned in collaboration with Pacific Northwest Research Station.

2.1.1.6. Thinning treatments within a known nest patch or predicted nest patch is prohibited.

2.1.1.7. In units which contain trees with potential murrelet nesting structure the unit wildlife biologist would be involved to insure that the potential nest structure is managed in accordance with options 2 or 3 of the Level 2 policy for the management of potential nesting structure.

2.1.1.8. No suitable marbled murrelet nest trees would be removed (individual trees with at least one potential nesting platform). The unit wildlife biologist would make the determination of whether a tree is considered a suitable nest tree.

2.1.1.9. Suitable nest trees would be protected by designing prescriptions for forest stands surrounding them (within 0.5 mile) that:

- provide protection from potential windthrow;
- require no openings within one tree length surrounding a potential nest tree; and
- ensure no damage to any potential nest tree limbs.

2.1.1.10 Heavy thinning (refer to definition in consultation documents) in stands within murrelet critical habitat is prohibited.

2.1.1.11 Heavy thinning treatments (refer to definition in consultation documents) within 300 feet of occupied or unsurveyed murrelet habitat or nesting structure is prohibited.

2.1.1.12 When within 300 feet of murrelet suitable habitat or murrelet nest structure, no gaps would be created within one potential tree height (250’) surrounding potential nesting structure and remaining area would have no gaps greater than ¼ acre.

2.1.1.13 Activities within 300 feet of murrelet habitat or nesting structure would maintain 40 percent or greater canopy cover, averaged over the 300 foot buffer area. No gaps would be created within 250 feet of murrelet habitat or nesting structure and no openings greater than ¼ acre would be created in the area between 250 to 300 feet of murrelet habitat or nesting structure.
2.1.2. Insects, disease, and wind (NFP: p. C-12, C-13)

2.1.2.1 To reduce the potential for Douglas-fir bark beetle infestations, avoid felling or topping more than 5 trees per acre for down wood during the period from May 1 through June 15 (adult beetle flight season). Consider the use of pheromone attractants to create snags during this time period.

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

2.1.2.3 Consider creating gaps, designed to be planted, in Swiss needle cast (SNC) infection areas to reduce the impact this disease would have on future stand stocking levels and individual tree growth rates. (See Silvicultural Prescription section for planting criteria.)

2.1.2.4 In units identified as being possibly susceptible to windthrow retain approximately 50% of the basal area present prior to treatment to ensure wind-firmness.

2.1.3 Streams and riparian vegetation

2.1.3.1 Minimize log hauling on roads during the wet-season (generally October to June), where such use could adversely affect water quality. To avoid adverse effects on water quality, consult a hydrologist or soil scientist before allowing log hauling during the wet season.

2.1.3.2 Limit log hauling to the dry season (generally considered June through October) on roads as shown in the Project EA, Appendix C, Table C-4.

2.1.3.3 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 (Core-BMP: Veg-3).

2.1.3.4 Determine width of no-harvest buffers, based on site-specific factors such as flow regime (i.e., perennial, intermittent, or ephemeral), presence or absence of conifers, and slope-stability conditions. Buffers would at least include the inner gorge adjacent to streams and the active floodplain. Where needed, increase buffer widths to avoid unstable areas (SFP: FW-087, -088, -089, -112).

2.1.3.5 To speed the growth and development of large wood that could eventually enter streams and benefit aquatic species habitats, thin and leave (do not remove) dense conifer in riparian buffers and headwall leave areas of plantations. Site-specific conditions such as slope stability, stream shade, and slope position would influence thinning prescriptions. Retain at least 40 trees per acre.

2.1.3.6 Directionally fell trees away from buffers to protect riparian vegetation from damage. Retain trees that were accidentally felled into buffers to minimize stream sedimentation or damage to riparian vegetation. Some trees may be removed as determined by a fish biologist or hydrologist (Core-BMP: Veg-3; SFP: FW-091).

2.1.3.7 Skyline corridor spacing should be set to both minimize damage to standing timber, as well as the underlying vegetation and soil. Where skyline 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 entire stream buffer or as advised by Forest Service Hydrologist (Core-BMP: Veg-5; SFP: FW-091, -092).

2.1.3.8 Locate landings to minimize the need for skyline corridors through riparian buffers. Limit skyline corridors to between 10 and 20 feet wide. Corridor width may appear wider in areas where trees adjacent to the corridor are cut to meet the silvicultural prescription. Where skyline
corridors pass through riparian buffers, remove no more than 20 percent of the canopy in a given 1,000 feet of stream (SFP: FW-091).

2.1.3.9 The building of temporary, unclassified roads shall occur in the dry season, generally considered June through October, to avoid surface erosion from exposed soil (unless otherwise approved by a Forest Service Hydrologist). Open roads shall be storm proofed if they have to set through extended periods of wet weather.

2.1.3.10 Add aggregate to and/or reshape system roads prior to log hauling, where needed, to ensure proper drainage and reduce potential impacts to streams.

2.1.3.11 Minimize blading of ditches, monitor roads during periods of heavy rain, and use BMPs to trap sediment, where necessary, to reduce sedimentation of streams from aggregate-surfaced roads (Core-BMP; Road-4).

2.1.4 Soils

2.1.4.1 To minimize soil disturbance, use skyline cable or helicopter logging systems as the primary method of log removal for all thinning sales (Core-BMP; Veg-1). Design skyline logging plans to minimize side-hill and downhill yarding, yarding through riparian buffers, and building of new temporary roads. Side-hill and downhill yarding can cause greater soil disturbance and damage to residual trees than uphill yarding; new temporary roads increase the area affected by soil compaction.

2.1.4.2 Use of ground-based yarding systems has been identified for some stands (the Project EA, Appendix B-3). Involve a soil scientist or hydrologist to determine use of ground-based systems in portions of other stands case-by-case (Core-BMP; Veg-1). Considering the trade-offs, the specialist(s) may determine that an alternative solution—such as building a short road on a stable ridge, logging by helicopter, or thinning and leaving the cut trees on site—may be more appropriate.

2.1.4.3 Ground-based equipment shall operate in the dry season (Core-BMP; Veg-2), usually from June through October, unless otherwise restricted by other resource concerns or waived by Forest Service personnel.

2.1.4.4 Limit the grade for ground-based operations to geologically stable areas (Core-BMP; Veg-4). Ground-based equipment are limited to side slopes generally less than 30%, but may operate on side slopes greater than 30% but less than 40% in a few selected instances, in order to reduce soil disturbance.

2.1.4.5 Ground-based skidding equipment shall stay on designated skid trails to minimize soil disturbance (Core-BMP; Veg-4). Ground-based skid trails would be pre-designated and preapproved before use. Existing skid trails should always be used before new skid trail locations are approved. They should not usually exceed 15 feet in width except for turnaround areas, and the objective is to maintain a 10 to 12 foot width throughout the length. Where practical the skidder, cat, shovel or forwarder should travel on slash. Traveling on slash has been shown to reduce off site soil erosion and lessen soil compaction. Skid trails would generally be 100 to 200 feet apart with conventional line pulling operations, and 40 to 60 feet apart with processor / forwarder operations.

2.1.4.6 Consider use of mechanical harvesting and pre-bunching of logs to minimize cost of ground-based and helicopter yarding.
2.1.4.7 Partial or one end suspension is required on skyline units, except at tail trees and landings. Given the irregular topography in some units, sections of ground lead may occur along some skyline corridors. Generally this is acceptable, but approval requires a site specific, on-the-ground review of the area by Forest Service personnel (SFP: FW-107).

2.1.4.8 Where operable, harvested trees should be topped and limbed in the units in order to provide small limbs and needles for nutrient recycling. This objective has to be tempered with the need to reduce fuel loading to control potential wild fires, and to meet site specific standards for slash loadings. Retain in units—through breakage and topping—the tops (minimum of 5” in diameter at the large end) of at least 20 percent of the trees felled in units. Tree tops would be retained across at least 80 percent of each unit. This practice, coupled with limbs that normally break off during yarding, would serve to address soil nutrient, displacement, and erosion concerns. Observations indicate that less soil displacement occurs in units where whole-tree yarding is done, compared to log yarding.

2.1.4.9 Where practical, at the completion of harvest activities, limbs and woody debris should be placed on areas of exposed soil to reduce the potential for offsite soil erosion.

2.1.4.10 Avoid disturbance to the existing large down woody debris concentrations created by the initial entry, as much as practical.

2.1.4.11 Where slopes are greater than 60 percent immediately below side-cast roads, retain two rows of conifers (where feasible and if conifers appear stable) to maintain slope stability (SFP: FW-112). Consult with a FS hydrologist or soil specialist on landing and corridor locations.

2.1.5 Temporary roads and skyline landings

A team of appropriate resource specialists and sale administrators would review road sites before preparing road plans for timber-sale contracts. This group would review any changes in road plans before incorporating them into contracts.

2.1.5.1 Building temporary roads on existing road templates, then decommissioning

2.1.5.1.1 All culvert additions on temporary roads would be installed and removed within the summer operating season (typically between July 1 and October 15). Culverts shall be removed within one calendar year of the conclusion of harvest activities.

2.1.5.1.2 Do not build temporary roads on existing road templates where road instability or grade is a major concern. Existing spur road templates that should not be re-opened for project use:

Table A-6. Existing spur road templates

<table>
<thead>
<tr>
<th>Stand</th>
<th>Road Type</th>
<th>Rationale</th>
</tr>
</thead>
<tbody>
<tr>
<td>606004</td>
<td>Temporary</td>
<td>Northern most portion has instability</td>
</tr>
<tr>
<td>606054</td>
<td>Temporary</td>
<td>Main spur has had culvert removed and sidecast pullback</td>
</tr>
<tr>
<td>606069</td>
<td>Temporary</td>
<td>Original spur template to access stand is not feasible to reopen</td>
</tr>
<tr>
<td>606119</td>
<td>Temporary</td>
<td></td>
</tr>
<tr>
<td>Stand</td>
<td>Road Type</td>
<td>Rationale</td>
</tr>
<tr>
<td>-------</td>
<td>-----------</td>
<td>-----------</td>
</tr>
<tr>
<td>606124</td>
<td>Temporary</td>
<td>Large failure and stability issues on East portion of spur.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Cost to reopen spur accessing west side of stand would exceed restoration value</td>
</tr>
</tbody>
</table>

2.1.5.1.3 If the horizontal alignment of a temporary road built on an existing template needs adjustment, favor the cut-bank side of the road prism to minimize disturbance to side-cast areas and established vegetation.

2.1.5.1.4 If a road is to be used during the wet season, surface with aggregate where needed.

2.1.5.1.5 If rock is needed for wet sites that may be present on existing non-system roads used during the dry season, limit rock to what is needed for traction, not structural strength. For the timber sale contract, identify existing non-system roads to be used during the dry season.

2.1.5.1.6 Install waterbars, and store the road between operating seasons, or as soon as the need for the road ceases. Design water bars to facilitate proper drainage of surface water and to prevent ponding. Place water bars in areas where drainage would not destabilize road fills. To keep streams within their channels when culverts have been removed, build water bars immediately above existing culverts to become the overflow point. Use the Waterbar Placement and Construction Guide for Siuslaw Forest Roads to determine water-bar spacing and design (SFP: FW-123).

2.1.5.1.7 To reduce soil erosion, seed exposed soils with native, certified weed-free species.

2.1.5.1.8 At the completion of harvest activities, spur roads, tractor skid roads or forwarder roads should be water barred and scarified (12 inch depth), as necessary. Where possible, primary skid trails and landings should be subsoiled (about 20 inches in depth) in order to reduce compaction and return the site to near original productivity. Subsoiling needs to be considered in light of the potential for root pruning, damage to existing regeneration, and the increased amount of soil disturbance.

2.1.5.1.9 To reduce the potential for the spread of invasive plants, maintain canopy cover to the extent possible, when reopening and building roads or stabilizing and closing them. Seed disturbed sites lacking canopy cover (landings, roads, waste areas, culvert removal sites, and road barricades) with available native, certified weed-free grass species.

2.1.5.2 Building new temporary roads where templates do not exist, then decommissioning

2.1.5.2.1 Do not include new roads as part of the system road network.

2.1.5.2.2 Limit new roads to stable areas, such as ridges and generally flat terrain, to minimize soil disturbance.

2.1.5.2.3 Do not locate new roads on valley bottoms or mid-slopes to avoid stream crossings and other impacts to hydrology.

2.1.5.2.4 Where feasible, design the logging plan to minimize the need for new roads (SFP: FW-162, 163).

2.1.5.2.5 Scatter slash created through road building in the stands.
2.1.5.2.6 Use new roads during the dry season whenever possible to avoid adding rock to native surfaces and to reduce costs. Identify dry-season roads in the timber-sale contract.

2.1.5.2.7 Waterbar and store new roads between operating seasons. Design water bars to facilitate proper drainage of surface water and to prevent ponding. Place water bars in areas where drainage would not destabilize road fills. To keep streams within their channels when culverts have been removed, build water bars immediately above existing culverts to become the overflow point. Use the Waterbar Placement and Construction Guide for Siuslaw Forest Roads to determine water-bar spacing and design (SFP: FW-123).

2.1.5.2.8 Decommission new temporary roads after operations are completed. Actions include:

- Waterbarring the roadway and barricading the road entrances to prevent motor vehicle access;
- Install waterbars as noted in previous design criteria;
- Remove all stream and ditch culverts.
- Pull back side cast fills on steeper hill slopes to stabilize the template;
- Seeding exposed soils with native, certified weed-free species; and
- Evaluating decommissioned roads to determine the need for ripping or subsoiling. A hydrologist, soil scientist, or geologist shall evaluate roads to determine the need for treatment. Roads used for log hauling during the wet season and have no potential for being used in the future may be treated.

2.1.5.2.9 To reduce the potential for the spread of invasive plants, maintain canopy cover to the extent possible, when reopening and building roads or stabilizing and closing them. Seed disturbed sites lacking canopy cover (landings, roads, waste areas, culvert removal sites, and road barricades) with available native, certified weed-free grass species.

2.1.5.3 Landing Sites

2.1.5.3.1 Construct landings in stable areas with stable cut bank slopes. Use existing landings where feasible (SFP: FW-115, 117).

2.1.5.3.2 After use, seed exposed soils with native, certified weed-free species; or spread landing slash by machine over landing sites (unless tree planting is planned) and roads, especially those with native (non-rock) surfaces. This practice would be more cost effective than machine piling and burning of landing piles and would help stabilize disturbed soils. The district wildlife biologist or botanist would recommend certain native-surface roads for seeding and fertilizing.

2.1.5.3.3 Consider machine piling and burning of landing piles, especially within 25 feet of key forest roads. The district hydrologist, fire management officer, and sale administrator would determine appropriate sites for machine piling and burning. These sites generally include roads and landings that have been rocked (SFP: FW-162).

2.1.5.4 Waste Sites

2.1.5.4.1 Use an interdisciplinary process to determine new sites for waste material before contracts are advertised, and to review existing waste sites to determine need for redesign or relocation. Where feasible, avoid placing waste material in areas that would impact access to future projects.
2.1.5.4.2 Place waste material only in stable areas and at least 50 feet away from stream channels. Contour waste piles to about 1.5:1 slope to minimize potential for surface erosion or mass soil movement. Allow waste piles to become vegetated naturally or use erosion control (alder, brush, native seeding, etc.), where there is a moderate to high potential for surface erosion. Compact waste material, where necessary, to prevent erosion. (SFP: FW-117, 171).

2.1.5.4.3 Waste material should not be transported outside the project area.

2.1.5.4.4 All waste sites should be monitored for a minimum of two growing seasons and any invasive plants that establishes should be treated using the most effective method permitted with a goal of eradication.

2.1.6 Quarry Operations

2.1.6.1 Shape quarry floor to drain onto vegetated areas, prevent runoff from concentrating or diverting to stream courses.

2.1.6.2 Seed exposed soils and stockpiled over burden with approved native seed mix.

2.1.6.3 Treat invasive vegetation consistent with botanical design criteria.

2.1.6.4 Restore and maintain access benches according to Mine Safety and Health Administration (MSHA) regulations

3 System Roads Associated with Commercial Thinning

Refer to the Project EA, Appendix B-3 and Appendix C for a list of system roads affected by the Project.

3.1 Wet Season Log Hauling

3.1.2 When selecting key and non-key roads for potential log haul during the wet season, consider the length of the collector road, slope position and aspect of the road, road condition, and projected cost for additional rock to support wet-season operations. Preferred candidates for wet-season haul include short, stable ridgetop roads or roads not located on north aspects. Refer to the project Transportation Plan for additional information.

3.1.3 Include non-key roads—expected for use as part of wet-season haul routes—in the timber-sale contract’s specified road reconstruction provisions, if any reconstruction is needed. If no reconstruction is planned, consider dry-season, pre-haul maintenance. Specify road reconditioning, removal of accumulated surface organics, brushing, cleaning culvert inlets, removing slide and slough material, and removal of down trees to open roads. Level existing waterbars, replace failing ditch-relief culverts, and apply needed surfacing materials.

3.1.4 Log hauling may be suspended or additional rock may be added to road surfaces, if it is determined that substantial damage to roads or impacts to natural resources would occur.

3.1.5 During wet-season haul, limit potential sedimentation of streams by suspending log hauling when rainfall is greater than 1 inch during a 24-hour period. Avoid, minimize, or mitigate adverse effects to soil, water quality, and riparian resources from wet season log hauling (Core-BMP: Road-4, Veg-7; Siuslaw Road Rules, USFS 2012d).
3.1.6 Suspend log hauling when it is determined that active erosion control measures cannot prevent sediment from entering streams (Core-BMP; Road-4). Include a hydrologist and/or fish biologist in making determinations about use of BMPs and suspension of log hauling.

3.1.7 Use standard erosion control methods such as filter cloth, diverting sediment onto stable, naturally vegetated slopes, or using catch basins to allow settling out of suspended sediment. Where necessary, install culverts or create ditches to disconnect water flow in ditches from streams.

3.2 Key Roads

3.2.2.1 Use the Forest Roads Analysis to determine the need for long-term access on system roads.

3.2.2.2 Repair and maintain key roads that would be used as haul routes. Limit repair and maintenance work to what is needed to make the haul routes stable and safe for a mix of commercial and public use. Design actions to improve the structural strength and stability of roads, improve drainage of road surfaces, and resurface roads where needed. Actions include replacing inadequate or failing ditch-relief culverts, repairing surface patching on asphalt roads, repairing structural patches on failing road fills, resurfacing roads with either gravel or asphalt, and seeding of exposed soils.

3.2.2.3 Consider retention and repair of asphalt segments near or adjacent to fish habitat and those asphalt segments that connect to existing paved access roads administered by other road management agencies.

3.2.2.4 Consider conversion from asphalt to gravel surfacing where it is economically more beneficial in the long term than repairing failed asphalt surfacing and sub grade (e.g., where individual asphalt segments are isolated from other asphalt roads).

3.2.2.5 Use clean (low in fine sediments), durable coarse rock for replacing asphalt in areas where fish habitat could be impacted. This type of rock is effective at minimizing or preventing impacts to fish habitat, and is less costly, compared to pavement. It also would serve to maintain the objectives of the aquatic conservation strategy.

3.2.2.6 Where possible, recycle ground asphalt on-site or at another location on the forest, bury on-site according to current standards, or haul to a recycling center.

3.2.2.7 Where feasible, disconnect the road drainage system from streams by redesigning road prisms to depend on out-sloping and rolling dips as methods to drain water instead of ditches.

3.2.2.8 Reestablish clearing limits in plantations from 10 feet above top of cut to 10 feet below top of fill. Consider using commercial timber sales, firewood permits, or service contracts as a means for removal.

3.2.2.9 Commercially thin roadside areas to prevent bank failure, reduce amount of leaf-litter on roads, reduce the amount of time it takes for road surfaces to dry (thus reducing slippery hazards and maintenance costs), and to reduce potential for hazard trees to develop near roads.

3.2.2.10 Reestablish clearing limits along key forest roads through sales or service contracts. Consider using commercial-thinning sales as a means for removal. Implement roadside thinning in areas where adjacent plantations have merchantable volume, but would not be thinned under a timber-sale contract.

3.2.2.11 Include in contract provision B6.33—Traffic Control Plan and Specifications—specific requirements needed for public safety, including signing that warns the public of timber sale log hauling and equipment access on roads used by residents and recreation users.
3.2.2.12 Notify affected residents and recreation users of all planned operations, including duration and timing. The Central Coast Ranger District office, local media, or phone calls would be the primary methods for notification.

3.3 Non-Key Roads

3.3.2 Assess roads in the planning area that provide primary access to private land case-by-case to determine maintenance levels. The district hydrologist, wildlife biologist, fire management officer (in WUI areas), and transportation planner would make these assessments.

3.3.3 Where necessary, stabilize roads prior to their use. Where feasible, disconnect the road drainage system from streams by redesigning road prisms to depend on out-sloping and rolling dips as methods to drain water instead of ditches. If needed, locate road drainage (cross drains) in areas that would not discharge over unstable slopes.

3.3.4 Where water bars are temporarily removed from project-maintained roads to facilitate harvest operations, add rock at these sites to maintain a hardened road surface, allow drainage, and reduce the potential for erosion.

3.3.5 Stabilize and store roads not needed for continuous access. Decommission unneeded roads.

3.3.6 Replace water bars, remove temporary culverts, and store project-maintained roads when the project is completed. Design water bars to facilitate proper drainage of surface water and to prevent ponding. Place water bars in areas where drainage would not destabilize road fills. To keep streams within their channels when culverts have been removed, build water bars immediately above existing culverts to become the overflow point. Use the Waterbar Placement and Construction Guide for Siuslaw Forest Roads to determine water-bar spacing and design (SFP: FW-123).

3.3.7 Minimize down-stream movement of sediment from culvert replacement sites, prior to and during construction, by isolating sites that have surface flow.

3.3.8 Purchasers would replace closure devices that were removed for harvest operations. Appropriate closure devices generally include earthen mounds or large boulders. These requirements would be included in the timber-sale contract or waived if they do not apply.

3.3.9 Locate and design road-closure devices to ensure effectiveness and to facilitate parking for dispersed recreation use.

3.3.10 When roads are no longer needed for this project, remove existing culverts and fill material, and unstable sidecast material from system roads in stands. Use criteria identified for road decommissioning when working on these roads.

3.3.11 Consider converting asphalt to gravel surfacing because it is economically more beneficial than repairing failed asphalt surfacing and sub grade. This would potentially reduce the Forest’s maintenance backlog by replacing a high-cost surfacing with a lower-cost surfacing.

3.3.12 Use clean (low in fine sediments), durable coarse rock for replacing asphalt in areas where fish habitat could be impacted. This type of rock is effective at minimizing or preventing impacts to fish habitat, and is less costly, compared to pavement. It also would serve to maintain the objectives of the aquatic conservation strategy.
4 Helicopter Landings and Flight Paths Associated with Commercial Thinning

4.1 Build helicopter service landings in stable areas, with stable cut-bank slopes. Use existing landings or previously disturbed sites, where feasible (SFP: FW-115, 117).

4.2 To minimize potential for petroleum spills affecting water quality, do not locate helicopter service landings near streams.

4.3 Use of helicopters, other than Chinook 47d helicopters, is prohibited within the disruption distance (Table A-2) of spotted owl occupied nest locations or potential nest patches during the critical breeding period (March 1 – July 7). If the current nest tree is not known, the disruption distance would be measured from the edge of a 300 meter buffer (nest patch) around the known or potential site. Use of helicopters, other than Chinook 47d helicopters, is prohibited within the disruption distance of occupied murrelet habitat, unsurveyed suitable murrelet habitat, and unsurveyed murrelet nesting structure during the critical breeding period (April 1 – August 5).

4.4 Use of Chinook 47d helicopters is prohibited within the disruption distance of spotted owl occupied nest locations or potential nest patches during the breeding period (March 1 – September 30). If the current nest tree is not known, the disruption distance would be measured from the edge of a 300 meter buffer (nest patch) around the known or potential site. Use of Chinook 47d helicopters is prohibited within the disruption distance of occupied murrelet habitat, unsurveyed suitable murrelet habitat, and unsurveyed murrelet nesting structure during the entire breeding period (April 1 – September 15).

4.5 Because the number of large helicopter log-landing sites is limited, use existing roads as log drop zones for helicopter logging. Design log drop zones to allow workers to be at least 1.5 times the length of the longest log from drop zones. Place landings no more than 0.5 mile from units. Design landings to allow the loader to swing logs and to accurately monitor loaded truck weight.

4.6 Where feasible, locate log and service landings to minimize the potential for damaging roads during the wet season and to minimize the need for rock on roads.

4.7 Where logs would be flown over publicly traveled roads, use flaggers to stop traffic when needed to protect public safety. Where logs would be flown over designated FS trails, notify public on site and through public affairs, and close the trail.

4.8 Involve a wildlife biologist in helicopter logging planning.

5 Silvicultural Treatments

Based on evaluations of past commercial thinning activities, typically it is only feasible to treat approximately two-thirds of the original harvest clear cut (HCC) area in order to conserve and safeguard ecological values and also due to limitations of harvest equipment. This reduction in the area available for commercial treatment is anticipated but not reflected in this analysis in order to allow the maximum opportunity for stand treatment. Approximately 98 percent of the managed stands being considered for treatment could be commercially thinned within the first decade following the completion of this analysis.

The following list summarizes the appropriate silvicultural treatments identified by the LSRA and the watershed analyses that can be employed to accelerate the attainment of late successional characteristics. Prescriptions found below were prepared by a certified silviculturist and reviewed by the Indian Creek Interdisciplinary Team.
Proposed silvicultural treatments are summarized in the Chapter 3 Vegetation analysis and post-harvest treatments are summarized in Appendix B-5.

- Thinning of young trees to promote growth rates.
- Thinning of young trees to provide for variable spacing.
- Thinning of young trees to provide for variable density spacing.
- Planting to increase species, structural and functional diversity.
- Creation of snags and coarse woody debris.

5.1 Design Criteria Common to all Commercial Thin

5.1.2 Eighty percent (80%) or more of the residual trees are well formed, healthy overstory trees that are free from physical damages which are relatively larger in diameter and have more live crown then surrounding trees. Twenty percent (20%) or less of the residual trees may exhibit some form of decadence or physical damage that can include broken, damaged or missing tops, sweep or crook, forked or multiple tops, decay conks, Red Tree Vole nests or other large nests, evidence of animal damage or cavity excavations. Residual trees having these characteristics should be, on average, the same diameter as those trees free from such defects.

5.1.3 The intent of all prescriptions are to retain and enhance habitat for threatened and endangered species.

5.1.3.1 Utilize Designation by Description or Designation by Prescription as appropriate for a given sale package.

5.1.3.2 Reduce densities to approximately .25 relative density index (RDI) in order to maximize the growth of individual leave trees.

5.1.3.3 Species preference for retention in descending order is western red cedar, Sitka spruce, western hemlock, and Douglas-fir. Red alder, bigleaf maple and other tall deciduous tree species may be present in stands as isolated and scattered individuals or found in clusters. When deciduous species are present, no special consideration would be given in terms of desired conifer spacing. Utilize directional felling and yarding techniques to protect maple and other tall deciduous
species from undue damages and look for opportunities to make alder timber subject to agreement.

5.1.3.4 Create Snags and Coarse Woody Debris:

5.1.3.4.1 Create approximately 1 snag for every 10 acres of commercial thinning from intermediate and smaller co-dominant trees in larger, untreated, natural and/or plantation stands to develop wildlife nesting and denning structures;

- Trees would be treated in groups of 2-5 trees;
- Where appropriate bat flanges, cavity starts and other wildlife enhancement may be placed in treated trees;
- Trees would not be treated that contain Red Tree Vole nests, or have Marbled Murrelet nest structure;
- Over-topped trees and dominant trees would not be treated; generally intermediate trees or the smaller co-dominant trees in a given area may be selected;
- Uncommon tree species would not be treated. Generally, Douglas-fir would be the only or at least the primary species treated; another species may be treated only when it makes up 25% or more of the unit’s composition AND makes up greater than 50% of the immediate treatment area’s composition.

5.1.3.4.2 Create up to four snags for every acre of commercial thinning within the original clear-cut harvest unit boundary to develop snag structures for wildlife habitat. Generally, snags should be well distributed across the harvest unit but may be concentrated within ¼ acre areas. Snag creation areas may coincide with the creation of coarse woody debris;

- Snags would be created in a 50/50 ratio of live topped (containing more than 15 live limbs) and snag (no more than 4 live limbs remaining)
- Snags would be grouped or clumped
- Where appropriate bat flanges, cavity starts and other wildlife enhancement may be placed in treated trees
- Uncommon tree species would not be treated. Generally, Douglas-fir would be the only or at least the primary species treated; another species may be treated only when it makes up 25% or more of the unit’s composition AND makes up greater than 50% of the immediate treatment area’s composition.

5.1.3.4.3 Create 2 pieces of down coarse woody debris for every acre of commercial thinning to develop wildlife habitat. Generally, coarse woody debris should be well distributed across
the harvest unit but may be concentrated with ¼ acre areas. Coarse woody debris creation areas may coincide with the creation of snags.

- Over-topped trees and dominant trees would not be treated; intermediate and the smallest co-dominant trees available may be selected.
- To prevent local Douglas-fir bark beetle infestations (which attack larger residual trees), down wood created (in combination with snag trees treated but excluding live-topped trees) may not have more than two trees greater than 12 inches in diameter at breast height.

5.1.3.4.4 Outside of the harvest boundary but within the historic clear cut stand boundary of thinned and deferred stands, including riparian buffers, create additional snags of up to 10 per acre from intermediate and the smallest co-dominant trees available.

- Consult hydrologist, fish biologist and Botanist before selecting target trees in riparian buffers. Over-topped trees and dominant trees would not be treated; intermediate and the smallest co-dominant trees that meet the other design criteria may be selected.
- Live-topped trees selected would be of the size necessary to safely climb and have a crown relatively suitable to survive after treatment. They would generally be the largest of the trees selected for any the various wildlife tree treatments and would have the best crown size and crown health of this selection group. They would still be selected in the process described above, selecting the smallest trees first that are not overtopped or dominant trees but that also meet this design criteria.
- Where appropriate bat flanges, cavity starts and other wildlife enhancement may be placed in treated trees.
- To prevent local Douglas-fir bark beetle infestations (which attack larger residual trees), treated snags (in combination with down wood created but excluding live-topped trees) may not have more than two trees greater than 12 inches in diameter at breast height treated.
- Uncommon tree species would not be treated. Generally, Douglas-fir would be the only, or primary, species treated; other species may be treated only when each makes up 25% or more of the unit’s composition AND makes up approximately 50% of the immediate treatment area’s composition.

5.1.3.4.5 Outside of the harvest boundary but within the historic clear cut stand boundary of thinned and deferred stands, including riparian buffers create additional down wood of up to 4 per acre from intermediate and the smallest co-dominant trees available.

- Over-topped trees and dominant trees would not be treated; intermediate and the smallest co-dominant trees available may be selected.
- To prevent local Douglas-fir bark beetle infestations (which attack larger residual trees), down wood created (in combination with snag trees treated but excluding
live-topped trees) may not have more than two trees greater than 12 inches in diameter at breast height.

- Uncommon tree species would not be treated. Generally, Douglas-fir would be the only, or primary, species treated; other species may be treated only when each makes up 25% or more of the unit’s composition AND makes up approximately 50% of the immediate treatment area’s composition.

5.2 Variable Space Thinning
These stands have been identified in previous watershed analysis documents.

5.2.2 Maintain 40 Percent Canopy Cover, (Commercial Thin)
These stands have been identified in previous watershed analysis documents where a one-time entry or single treatment would be employed to meet management goals and objectives.

5.2.2.1 Maintain a minimum of 40 percent canopy cover.
5.2.2.2 Thin from below to approximately .25 RDI.
5.2.2.3 Place ¼ to 1 acre gaps in units identified as being suitable for gap placement (Appendix B-2). Create one acre of gaps for every 10 acres of commercial thinning.
5.2.2.4 Underplant approximately 80 percent of commercially thinned acres with predominantly shade tolerant conifer species. Planting prescriptions would be developed at the time of implementation and may vary depending upon site specific conditions. In general underplanting densities would range between 50 and 150 trees per acre.

5.2.3 Maintain 60 Percent Canopy Cover, (Commercial Thin)
These stands have been identified in previous watershed analysis documents where multiple treatments may be employed to meet management goals and objectives.

5.2.3.1 Maintain a minimum of 60 percent canopy cover.
5.2.3.2 Thin from below to approximately .25 RDI.
5.2.3.3 Place ¼ to 1 acre gaps in units identified as being suitable for gap placement (Appendix B-2). Create one acre of gaps for every 10 acres of commercial thinning.
5.2.3.4 Underplant approximately 80 percent of commercially thinned acres with predominantly shade tolerant conifer species. Planting prescriptions would be developed at the time of implementation and may vary depending upon site specific conditions. In general underplanting densities would range between 50 and 150 trees per acre.

5.3 Fire and Fuel management
5.3.2 Follow the Fire Management Plan for LSR RO268 for all wildfire suppression or pre-suppression prevention programs. For burning slash piles, prepare a burn plan that meets all the parameters identified in FSM 5140. Register all material to be burnt into the FASTRACS program prior to burning. Burning would be conducted in compliance with National Ambient Air Quality Standards and under the Oregon Smoke Management Plan.

5.3.3 Design fuel-treatment activities to meet Aquatic Conservation Strategy objectives and mandatory terms and conditions from the US Fish and Wildlife Service and NOAA Fisheries. For additional

5.3.4 Where fuel (residual logging slash) borders county roads and key forest roads that are maintained open for general use, provide fuel breaks (minimum of 25 to 100 feet from road edge), to reduce the risk of human-caused fire. The following treatment methods may be used: Untreated buffers, directional felling of trees away from roads, burning slash (hand or machine piles), or mechanical treatment—chipping, mastication, and scattering. High cut banks (with no slash) can be considered adequate fuel breaks.

5.3.5 If scattering of landing piles would not adequately address the fire hazard, burn landing slash within 25 feet of open-system roads. Seed burned areas with native, certified weed-free seed, if the landing is larger than 1/5 acre (about 95’ X 95’) and has a native (non-rock) surface.

5.3.6 After harvest operations are completed on any given unit, conduct fuel treatments, where necessary, adjacent to roads, as soon as practical, to minimize exposure to fire hazards.

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

5.3.8 To reduce the potential for wildfire, do not create down wood in designated fuel breaks unless the tops are kept outside of the breaks. Identify designated fuel breaks in the timber-sale contract or on implementation plan maps.

5.3.9 Patrol and mop-up of burning piles would occur when needed to prevent treated areas from re-burning or becoming an escaped fire.

5.3.10 Design all burn plans to minimize adverse impacts to soils and residual trees, and include contingency plans, ensuring the availability of adequate fire-suppression resources in the event of an escaped fire.

5.3.11 For spotted owls, burning within the disruption distance of an occupied or potential nest patch between March 1 and July 7 is prohibited. If the current nest tree is not known, the disruption distance would be measured from the edge of a 300 meter buffer (nest patch) around the known spotted owl site. For murrelets, burning within the disruption distance of occupied or unsurveyed suitable habitat, or unsurveyed nesting structure, between April 1 and August 5 prohibited.

5.4 Wildland-Urban Interface

Table A-7. Fire & Fuels Wildland Urban Interface Treatment

<table>
<thead>
<tr>
<th>Unit†</th>
<th>Structure Type (Number of Structures)</th>
<th>Physical Location</th>
<th>Lat/Long of Structure</th>
</tr>
</thead>
<tbody>
<tr>
<td>606038</td>
<td>Primary (1)</td>
<td>North of Unit</td>
<td>N 44° 12' 58.398&quot;</td>
</tr>
</tbody>
</table>
5.4.2.1 Treat stands within 300 feet of private land that contains structures (primarily residences) to reduce fire risk and create long-term fuel breaks. Thin stand density to an average 70 trees per acre or lower to allow for underburning or for hand-pile burning. Directional felling and whole-tree yarding could be done in place of burning options. Wider spacing in stands permits heat to escape, minimizing crown damage and creating a fuel break that would not easily support a running crown fire. Based on past results, no more than 10 percent of the residual trees would be damaged by fire. Count damaged trees towards meeting the down woody debris requirement. Consider whole-tree yarding and slash disposal on landings to potentially eliminate the need for burning.

5.4.2.2 Maintain roads that access stands in the wildland-urban interface. Treat roads with rolling waterbars to facilitate access for initial-attack equipment. Leave roads open or close roads using a guardrail. The district hydrologist, fire management officer, and transportation planner would determine closure type and locations.

5.5 Dispersed Recreation Sites

5.5.2 A person trained to identify danger trees, consistent with the Field Guide for Danger Tree Identification and Response (USDA, USDI, et al. 2005), would evaluate potential danger trees near dispersed recreation sites.

5.5.3 A road manager, fish biologist, and wildlife biologist would review identified danger trees prior to felling to identify potential impacts to wildlife species such as red tree vole, northern spotted owl, or marbled murrelet. These specialists would help determine which trees, snags, or both need to be felled or topped to eliminate the roadside danger.

5.5.4 Priority for felled danger trees include: 1) leave trees on site to meet down wood requirements, 2) store trees (logs) for later fish-structure use, 3) remove trees through timber-sale contracts, 4) remove trees through firewood permits, or 5) remove trees through service contracts.

5.5.5 No known nest trees would be removed, without further consultation with USFWS. Trees confirmed to be a hazard that could contain nest structure (not a known nest tree) would be examined by a district biologist, and would only be removed outside of the breeding season, or determined through survey protocols to be inactive, or consulted on separately.
5.6 Invasive Plants

5.6.2 Inspect all areas where ground-disturbing operations occurred within thinning units for at least two growing seasons, following completion of the project. Conduct follow-up treatments based on inspection results. Consider restoration measures following treatment to reduce the risk of re-infestation (e.g., seeding, planting with native species).

5.6.3 Implement Early Detection-Rapid Response design criteria as specified in Appendix F.

5.7 Planting and tending young trees in commercially thinned stands

(Refer to Silvicultural Prescription section for planting criteria.)

5.7.2 Maintain planted trees by manually releasing them from competing vegetation.

5.8 Large Wood Placement Activities

5.8.1 In-stream placement of large wood

5.8.1.2 In-stream placement of large wood must be consistent with the Oregon Department of State Lands General Authorization for placement of large wood.

5.8.1.3 Select large wood that has a length at least 2 times bank-full width, or at least 1.5 times bank-full width if a root wad is attached.

5.8.1.4 Place LWD in a manner to most closely mimic natural accumulations of LWD in each particular stream.

5.8.1.5 A few red alder may be felled near a few large-wood-placement sites. These small canopy openings may be needed to facilitate placement of large wood in areas where tree canopies are dense.

5.8.1.6 Limit in-stream activities to between July 1 and September 15, unless a waiver is obtained by ODFW (SFP: FW-117).

5.8.1.7 The use of ISC Type I and Type II helicopters within 0.5 mile of spotted owl or marbled murrelet occupied or unsurveyed suitable habitat would occur after September 30 in a given calendar year to avoid impacts during the critical breeding periods.

5.8.2 Mature tree selection from natural stands

5.8.2.2 Survey and Manage and Sensitive species—Trees selected for large wood placement would be surveyed for survey and manage and sensitive wildlife and plant species prior to harvest. Any tree supporting these species would not be harvested.

5.8.2.3 Listed terrestrial species—After the required surveys are completed (e.g., red tree vole and lichen surveys), a wildlife biologist would direct the selection of trees to be placed in streams for enhancing hydrologic function and water quality. No trees with marbled murrelet or Northern spotted owl nest features would be selected, and trees with nest structure near target trees would be protected from damage. First priority for tree selection would be to use suitable hazard trees or trees blown down across key forest roads.
5.8.2.4 No gaps greater than ¼ acre will be created when within 300 feet of marbled murrelet nesting structure, or ½ acre when within spotted owl critical habitat.

5.8.3 Plantation and Large Wood Source Area Tree Selection and Removal

5.8.3.2 Listed terrestrial species—after the required surveys are completed (e.g., red tree vole and lichen surveys), a wildlife biologist would direct the selection of trees to be placed in streams for enhancing hydrologic function and water quality. First priority for tree selection would be to use trees blown down across key forest roads.

5.8.3.3 Select and cut or push over plantation trees (25 to 80 years old) adjacent to system or non-system roads; on non-system roads, and existing and potential landing sites; or in areas requiring non-commercial thinning. Retain the root wad on plantation trees that are pushed over.

5.8.3.4 Within spotted owl or marbled murrelet suitable habitat individual trees or small groups of trees should come from the periphery of permanent openings (roads etc) or from the periphery of non-permanent openings (e.g., plantations). Groups of trees greater than 4 trees shall: 1) not be within marbled murrelet suitable stands or stands buffering 300ft of suitable stands, and 2) not be buffering 300ft of individual trees with marbled murrelet nesting structure. A minimum distance of one potential tree height should be maintained between individual or group removals.

5.8.3.5 Do not remove trees in locations where removal would destabilize stream banks or remove shade to streams.

5.8.3.6 Do not remove trees in locations where removal would destabilize road prisms.

5.8.3.7 Limit tree pushover actions to the dry season and to slopes within the safe operating capability of the excavator used (generally 30 percent or less); use existing roads for access, where feasible.

5.8.3.8 Limit the timing and location of tree-removal operations to avoid disturbance to nesting marbled murrelets and spotted owls.

5.8.3.9 Decompact excavator access routes that are native surface.

5.8.3.10 Replace barriers at road entrances and waterbars on roadbeds that would be removed for equipment access.

5.8.3.11 Minimize impacts to natural scenery along road prisms.

5.8.3.12 Consult with the logging systems specialist prior to the selection of trees for use in streams to avoid removing trees that may be needed for guylines or tailhold anchors.

5.8.3.13 Consult with the Forest Archeologist prior to digging or pulling over trees.

5.9 Riparian Release

5.9.1 Release riparian conifer from conifer and hardwood competition. Felling shall be restricted to the few trees that directly affect light to understory conifers.

5.9.2 Non-commercially thin dense conifer in riparian areas of plantations.
5.10 Road Decommissioning

5.10.1 Roads that provide the sole access to private land would not be decommissioned. Consider easements, access needed by utility companies, and other access needs, when proposing roads for decommissioning. Coordinate proposed road decommissioning with affected private landowners and utility companies.

5.10.2 Roads identified for decommissioning and associated actions are listed in the Project EA, Appendix C. Consider decommissioning roads that are determined to no longer be needed for land management or where individual roads are causing resource impacts that can be mitigated by decommissioning. Consider a full range of decommissioning treatments—from removing drainage structures and storing roads to full obliteration of the road template.

5.10.3 Use a team of planners (at least a fish biologist or hydrologist and wildlife biologist) and engineers, to review road-project sites, before preparing design plans for road-decommissioning contracts. Involve planners and engineers before changes in design plans are incorporated into contracts.

5.10.4 Implement in-channel decommissioning activities during the in-stream work period (July 1 to September 15). When needed, obtain a waiver from the State to conduct the work outside the in-stream work period. Follow the directions in the Forest Road Obliteration and Upgrade Guide.

5.10.5 Control erosion at fill removal sites. Vary the method of control, depending on the amount of sediment that has the potential to enter streams and affect aquatic biota. Consider fill removal, slope stability, cut slopes adjacent to stream channels, road surfaces, and sediment plains in stream channels, when determining control methods—some sites may not require any erosion control, while others may require more extensive treatments.

5.10.6 Remove all fill material and culverts at all culvert-removal sites with defined stream channels. Remove all fill that extends from each edge of the natural valley floor width up to the road at about 1.5H:1V slope. Where natural slopes are steeper than 1.5H:1V, remove only the fill between the natural slopes. Carefully remove all fill material to minimize sediment inputs into streams. (SFP: FW-123).

5.10.7 Partially remove fills (partial removal may occur only after consultation with fisheries and watershed specialists) where fills are extremely deep, contain too large of material to move (such as large boulders), or would result in adverse effects if completely removed. For partial-fill removal, remove the same wedge of fill as for full-removal areas, except that portion of the fill that is too deep to reach or that which may cause adverse effects. Partial-removal sites may leave the culverts functioning in place.

5.10.8 Control erosion on stream-adjacent cut slopes, using slash placed on the contour of the slope, where there is a moderate to high risk of erosion affecting aquatic resources. Use a certified, weed-free native seed mixture, if there is no slash or nearby seed sources such as red alder. Erosion is most likely where slopes are steeper than 1.5H:1V or their length exceeds 20 feet.

5.10.9 Place woody debris (locally available alder, conifer trees less than 80 years old, and brush that may need to be removed from decommissioning sites or adjacent to the road prism) in stream channels, perpendicular to stream flow, where a large sediment plain is expected to erode from the channel as the stream adjusts to its gradient during high flows. Stabilize smaller sediment plains, where woody debris can be easily obtained near the site.

5.10.10 Install water bars on both sides of excavated stream banks at some sites to route surface water away from newly excavated slopes (SFP: FW-123).
5.10.11 Use an interdisciplinary process to determine new sites for waste material before contracts are advertised, and to review existing waste sites to determine need for redesign or relocation. Where feasible, avoid placing waste material in areas that would impact access to future projects.

5.10.12 Place waste material only in stable areas and at least 50 feet away from stream channels. Contour waste piles to about 1.5H: 1V slope to minimize potential for surface erosion or mass soil movement. Allow waste piles to become vegetated naturally or use erosion control (alder, brush, native seeding, etc.), where there is a moderate to high potential for surface erosion. Compact waste material, where necessary, to prevent erosion. (SFP: FW-117, 171).

5.10.13 Level and seed long-term (multiyear use) waste areas after each season of use. Shape or contour, and seed short-term (one-time use) waste sites. Consider planting native tree species at these sites.

5.10.14 Monitor waste piles for the presence of invasive species for a minimum of two growing seasons after establishment. If invasive species do become established, determine the most effective treatment method permissible and ensure the infestation is eradicated.

5.10.15 Stabilize unstable or potentially unstable sites (such as road side-cast material), during road decommissioning projects, 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 percent, and road fills are within 200 feet slope-distance of streams (SFP: FW-108, 117).

5.10.16 Design water bars to facilitate proper drainage of surface water and to prevent ponding. Place water bars in areas where drainage would 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 Waterbar Placement and Construction Guide for Siuslaw Forest Roads to determine water-bar spacing and design (SFP: FW-123).

5.10.17 Transport culverts—removed from stream crossings and ditches—to an appropriate site(s). Recycle, reuse, or dispose culverts at a landfill.

5.10.18 Minimize specified reconstruction on roads needed for this project, if they are planned to be decommissioned.

5.10.19 To meet scenic quality objectives, place and shape excavated material from road decommissioning in such a manner as to follow natural contour lines and vary with surrounding topography.

5.10.20 Where applicable, seed disturbed sites with a native, certified weed-free seed mixture that includes species that would enhance wildlife forage.

5.11 Road storage and closure

5.11.1 Roads that provide primary access to private land may be stored or closed (e.g., locked gate or guardrail), depending upon mutual agreement between the private landowner and the US Forest Service. Consider easements, access needed by utility companies, and other access needs, when proposing storage. Coordinate proposed storage with affected private landowners and utility companies.

5.11.2 Store or close roads needed for intermittent project access. Use closure devices such as earth berms, boulders, guardrail barricades, or gates, depending on access needs, length of road, and amount of time between project entries. Locate and design closure devices to be effective.

5.11.3 Remove stream culverts or drain-dip shallow culverts prior to storage, if culvert failure is likely in the foreseeable future.
5.11.4 Locate and design road-closure devices to facilitate parking for forest users.
5.11.5 Repair, re-sign, and lock existing gates on roads identified in the Project EA, Appendix C.
5.11.6 To the extent possible, defer road storage until harvest, post-harvest mitigation, and post-harvest enhancement actions are completed.
5.11.7 Planners and engineers would review the project sites before preparing design plans for road-storage (road-closure) contracts. Planners and engineers would review any changes in design plans before they are incorporated into contracts.
5.11.8 Implement road storage actions during the dry season (generally June through October). Consult a hydrologist, geologist, wildlife biologist, and/or engineer to allow these activities to occur outside this work period, when necessary.
5.11.9 Design water bars to facilitate proper drainage of surface water and to prevent ponding. Place water bars in areas where drainage would not destabilize road fills. To keep streams within their channels when culverts have been removed, build water bars immediately above existing culverts to become the overflow point. Use the Waterbar Placement and Construction Guide for Siuslaw Forest Roads to determine water-bar spacing and design (SFP: FW-123).
5.11.10 For culverts with shallow fills (where the risk from culvert failure is low), and to keep streams within their channels when culverts are obstructed, build water bars immediately above existing culverts to become the overflow point. Use the Waterbar Placement and Construction Guide for Siuslaw Forest Roads to determine water-bar spacing and design (SFP: FW-123).
5.11.11 Use an interdisciplinary process to determine new sites for waste material before contracts are advertised, and to review existing waste sites to determine need for redesign or relocation. Where feasible, avoid placing waste material in areas that would impact access to future projects.
5.11.12 Where applicable, seed disturbed sites with a native, certified weed-free seed mixture that includes species that would enhance wildlife forage.

5.12 Roadside maintenance adjacent to key and non-key forest roads
5.12.1 Key and non-key forest roads identified for road maintenance projects are listed in the Project EA, Appendix B-3.
5.12.2 Roadside maintenance includes actions that remove trees (conifer or hardwoods) from road prisms, and thin young stands (with trees less than 80 years old) within 100 feet of road prisms. The objectives are to prevent cutbank failure and reduce road maintenance costs caused by trees falling from cutbanks; and reduce shading and leaf litter on roads to improve drainage, reduce organic debris, and improve drying of road surfaces. Include the following design criteria for these actions:
5.12.3 Consult with a fisheries biologist, hydrologist, wildlife biologist, silviculturist, and botanist prior to removal of any trees within 50 feet of perennial streams and 25 feet of intermittent streams.
5.12.4 Consult with a road manager, wildlife biologist, silviculturist, botanist, fish biologist, and hydrologist during layout of roadside thinning and prior to developing contracts.
5.12.5 Reestablish clearing limits along system roads from 10 feet above top of cut to 10 feet below top of fill. Commercial timber sales, firewood permits, or service contracts are appropriate tools for completing the work.
5.12.6 Maintain appropriate road drainage and erosion control during operations.

5.12.7 Restrict harvest equipment to the road surface. Minimize soil disturbance when downhill yarding. Leave trees on site, where removal causes substantial damage to the road or road prism. Require one-end suspension of the leading end of logs, when yarding.

5.12.8 Accomplish other potential requirements such as side-cast pullback, culvert replacement, or noxious weed control, with sale receipts.

5.13 Roadside danger trees


5.13.2 A person trained to identify danger trees would evaluate potential danger trees along open key and non-key forest roads.

5.13.3 A road manager, fish biologist, and wildlife biologist would review identified danger trees prior to felling to identify potential impacts to wildlife species such as red tree vole, northern spotted owl, or marbled murrelet. These specialists would help determine which trees, snags, or both need to be felled or topped to eliminate the roadside danger.

5.13.4 Priority for felled danger trees include: 1) leave trees on site to meet down wood requirements, 2) store trees (logs) for later fish-structure use, 3) remove trees through timber-sale contracts, 4) remove trees through firewood permits, or 5) remove trees through service contracts.

5.13.5 No known nest trees would be removed, without further consultation with USFWS. Trees confirmed to be a hazard that could contain nest structure (not a known nest tree) would be examined by a district biologist, and would only be removed outside of the breeding season, or determined through survey protocols to be inactive, or consulted on separately.

5.14 OHV Use

5.14.1 Management of OHV use would conform to the direction provided under the Siuslaw Travel Management Project (USFS 2009).

5.14.2 Use is restricted to roads, trails, and areas designated open on the Forest Motor Vehicle Use Map (MVUM).

5.15 Scenery

Forest vegetation for all thinning

5.15.1 Thin for natural appearance, variable spacing, and occasionally leave a clump of 2 or more trees as one.

5.15.2 Vary thinning for a patchy appearance next to straight unit boundaries and private, more open land. Vary edge treatment with condition of adjacent land, thinning more at spots along boundaries where adjacent land is more open, so that transition between treated forest and untreated adjacent land is more gradual. Stands adjacent to private property, vary thinning near property boundary to reduce contrast and enhance natural appearance.

5.15.3 To the extent possible, vary thinning near cable corridors (if any) to help blend the corridor into the surrounding forest in view. Thin for a patchy appearance adjacent to cable corridors, (thin
some places adjacent to corridors more than the surrounding forest is thinned and leave patches thinned less than the surrounding forest.)

5.15.4 “Gaps” – follow design criteria, so that any openings are subordinate to the natural landscape and appear natural to the casual observer. Place openings to mimic natural openings in the Indian Creek landscape. Where possible, place openings adjacent to natural features (for example – rock outcrops – if soil conditions permit, existing meadow, etc.). Layout opening perimeters in shapes that respond to the natural landscape features, so that the edge appears natural. Group openings where this fits with topography and other considerations, for natural appearance.

5.15.5 Protect and enhance Big Leaf Maple in draws up hillsides and Big Leaf Maple that provide canopy over river and creeks, as possible in project implementation. Any planting of hazel and big leaf maple, concentrate planting in the types of topographical, geographic associations in which they occur naturally, rather than continuously dispersed across the site.

5.15.6 Planting of Big Leaf Maple to be done to continue and enhance natural topographical association of Big Leaf Maple: in draws up hillsides, and along creeks and rivers, at edges of openings.

For vegetation/fuel treatments adjacent to Indian Creek and Indian Creek Road

5.15.7 Selective thin within 100 feet of road to enhance and retain a natural appearance in view, highlight large trees and special natural features in identified stands

5.15.8 Vegetation work goal to result in managed vegetation appearing as a continuation of surrounding natural vegetation patterns.

5.15.9 Generally tree removal to be individual tree select, any spacing to be variable, sometimes leaving a clump as one tree. Leave some clumps of trees and scattered larger openings for a natural appearance.

5.15.10 Highlight large trees by thinning more heavily or clearing around them. Leave seedling trees and ground cover as possible around large trees. Leave evergreen seedlings scattered throughout, as possible for added multi-storied structure.

5.15.11 Protect as possible smaller variations in vegetation appearance: down tree, grove of trees, a large patch of ferns, etc.

5.15.12 Remove non-native shrubs etc as fits with other work.

5.15.13 Review example treatments and areas of typical work, and areas to leave with Recreation specialist and Silviculturist before work on larger area.

Road Use, Construction, and Obliteration

5.15.14 Wherever possible, contour waste piles, fill disposal, and grade road entrances and points along roads to blend with the surrounding topography. Continue patterns of topography and drainage patterns from above to below roads.

5.15.15 Avoid creating a smooth continuous slope. Generally aim for a rolling, natural grade. Create small shelves in continuous grades to allow native vegetation to establish. Grade to continue surrounding natural grade, and to meet surrounding natural grade.

Landings
5.15.16 Site landings to involve minimal impact on natural vegetation and grade, and continue natural patterns of topography and drainage from above to below the landing site as much as possible with other considerations.

5.15.17 Obliterate landings wherever possible. Re-contour to blend with surrounding topography, and to continue natural patterns of topography and drainage across the old landing site as much as possible.

*Down Trees in Streams*

5.15.18 Whole trees would be placed as single pieces and/or in complexes to resemble natural debris collections that result from debris torrents, as an interim measure. A long term goal of Forest Management - of which this project is one stage - is that the Forest processes would be restored and trees would be carried to the stream naturally, and trees placement would not be needed.

5.15.19 The fallen trees would be placed to mimic natural wood accumulations in appearance and function, to the extent possible.

5.15.20 As many limbs as feasible would be retained attached to the trees used in the project.

5.15.21 Clearing of vegetation to be done in a manner that results in a cleared area looking as natural as possible.

5.15.22 Large boulders may be used to provide some stability to the complexes in a manner that functions and appears similarly to natural debris accumulations, with boulders from a source that would be natural to this stream, of naturally weathered appearance and varied in size.

5.15.23 No cabling of down trees would be done.

6 Monitoring Objectives

Monitoring items include those required for implementation and effectiveness monitoring. Implementation monitoring determines if the project design criteria and Siuslaw Forest Plan standards and guides, as amended by the Northwest Forest Plan, 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.

6.1 Implementation Monitoring

6.1.1 Forest Plan Standards and Guides

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

6.1.2 Contract and Operations

6.1.2.1 Involve appropriate specialists to ensure activities are implemented as designed, when developing timber sale, roadside salvage or thinning, road decommissioning and other projects. The appropriate specialists would also participate periodically during contract work, especially when unusual circumstances arise that may require a contract modification.
6.1.2.2 Identify key checkpoints to ensure key problem situations are addressed in the specifications. These checkpoints include a plan-in-hand review, and a contract review of specifications before the next phase of work begins.

6.1.2.3 During thinning operations, monitor the consistency of the silvicultural prescriptions in achieving the desired leave-tree stocking, variable spacing, and species and structural diversity. This implementation monitoring is imperative in those stands that are being treated using "Designation by Description" or "Designation by Prescription" methods. With each of these methods, the number and type of leave trees have been specified contractually, but only wolf trees, clumped trees, intermediate trees, and gaps are physically designated on the ground.

6.2 Effectiveness Monitoring
Monitoring would be tiered to the Siuslaw Forest Plan. Involve the appropriate specialists in the various monitoring tasks identified below.

6.2.1 Heritage Resources
6.2.1.1 Within one-year of commercial timber harvest or temporary road construction:
6.2.1.1.1 Monitor all “high probability areas” for previously unidentified cultural resources; and
6.2.1.1.2 Monitor a sample of non-high probability areas for previously unidentified cultural resources.

6.2.1.2 Evaluate and document the effectiveness of the cultural resources survey design based on monitoring results in a report that is submitted to SHPO.

6.2.2 Threatened and Endangered Species
6.2.2.1 Complete and submit implementation and monitoring forms, with a cover letter from the Forest Supervisor, to formally verify that all adverse effects to listed species have been reported. Submit these reports yearly.

6.2.3 Vegetation Management
6.2.3.1 Monitor thinning effectiveness in achieving the desired leave tree stocking, variable spacing, species and structural diversity, and treatment of Phellinus infection centers. Adjust post-thinning prescriptions for planting and deadwood creation, where necessary, to further enhance wolf tree creation, stand spacing variability, and structural and species diversity.

6.2.3.2 Monitor planting effectiveness in achieving survival, variable spacing, and species diversity in planted gaps, and underplanted sites in upland and riparian areas.

6.2.3.3 Monitor created snags and wildlife trees by observing effects of treatments. Focus observations on the location and rate of decay, and use by cavity nesters.

6.2.3.4 Evaluate stands for existing snags and down wood within 3 years after the thinning treatment. Modify down wood and snag creation numbers, if necessary, to meet the snag, down wood, and wolf tree objectives.

6.2.3.5 Observe all thinned stands to determine if residual trees are being damaged by Douglas-fir bark beetles.
6.2.3.6 Evaluate riparian leave areas as to their effectiveness in maintaining stream shade.

6.2.4 Road Treatments

6.2.4.1 Monitor excavated slopes after road-stabilization activities for areas where sediment has the potential to enter stream channels or waterbodies. Eliminate or minimize erosion, if the road surface is eroding and could adversely affect aquatic habitat.

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

6.2.5 Invasive Plants

6.2.5.1 For a period covering project implementation and at least two growing seasons post-project, annually monitor for the presence of invasive plants in these areas:

- All system roads and associated landings, and portions of thinning units within 100 feet of the roads;
- All non-system roads and associated landings, and portions of units within 50 feet of the roads;
- All portions of units that used a ground-based logging system;
- All created gaps and all areas, where fuels were treated with prescribed fire;
- All areas with substantial soil disturbance; and
- All waste piles and storage areas.

6.2.5.2 Treat infestations of invasive plants found in the above areas, using appropriate methods as identified in the Invasive Plant Treatment section above and Appendix F.

6.3 Road Maintenance and Road Project Agreements

6.3.1 Road Maintenance Agreements. Not require a road maintenance agreement for Bonneville’s use of NFS roads, unless an existing special use authorization for Bonneville’s transmission facilities or a FLPMA permit involves a one-way average daily traffic count of 50 or more or use of equipment or vehicles on NFS roads that exceed the maximum load, weight, length, height, or width restrictions applicable to the state road system. If a road maintenance agreement is needed, use the template in Appendix F of the MOU, and attach the road maintenance agreement as an appendix to the existing special use authorization or FLPMA permit.

6.3.2 Road Project Agreements. Using the template in Appendix F of this MOU, execute a road project agreement for maintenance or reconstruction of NFS roads needed for new construction of transmission facilities, road and trail construction and reconstruction, non-routine transmission facility maintenance, or fiber optic cable installation that is conducted under an existing special use authorization for Bonneville’s transmission facilities or under a FLPMA permit. Execute the road project agreement prior to initiation of the above-referenced projects, and attach it as an appendix to the existing special use authorization or FLPMA permit.

6.3.3 Implementation. Maintain close contact when maintenance is being accomplished under a road maintenance agreement or road project agreement to ensure that the work is consistent with the terms of the agreement. Designate a point of contact for each party for implementation of the agreement, and notify the other party of any changes in the point of contact.
6.3.4 Identification of NFS Roads. Ensure that NFS roads named in road maintenance agreements and road project agreements are properly described, located on a map, or otherwise identified and that there is no duplication of names, route numbers, project numbers, or other identifiers that might lead to confusion or misunderstanding.

6.3.5 Maintenance Plan. Ensure that road maintenance agreements and road project agreements include a maintenance plan specifying desired standards and results and any special conditions that must be met. Work performed under the maintenance plan generally will fit into one or more of the following categories:

1. Routine maintenance, such as ditch cleaning or shaping, drainage structure cleaning, aggregate road surface maintenance and stabilization, shoulder stabilization, paved road crack sealing, paved road surface cleaning, chip and slurry sealing, and sign maintenance.
2. Seasonal or partial maintenance.
3. Maintenance during non-routine use, e.g., short-term, intense use during a project.
4. Maintenance of drainage structures such as culverts, debris racks, down drains, drop inlets, end sections, and headwalls.