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Environmental Assessment

Lobster Landscape Management Project

Central Coast Ranger District-ODNRA
Siuslaw National Forest
Benton, Lane, and Lincoln Counties, Oregon

Lead Agency: **USDA Forest Service**

Responsible Official: **William Helphinstine, District Ranger**
Central Coast Ranger District
Siuslaw National Forest
4480 Hwy. 101, Bldg. G
Florence, OR 97439

For Information Contact: **Paul Thomas, Team Leader**
Central Coast Ranger District
4480 Hwy. 101, Building G.
Florence, Oregon 97439
(541) 563-8426
pgthomas@fs.fed.us

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Why is the project needed, and what evidence established these needs? Chapter 1

Chapter titles are framed as questions intended to focus the writing and to alert readers to judge whether the answers provided are adequate. For readers accustomed to earlier environmental documents, chapter 1 is equivalent to the "Purpose and Need for Action" section.

Introduction

District Ranger Bill Helphinstine proposed the Lobster Landscape Management Project (the Project) to speed the development of late-successional habitat by enhancing growth, health, stand structure, and diversity in plantations up to 58 years old; and to enhance watershed function. The Project lies in the Lobster Creek basin and is about 32 air miles southwest of Corvallis, Oregon (map 1).

The Proposed Project

The Lobster Landscape Management Project is a package of associated terrestrial and watershed restoration actions. Major actions include commercially thinning about 3,003 acres to speed the development of late-successional habitat in plantations now 20 to 58 years old, improve existing diversity in plantations, non-commercially thinning about 212 acres of plantations generally less than 20 years old to speed their development, decommissioning about 5 miles of roads and closing about 47 miles of roads to help restore watershed health, and repairing and maintaining about 18 miles of key forest roads and about 42 miles of non-key forest roads. The Project proposes no changes to roads administered by other public agencies or to roads managed by private landowners.

Repairing and maintaining key forest roads are connected actions because timber purchasers will be required to perform the work as a condition of timber-sale contracts prior to using the roads. Some of these roads extend outside the Lobster Creek watershed boundary and provide connections from the project area to locations where commercial thinning products will be transported. All other actions are connected because they help meet the restoration objectives, or they would be funded by revenue from the sale of timber. Most activities would be completed in 10 years, with commercial timber-sale contracts awarded in 5 to 6 years, beginning as early as fiscal year 2007 (10-1-06 to 9-30-07). Road maintenance and decommissioning actions may begin as early as the summer of 2006.

Refer to chapter 2 for a quantified list of actions proposed by the Project (Alternative 2) and other alternatives.

The Siuslaw Forest Plan (USDA 1990), as amended by the Northwest Forest Plan (USDA, USDI 1994, 2001, 2004), establishes the management direction, desired conditions, and standards and guidelines under which lands administered by the Siuslaw National Forest are managed. These plans are intended to provide for healthy forest ecosystems, including protecting riparian areas and waters as well as providing adequate habitat to maintain viable populations of aquatic and terrestrial species. All relevant aspects of the amended Siuslaw Forest Plan, such as management area standards and guidelines, apply to this project. Thus, this assessment is tiered to the Final Environmental Impact Statement for the Siuslaw National Forest Land and Resource Management Plan, as amended by the Northwest Forest Plan (the Plan).

The Planning Area

The planning area includes 6 sub-watersheds in the Lobster 5th-field watershed and covers about 18,617 acres. The U.S. Forest Service manages about 79 percent of the area, 15 percent is privately owned, and six percent is managed by the Bureau of Land Management. The project area is located in Township 14 South, Range 9 West; and Township15 South, Ranges 8 and 9 West; Benton, Lane, and Lincoln Counties, Oregon. The riparian reserve, late-successional reserve, and matrix land allocations exist in the planning area. Proposed actions would be consistent with the land allocations in the Plan.

The Problems (Issues) To Be Addressed

Based on available information, including the direction from the Siuslaw Forest Plan, as amended by the Northwest Forest Plan (the Plan), the recommendations from the Late-Successional Reserve Assessment, Oregon Coast Province—Southern Portion (USDA, USDI 1997), Lobster-Five Rivers Watershed Analysis (USDA 1997), and the Siuslaw National Forest Roads Analysis (USDA 2003), District Ranger Bill Helphinstine identified the following problems and the need to address them:

- The shortage of late-successional forest habitat in the Pacific Northwest limits recovery of old-growth-dependent species, such as the northern spotted owl and the marbled murrelet. Thus, he saw a need to speed the development of late-successional habitat in late-successional and riparian reserves.
- The decline of grass, forb, and shrub habitats may limit local populations of species that use these habitats, including Region 6 sensitive species and management-indicator species. Thus, he saw a need to maintain existing meadow habitats and create some grass, forb, and shrub habitats.
- The shortage of properly functioning aquatic habitat in the Oregon Coast Range, including the Lobster watershed, limits recovery of cold-water species, such as coho salmon. Thus, he saw a need to improve watershed function.
- The shortage of road maintenance funds limits the suitability of key forest roads for commercial and noncommercial use. Thus, he saw a need to use timber-sale revenue to maintain key forest roads to standards that allow both uses.

- The Northwest Forest Plan called for substantial timber production from the matrix lands, but marbled murrelets are almost always found in surveyed mature forest on the Siuslaw matrix lands, which are then re-designated as late-successional reserves. Thus, he saw the need to produce timber from plantations in matrix lands in a manner that provides important ecological functions.
- Through public scoping, building temporary roads and temporarily reopening non-system roads was considered a problem by some people. Thus, he saw a need to develop an alternative to the proposed action that would not build temporary roads or temporarily reopen system and non-system roads.

Evidence Used by the District Ranger in Deciding to Address These Problems

The record of decision (USDA, USDI 1994b) for the Northwest Forest Plan—based on physical, biological, and societal evidence provided in the Forest Ecosystem Management Assessment Team report (USDA, USDI, et al. 1993) and described in the Plan's environmental impact statement (USDA, USDI 1994a)—is intended to provide for:

Healthy forest ecosystems, including protecting riparian areas and waters; and
A suitable supply of timber and other forest products to help maintain local and regional economies predictably over the long term.

The Plan identified concern for northern spotted owls, marbled murrelets, and anadromous fish in the Oregon Coast Range Province (which includes the Siuslaw National Forest) because of its isolation and harvest history (chapters 3 and 4; page 21). The 1994 record of decision, which amended the Siuslaw Forest Plan, allocated federal lands in the Lobster watershed into one or more of the following:

Late-successional reserve (pages C-9 to C-20);
Riparian reserve (pages C-30 to C-38); or
Matrix (lands not included in the other two allocations; pages C-39 to C-48).

The Assessment Report for Federal Lands in and adjacent to the Oregon Coast Province (USDA 1995) shows the planning area in the central interior block (block 6). The mature conifer stands in block 6 have been extensively clearcut, and few patches of large, functional late-successional forest remain. The central interior block once supported the largest unfragmented patches of late-successional forest in the Province. The Report recommends managing to accelerate late-successional forest development and to aggregate small patches into larger ones.

The Report describes the in-stream fish habitat on federal lands throughout the Province as being in marginal to poor condition. It recommends specific actions to improve fish habitat on federal land by stabilizing, decommissioning, or obliterating roads; and restoring long-term habitat by reestablishing natural riparian areas through actions such as thinning these areas to speed the development of large wood.

The Siuslaw National Forest Roads Analysis (USDA 2003) was developed to provide information to support road management decisions on the Forest. The Roads Analysis recognized funding for road maintenance is limited and recommends prioritizing limited available maintenance funds to key forest roads. Historically, the Siuslaw National Forest emphasized timber management. Timber-sale revenue helped build a large road system to access primarily timber resources. Timber-sale revenue also paid for the majority of road maintenance. Declining timber harvest and a greater emphasis on ecosystem management has substantially reduced the Forest's ability to maintain an extensive road system. Maintenance on many of the Forest's system roads has been deferred for several years due to a lack of funds. Thus, some roads have been decommissioned, closed, or been kept at the lowest possible maintenance level.

For needing late-successional habitat

Late-successional reserves were designed into the Northwest Forest Plan to protect and enhance these forest ecosystems, which are required habitat for many species. Riparian reserve objectives include protecting and enhancing habitat for terrestrial plants and animals, as well as providing connectivity corridors between late-successional reserves. The Late-successional Reserve Assessment, Oregon Coast Province, Southern Portion (USDA, USDI 1997), identified the following landscape changes in the Lobster watershed:

> The dominant patch size has decreased from jumbo patches (larger than 10,000 acres) to smaller patches (100 to 1,000 acres).
>
> The largest percentage reduction in late-seral vegetation on federal lands in the Province is the central interior Alsea disturbance block, which contains the Lobster watershed.

The Lobster-Five Rivers Watershed Analysis (USDA 1997) reported that:

> Most of the subwatersheds contain less than 40 percent late-successional forest.
>
> Fewer than 15 percent of the late-successional forest stands function as interior forest habitat.
>
> Less than 50 percent of the known spotted owl nest sites consistently produce young.
>
> More than 40 percent of the planning area is in plantations.
>
> Plantations were intended to be and have been managed for intensive wood-fiber production.
>
> Snags and down wood in plantations are less than one-third of the amounts found in natural stands of similar age.

Over the past few years, much work has been done in the scientific field evaluating the merits of thinning to speed the development of late-successional, old-growth characteristics in dense, young managed stands (plantations) west of the Cascades in the Pacific Northwest. Examples of scientific findings that support our treatment strategies for plantations include:

- In an Oregon Coast Range study, Tappeiner et al. (1997) found that trees in old-growth stands had little competition from one another because of the low tree numbers per acre. Also, self- or natural-thinning was uncommon during the development of the older stands studied, indicating that canopy gaps in these forests were the result of scattered conifer survival as well as mortality of individual large trees. Based on the Lobster-Five Rivers Watershed Analysis, low numbers of large trees in these forests were the result of intermediate disturbances, such as wind-throw, root-rot, or fire (c, p. 27).
- In a study by Hayes et al. (1997), no bird species endemic to the Oregon Coast Range is unique to closed-canopy stands with limited understory development, which is the existing condition of plantations proposed for treatment. In a study exploring the effects of thinning on wildlife in the Oregon Cascades, Hagar and Howlin (2001) concluded that songbird species richness and diversity is increased after thinning relative to controls, and no species were "lost" after treatment.
- Through their study, Bailey et al. (1998) found that thinning in young Douglas-fir forests of western Oregon increased total herbaceous cover and vegetation species richness. Bailey and Tappeiner (1998) concluded that thinning young Douglas-fir stands appears to set young stands on a trajectory towards achieving overstory and understory attributes similar to those in old-growth stands by promoting the development of understory tree species and tall-and low-shrub species.
- Wilson and Oliver (2000) concluded that control of Douglas-fir stand density through early thinning is critical to future stand stability.
- In their notes to the Regional Ecosystem Office as a result of their meeting on January 18, 2001, the Science Findings Evaluation Group has indicated "very strong support for active management (thinning, selective thinning, and possible underplanting) in young, dense forest stands".
- Jerry Franklin, professor at the University of Washington, who specializes in old-growth forest ecology, was involved in a field trip (September 2001) to review some plantations on the Siuslaw National Forest that were commercially thinned under previous projects. John Tappeiner (pers. comm.), a professor of silviculture at Oregon State University, who researches stand development in the Oregon Coast Range, was consulted about commercial thinning dense, young Douglas-fir plantations on the Forest. Both scientists reaffirmed the need for thinning these plantations, and supported thinning at different densities so that variable pathways can be established.

With one known exception, all current scientific evidence points to the need for thinning young, dense managed stands to achieve conditions favorable for developing late-successional upland and riparian forest characteristics. Winters (2000) conducted a study in the Washington Cascades that suggests that old-growth stands were developed from high conifer densities. This study was based on a single stand with no replications. This finding is contrary to the findings of all other studies conducted in coastal forests and is based on a single stand. Therefore, we feel the preponderance of the evidence suggests that, for stands in the Oregon Coast Range province, an early reduction in stand density is the most prudent approach to follow.

For needing grass, forb, and shrub habitats

The Lobster-Five Rivers Watershed Analysis (USDA 1997) identified the following grass, forb, and shrub conditions in the watershed:

> Low numbers of large trees in late-successional forests were the result of intermediate disturbances, such as wind-throw, root-rot, or fire (p. 27). These intermediate disturbances would increase the amount of grass, forb, and shrub habitats for 10 to 15 years.
>
> More than 40 percent of the planning area is in plantations over 15 years old, which no longer contain grass, forb, and shrub habitats.
>
> Early seral habitat (grass, forbs, and shrubs) is continuing to decline on federal lands.

The natural fire disturbance regime, prior to European settlement, was major stand-replacement fires, with low to moderate intensity fires occurring between these stand-replacing events every 25 to 75 years (Impara 1997). Much of the low intensity burning was implemented by Native peoples. Low intensity fires now play a much lesser role than historically, reducing the potential for maintaining and creating grass, forb, and shrub habitats.

For needing to restore watershed health

The Plan's Aquatic Conservation Strategy is intended to restore and maintain the health of watersheds and the aquatic ecosystems they contain. The Lobster-Five Rivers Watershed Analysis identified the following adverse conditions in the watershed:

> Concentrations of fine sediments are higher than historically, impairing the function of riffles, pools, and winter-rearing areas for fish.
>
> Forest and county roads inhibit large wood and coarse sediment transport, disconnect stream channels, may contribute fine sediment to streams, and may act as barriers to aquatic species migration.
>
> Currently, and over the past 15 years, funding to maintain all non-key forest roads to standard is lacking. Roads not maintained to standard deteriorate more rapidly and culverts are more likely to fail. Deteriorating roads and culvert failure contribute fine sediment to streams. Culvert failure can also obstruct fish passage.

The water quality of four streams—Lobster Creek, Phillips Creek, Camp Creek, and Preacher Creek—are considered impaired because they exceed the 64-degree temperature standard established by the Oregon Department of Environmental Quality.

For needing to maintain key forest roads

For the past several years, Forest program funds have not been sufficient to maintain the existing key forest road system. Thus, a backlog of key forest road maintenance has accumulated in the Lobster watershed.

The Lobster-Five Rivers Watershed Analysis (USDA 1997) indicates that: roads constructed before the mid-1970's have a much higher number of road-related landslides compared to newer roads. The older roads were constructed, using a side-cast method and are a greater risk to natural resources. Continued use of these roads will require some stabilization and realignment to reduce the risk of landslides.

The Siuslaw Forest Plan standard and guideline FW-162 states "Maintain roads to the minimum standard required for the safety of users, for current and future intended uses, and to meet all resource objectives for an area".

The Siuslaw National Forest Roads Analysis recommends inventorying maintenance needs (annual and deferred) of the key forest road system and prioritizing road maintenance work to ensure user safety and resource protection within current and anticipated Forest budgets. It also recommends considering alternative funding sources for road maintenance and repair.

Road condition surveys indicate that key forest roads are not suitable for commercial and non-commercial use. Due to a lack of adequate road maintenance over the past 15 years, the capitol investment associated with building and maintaining key forest roads is at risk of being lost.

For needing commodities

Based on societal needs outlined in the Forest Ecosystem Management Assessment Team's (FEMAT) report (USDA, USDI, et al. 1993), the Plan designates producing timber and other products to be important objectives for matrix lands. The standards and guides for these lands are designed to provide important ecological functions and to maintain structural components like logs, snags, and large trees.

Help From Other Agencies and the Public

After identifying the actions that the proposed project would implement to address the problems on page 2, the District Ranger sought public comment on them. Letters describing the actions considered in the proposed project were mailed to about 200 parties, plus local landowners, on January 20, 2005. Public comment was also solicited through news releases in the Newport News-Times in Newport, Oregon; the Corvallis Gazette-Times in Corvallis, Oregon; the Siuslaw News in Florence, Oregon; and the Democrat-Herald in Albany, Oregon. The Siuslaw National Forest's quarterly "Project Update" publications were also used for public outreach. Comments on the proposed project were requested by February 21, 2005. Through these scoping efforts, 11 persons responded.

Public comments contained a variety of suggestions to consider. Comments, not outside the scope of the Project and not covered by previous environmental review or existing regulations, were reviewed for substantive content related to the Project. After reviewing the comments, the issue of no temporary road building and no reopening of non-system roads was added to the need and associated problem identified on page 3. Thus, Alternative 3 was developed to address this problem. Based largely on public comment, some alternatives were considered but eliminated from detailed study. The alternatives are described in chapter 2. Comments relevant to clarifying how the Project would be implemented or relevant to the effects of implementing the Project are addressed in chapters 2 and 3, the Project design criteria (appendix A), or the Project file.

Decision Framework

The Responsible Official for the Project is the District Ranger for the Central Coast Ranger District-ODNRA (formerly the South Zone District) of the Siuslaw National Forest. The environmental assessment (EA) for the Project—to be completed after public comment on the preliminary analysis—will disclose the predicted environmental effects of implementing the different alternatives the District Ranger directed the Team to analyze. Based on this EA, a decision will be made by the District Ranger. The District Ranger will determine through a Decision Notice:

> To what extent, if any, will actions called for in the proposed project or management alternatives be implemented?
>
> What management requirements and mitigation measures (project design criteria) will be applied to these actions?

The primary factors that will influence the District Ranger's decision are based on how well the problems on page 2 are addressed. The Decision Notice will document this decision and describe what actions will be implemented to address the problems. The decision will be consistent with the Siuslaw Forest Plan, as amended by the Northwest Forest Plan, and will incorporate the associated project design criteria (appendix A), including the management requirements and mitigation measures.

What alternatives were developed to meet the identified needs?

Chapter 2

In chapter 2, the District Ranger considered alternative proposals that were not fully developed for reasons disclosed. He guided the development of alternative proposals for resolving the problems and meeting the needs identified in chapter 1. These fully developed alternatives are described in this chapter; it is equivalent to the traditional section, "Alternatives Including the Proposed Action".

Alternatives were designed based in part on priorities and recommendations identified in the Forest's late-successional reserve assessments for LSR RO268 and the Lobster-Five Rivers Watershed Analysis. The interdisciplinary team also evaluated the project activities and their placement, based on the histories and current conditions of those sites. For example, information was collected in the project area about past harvesting practices, such as clear-cutting trees, broadcast-burning harvested areas, and felling all of the snags; silvicultural practices, such as planting a single tree species at 400 trees per acre; and the age and current attributes of managed stands for the sites. This collection of site information helped the District Ranger to identify stands suitable for or in need of treatment to help maintain stand health and accelerate the develop of late-successional forest characteristics.

The interdisciplinary team evaluated roads and their influence on watershed function to help the District Ranger identify areas for restoration. Actions for restoring watershed function under this environmental assessment include decommissioning roads. Several factors were used to identify roads for decommissioning: the need to reduce adverse effects to fish habitat and water quality by reducing reliance on valley-bottom and mid-slope roads, maintaining future access to managed stands, providing public access, providing legal access to private land, and reducing road maintenance or rebuilding costs because funds for maintaining the current road system are lacking.

Alternatives were developed to meet the identified needs and associated problems, and to be consistent with the standard and guidelines associated with the Siuslaw Forest Plan, as amended by the Northwest Forest Plan. The range of alternatives considered, including those that were considered but eliminated from detailed study, reflects the problems identified in chapter 1; concerns raised during public scoping for this project; public involvement with recent, similar Forest projects, such as the Five Rivers Landscape Management Project (USDA 2002c), Lower Siuslaw Landscape Management Project (USDA 2002b) and the Yachats Terrestrial Restoration Project (USDA 2005c); and concerns raised during monitoring of similar District projects that were implemented in the past.

Alternatives Considered But Eliminated from Detailed Study

The following alternatives represent those that were considered by the District Ranger, but for various reasons, were eliminated from detailed study. These alternatives were considered to address comments raised during public scoping.

Essential fish habitat extended buffers

Through the Magnuson Stevens Act, NOAA-Fisheries has the regulatory responsibility to conserve and enhance essential fish habitat associated with coho and chinook salmon in the planning area. They have no statutory requirements or obligation to protect and restore the ecosystems and habitats of other aquatic or terrestrial species associated with the planning area. NOAA-Fisheries reviewed the proposed actions and concluded they are not aware of any opportunities for commercial thinning to improve the recruitment of in-stream wood into essential fish habitat. They proposed recommendations to avoid, minimize or offset potential adverse affects to essential fish habitat in the watershed from commercial thinning on Federal Lands. To implement these measures, 64 units would have a no cut buffer within 100 feet of streams or channels, and a light thin prescription (200 trees per acre) between 100 feet and 250 feet (site potential tree height) from streams or channels. Seven units would have a no cut buffer of 145 feet from streams and channels, and a light thin prescription (200 trees per acre) between 145 feet and 250 feet from the streams and channels. Nine units would be thinned as proposed.

Implementation of this alternative would place over 70 percent of the potential acres proposed for commercial thinning in the extended buffer prescriptions. In a study on 10 sites in the Oregon Coast Range, Tappeiner et al. (1997) found that mature trees in old-growth stands experienced minimal inter-tree competition over their lifetime because of low initial stocking of trees per acre. The plantations in the Lobster watershed were planted initially with 400 to 600 trees per acre, and currently average 180 to 200 trees per acre, as a result of earlier non-commercial thinning treatment. Plantations that were not non-commercially thinned average 330 trees per acre. Given Tappeiner's study and the inventory results from chapter V, Table 9 of the Late-Successional Reserve Assessment (USDA 1997; version 1.3), thinning stands to 40 to 75 trees per acre would allow the remaining trees to develop on a trajectory more consistent with natural stand development, known to produce large old-growth trees.

The proposed NOAA Fisheries buffer prescriptions would result in no change in the vegetative composition of the plantations, and no increase in the growth of the residual trees. The District Ranger concluded that eliminating 70 percent of the project area from treatment would not meet the need to speed the development of late successional habitat in late successional and riparian reserves, a primary purpose for the project. The Forest Supervisor concluded that the proposed NOAA Fisheries buffer prescriptions were not required to avoid, minimize or offset potential adverse affects to essential fish habitat (USDA 2006b). Thus, this alternative was not fully developed.

Single-entry treatment of managed stands

To accomplish this, managed stands across the landscape would be thinned to about 30 to 50 trees per acre and include associated activities, such as planting trees in the understory. Following treatment, these stands would be allowed to develop old-growth conditions on their own. A landscape populated by stands with minimum numbers of trees leaves little room for mortality from natural events, such as strong winds or insect infestation. In addition, the variability between stands would be limited. Tappeiner et al. (1997) and Oliver and Larson (1996) advocate tree-spacing variability among stands across the landscape. Carey et al. (1999) says that diversity in treatment is critical to meeting existing and future needs of wildlife. Variability and diversity are the keys to recapturing many of the forest functions. Also, the Northwest Forest Plan standards and guidelines incorporate the concept of adaptive management (ROD, page E-12). Applying the single-entry treatment on all plantations limits the agency's ability to monitor, evaluate, and adapt treatments to these plantations in response to new information. Thus, under this alternative, the Forest Service would not be able to apply the concept of adaptive management in the Lobster 5th-field watershed.

Based on the information above, the District Ranger decided to take a more conservative approach to stand management and development at this time by implementing single-entry prescriptions for only a few stands under this project. As information is obtained about single-entry treatments through studies, such as the Five Rivers Landscape Management Project Final EIS (USDA 2002c), it may become a more widespread silvicultural tool in the future.

Alternatives Considered in Detail

Alternatives 1, 2, and 3—Three alternatives, including Alternative 1 (No Action), Alternative 2 (Proposed Project), and Alternative 3 (No Temporary Roads) were fully developed and are described in this section. The analyses of their effects are disclosed in chapter 3. Actions included for alternatives 2 and 3 are designed to address the problems identified by the District Ranger and incorporate the standards and guides established by the Siuslaw Forest Plan, as amended by the Northwest Forest Plan (USDA, USDI 1994b; ROD, page B-11).

Management requirements, mitigation measures, and monitoring—Design criteria (appendix A) outline the practices to be used and their timing and duration when planned activities under Alternatives 2 and 3 are implemented. Measures to avoid or minimize impacts associated with implementing these alternatives have been included in the design criteria. Therefore, we believe that management requirements and mitigation measures for all proposed actions are covered by the design criteria. For the proposed actions, appendix A identifies implementation monitoring (determines if actions are implemented as designed) and effectiveness monitoring (determines the effectiveness of the design criteria). Monitoring and observations of past, similar actions indicate that the design criteria are effective in protecting natural resources.

Alternative 1: No Action

The no-action alternative is required by Council of Environmental Quality regulations (40CFR 1502.14(d)). The no-action alternative forms the basis for a comparison between meeting the project needs and not meeting the project needs. This alternative provides baseline information for understanding changes associated with the action alternative and expected environmental responses as a result of past management actions. Selecting this alternative would continue the following resource management actions:

> Except for the processes associated with wildland fire, forest management would rely on natural processes to develop late-seral forests, restore watersheds, and maintain or create early seral habitat;
>
> No plantations would be commercially or non-commercially thinned under this alternative;
>
> Current management trajectory of plantations would be abandoned and not replaced with a management strategy to accelerate developing late-seral forest conditions;
>
> Current key forest roads would be retained, with no changes in management objectives;
>
> Other roads would be evaluated and managed by reacting to individual events—such as slides, road slippage, or culvert failures—that make a road impassable or affect natural resources; and
>
> No additional projects are anticipated for the next 10 years, unless a catastrophic event such as a flood or fire occurs.

Because the existing environment is not static, environmental consequences from selecting this alternative are expected. Depending on the kind and frequency of disturbances and gradual changes in vegetation and animal populations, these lands would move toward old-growth conditions.

Alternative 2: Proposed Project

To meet the Project needs, this alternative would implement the management actions listed below (table 1, map 2).

To speed the development of late-successional habitat in late-successional and riparian reserves, and to maintain and create grass, forb, and shrub habitats, the following actions are proposed (appendices A, B, and C):

Plantation treatments and associated actions

- Commercially thin about 3,003 acres of plantations, including about 2,459 acres by skyline logging and 544 acres by helicopter. About 2,778 acres are in late-successional reserve, with about 2,195 acres also in riparian reserve; about 225 acres are in matrix;

- Temporarily reopen about 1.03 miles of system roads and about 6.74 miles of non-system roads by removing artificial barricades, minor slides, or vegetation. About 6.9 miles are in late-successional reserves, with about 4.8 miles also in riparian reserve; about 0.87 mile is in matrix;
- Build about 1.45 miles of temporary road on stable ridges. About 1.35 miles are in late-successional reserve, with about 0.01 mile also in riparian reserve; about 0.1 mile is in matrix;
- Create cavities in about 300 large trees (28 to 36 inches in diameter) in natural stands adjacent to plantations that would be commercially thinned, as mitigation for trees with cavities and for snags that were cut inside plantation boundaries during the initial harvest;
- Develop future snags in portions of plantations that would be commercially thinned by topping or girdling about 17,800 trees. These would serve to mitigate snags that were cut inside plantation boundaries during the initial harvest and trees removed with this project that otherwise would develop into snags;
- Increase the down wood component in plantations that would be commercially thinned by leaving about 14,900 trees on the ground to mitigate loss associated with past harvest practices and trees removed with this project that otherwise would develop into down wood;
- Create grass, forb, and shrub habitats in commercially thinned plantations by under-burning about 775 acres and seeding about 1,000 acres;
- Maintain about 54 acres of meadow habitat to provide habitat for dependant species;
- Non-commercially thin about 212 acres of plantations. All acres are in late-successional reserve, with about 160 acres also in riparian reserve;
- Plant a mixture of shade-tolerant conifers and hardwoods in about 736 acres of plantations; and
- Remove about 240 cubic yards of culvert fill and unstable sidecast material from temporary roads; and
- Plant shade-tolerant conifers and hardwoods on about 5 acres adjacent to Preacher Creek to improve future stream shading and provide future sources of large wood for streams.

To improve watershed function and to repair and maintain forest roads, the following actions are proposed in addition to the silvicultural treatments:

Key and non-key forest road actions

- Decommission (remove culverts and fill material, waterbar road surfaces, and close roads) about 5 miles of non-key (system) roads. All miles are in late-successional reserve, with about 3.85 miles also in riparian reserve;
- Remove about 11,870 cubic yards of fill material from system roads, and about 2,400 cubic yards from one abandoned road near Bear Creek;
- Close about 46.6 miles of non-key (system) roads. About 43.1 miles are in late-successional reserve, with about 13.74 miles also in riparian reserve; about 3.5 miles are in matrix;
- Repair and maintain about 26.3 miles of key forest roads, including 8.7 miles outside the planning area, and 41.7 miles of non-key forest roads to standard by repairing road surfaces, repairing road

fills, replacing failed or failing ditch-relief culverts, adding ditch-relief culvers, and replacing selected culverts in streams; and
- Use thinning and salvage operations to manage roadside vegetation adjacent to key forest roads, affecting about 225 acres.

To provide timber and other products and amenities from matrix lands, the following actions are proposed:

Stand treatments in matrix
- Commercially thin about 225 acres and provide about 2.6 million board feet of timber.

Rationale for Alternatives to the Proposed Project
One commenter wanted us to analyze an alternative (Alternative 3) that would not build any temporary roads or temporarily reopen any non-system roads.

Alternative 3: Build No Temporary Roads and Do Not Temporarily Reopen Roads
To meet the Project needs, this alternative would implement the management actions listed below (table 2, map 3).

To speed the development of late-successional habitat in late-successional and riparian reserves, and to maintain and create grass, forb, and shrub habitats, the following actions are proposed (appendices A, B, and C):

Plantation treatments and associated actions
- Commercially thin about 2,804 acres of plantations, including about 1,615 acres by skyline logging and 1,229 acres by helicopter. About 2,589 acres are in late-successional reserve, with about 2,049 acres also in riparian reserve; about 215 acres are in matrx;
- Create cavities in about 280 snags (28 to 36 inches in diameter) in natural stands adjacent to plantations that would be commercially thinned, as mitigation for trees with cavities and for snags that were cut inside plantation boundaries during the initial harvest;
- Develop future snags in plantations that would be commercially thinned by topping or girdling about 17,000 trees. These would serve to mitigate snags that were cut inside plantation boundaries during the initial harvest and trees removed with this project that otherwise would develop into snags;
- Increase the down wood component in plantations that would be commercially thinned by falling and leaving about 14,100 trees on the ground to mitigate loss associated with the initial harvest and trees removed with this project that otherwise would develop into down wood;
- Create grass, forb, and shrub habitats in commercially thinned plantations by under-burning about 710 acres and seeding about 950 acres;

- Maintain about 54 acres of meadow habitat to provide habitat for dependant species**;**
- Non-commercially thin about 411 acres of plantations. About 388 acres are in late-successional reserve, with about 290 acres also in riparian reserve; about 20 acres are in matrix;
- Plant a mixture of shade-tolerant conifers and hardwoods in about 683 acres of plantations; and
- Plant shade-tolerant conifers in about 5 acres of riparian areas near Preacher Creek to improve future stream shading and provide future sources of large wood for streams.

To improve watershed function and to repair and maintain forest roads, the following actions are proposed in addition to the silvicultural treatments:

Key and non-key forest road actions

- Decommission about 5 miles of non-key (system) roads. All miles are in late-successional reserve, with about 3.85 miles also in riparian reserve;
- Remove about 11,870 cubic yards of fill material from system roads, and about 2,400 cubic yards from one abandoned road near Bear Creek;
- Close about 46.6 miles of non-key (system) roads. About 43.1 miles are in late-successional reserve, with about 13.74 miles also in riparian reserve; about 3.5 miles are in matrix;
- Repair and maintain about 26.3 miles of key forest roads, including 8.7 miles outside the planning area, and 41.7 miles of non-key forest roads to standard by repairing road surfaces, repairing road fills, replacing failed or failing ditch-relief culverts, adding ditch-relief culverts, and replacing selected culverts in streams; and
- Use thinning and salvage operations to manage roadside vegetation adjacent to key forest roads, affecting about 225 acres.

To provide timber and other products and amenities from matrix lands, the following actions are proposed:

Stand treatments in Matrix

- Commercially thin about 215 acres and provide about 2.4 million board feet of timber.

Table 1: Description of Alternative 2 by subwatershed

Proposed Actions	Bear	Camp	Elk	Lower Lobster	Lower Middle Lobster	Preacher
Plantation treatments and associated actions						
Commercial thinning total (acres)	320	536	119	658	325	1,045
Commercially thin, using skyline logging systems (acres)	301	430	109	585	251	783
Commercially thin, using helicopter logging systems (acres)	19	106	10	73	74	262
Temporarily reopen roads (miles)	0.65	1.13	0.25	1.10	1.25	3.39
Build new temporary roads (miles)	0	0.05	0.03	0.34	0.08	0.95
Create cavities in natural stands (trees)	32	53	12	66	32	105
Create snags in plantations (trees)	1,900	3,200	700	4,000	1,900	6,100
Create down wood (trees)	1,600	2,700	600	3,300	1,600	5,200
Under-burn commercially thinned plantations (acres)	70	40	0	135	80	450
Seed burned and disturbed sites (acres)	106	182	36	213	108	355
Maintain existing meadows (acres)	0	3	0	33	10	8
Non-commercially thin plantations (acres)	5	47	2	54	5	99
Plant trees in commercially thinned plantations (acres)	201	117	26	127	82	183
Remove culvert fill and unstable sidecast material from temporary roads (cubic yards)	0	0	40	0	0	200
Plant trees in riparian areas (acres)	0	0	0	0	0	5
Key and non-key forest road actions						
Decommission roads (miles)	0	0.4	0	1.1	2.0	1.4
Remove fill from decommissioned roads and one abandoned road (number of sites/cubic yards)	8/3,800	1/2,000	0	2/3,050	2/1,670	4/3,450

Proposed Actions	Bear	Camp	Elk	Lower Lobster	Lower Middle Lobster	Preacher
Close roads (miles)	4.4	5.6	4.1	14.4	11.6	6.5
Repair and maintain key forest roads (miles)	0	6.4	0	4.3	0	6.9
Repair and maintain non-key forest roads (miles)	9.4	3.7	2.8	8.8	7.3	9.7
Thin and salvage adjacent to key forest roads (acres)	57	51	0	48	0	69
Stand treatments in matrix						
Produce timber from commercially thinned plantations (MBF)	624	0	554	996	426	0

Table 2: Description of Alternative 3 by subwatershed

Proposed Actions	Bear	Camp	Elk	Lower Lobster	Lower Middle Lobster	Preacher
Plantation treatments and associated actions						
Commercial thinning total (acres)	320	536	119	560	224	1,045
Commercially thin, using skyline logging systems (acres)	256	311	70	374	119	445
Commercially thin, using helicopter logging systems (acres)	64	225	49	186	105	600
Temporarily reopen roads (miles)	0	0	0	0	0	0
Build new temporary roads (miles)	0	0	0	0	0	0
Create cavities in natural stands (trees)	31	52	12	56	25	104
Create snags in plantations (trees)	1,900	3,200	700	3,500	1,600	6,100
Create down wood	1,600	2,700	600	2,800	1,300	5,200
Under-burn commercially thinned plantations (acres)	66	40	0	119	75	410
Seed burned and disturbed sites (acres)	102	170	34	204	102	338
Maintain existing meadows	0	3	0	33	10	8

Proposed Actions	Bear	Camp	Elk	Lower Lobster	Lower Middle Lobster	Preacher
(acres)						
Non-commercially thin plantations (acres)	5	47	2	152	106	99
Plant trees in commercially thinned plantations (acres)	201	117	26	86	70	183
Remove culvert fill and unstable sidecast material from temporary roads (cubic yards)	0	0	0	0	0	0
Plant trees in riparian areas (acres)	0	0	0	0	0	5
Key and non-key forest road actions						
Decommission roads (miles)	0	0.4	0	1.1	2.0	1.4
Remove fill from decommissioned roads and one abandoned road (number of sites/cubic yards)	8/3,800	1/2,000	0	2/3,050	2/1,670	4/3,450
Close roads (miles)	4.4	5.6	4.1	14.4	11.6	6.5
Repair and maintain key forest roads (miles)	0	6.4	0	4.3	0	6.9
Repair and maintain non-key forest roads (miles)	9.4	3.7	2.8	8.8	7.3	9.7
Thin and salvage adjacent to key forest roads (acres)	57	51	0	48	0	69
Stand treatments in Matrix						
Produce timber from commercially thinned plantations (MBF)	598	0	532	960	410	0

Comparison of Alternatives

Key quantitative differences—based on our estimates—of Alternatives 1, 2, and 3 are compared in table 3.

Table 3: Comparing the key quantitative differences of Alternatives 1, 2, and 3

Issue, objective, and outcome	Alternative 1	Alternative 2	Alternative 3
Increase late-sucessional habitat in late-successional and riparian reserves, and maintain and create grass, forb, and shrub habitats:			
Speed development of late-successional habitat (acres)	0	3,003	2,804
Commercial thinning, skyline logging (acres)	0	2,459	1,575
Commercial thinning, helicopter logging (acres)	0	544	1,229
Reopen, then close, temporary roads (miles)	0	7.77	0
Build, then close, temporary roads (miles)	0	1.45	0
Create cavities in natural stands (trees)	0	300	280
Create snags in plantations (trees)	0	17,800	17,000
Fall trees to create down wood in plantations (tree number)	0	14,900	14,100
Under-burn commercially thinned plantations (acres)	0	775	710
Seed burned and disturbed sites (acres)	0	1,000	950
Maintain existing meadow habitat (acres)	0	54	54
Non-commercial thinning in plantations (acres)	0	212	411
Plant trees in commercially thinned plantations in reserves (acres)	0	736	683
Plant trees in riparian areas (acres)	0	5	5
Improve watershed function in late-successional and riparian reserves, and repair and maintain forest roads			
Decommission roads (miles)	0	4.9	4.9
Remove fill material from decommissioned roads (cubic yards)	0	11,870	11,870
Remove fill material from one abandoned road (cubic yards)	0	2,400	2,400
Close roads (miles)	0	46.6	46.6
Repair and maintain key forest roads inside/outside of planning area (miles)	0	17.6/8.7	17.6/8.7
Repair and maintain non-key forest roads (miles)	0	41.7	41.7
Thin and salvage adjacent to key forest roads (acres)	0	225	225

Issue, objective, and outcome	Alternative 1	Alternative 2	Alternative 3
Remove culvert fill and unstable sidecast material from temporary roads (number of sites/cubic yards)	0	240	0
Stand treatments in matrix			
Commercially thin plantations (acres treated/thousand board feet)	0	225/2,600	215/2,400
Timber-sale economics			
Estimated total timber-sale value (dollars)	0	5,510,400	4,830,500
Estimated costs for mitigation and enhancement projects (dollars)	0	2,196,900	2,178,600

Alternative 2, map 2

Alternative 2, map 2

Alternative 3, map 3

Alternative 3, map 3

Map 4

Map 4

What environmental effects are predicted for each alternative?

Chapter 3

In chapter 3, we predict the likely effects of each action under each alternative; it is equivalent to the traditional section "Environmental Consequences". The Northwest Forest Plan, FEMAT report, Late-Successional Reserve Assessment, and the Five Rivers-Lobster Watershed Analysis provide evidence for baseline environmental conditions from which direct, indirect, and cumulative effects are analyzed in chapter 3. These broad-based assessments of environmental conditions provide a cumulative view of environmental conditions at different landscape scales and consider past, present, and reasonably foreseeable actions.

One advantage of planning the Lobster Landscape Management Project at the landscape scale is an improved analysis of cumulative effects. Knowing the site-specific details of all projects in a large geographic area allows us to predict cumulative effects with more certainty than if projects were analyzed individually. The analysis of direct and indirect effects in this chapter inherently includes cumulative effects because most foreseeable future federal actions in the watershed are included in the analysis. Cumulative effects are disclosed under the section titled “Other Predicted Effects” and describe how all actions, including those expected from other landowners, affect each resource.

When the District Ranger chose the members of the interdisciplinary team, he considered possible scenarios for this environmental assessment and determined what disciplines would illuminate decisions about them. Relying on his professional judgment and expertise, he chose the disciplines and formed the team of Forest experts in those disciplines. Team members reviewed areas where actions are proposed, reviewed relevant refereed literature and Forest assessments for this planning area, and consulted disciplinary colleagues in the Forest Service, other agencies, universities, and elsewhere. Often, literature reviewed by team members was deemed incomplete and, though studies of similar environments and similar scenarios were reviewed, the expert's professional judgment was required to determine what information can be appropriately used here--and how strongly it supports predictions about what the environmental effects of proposed actions will be. Although team members benefit from the array of research information and the insights of colleagues, they are valued most highly for their experience in and knowledge about the project planning area.

Consultation with other experts helps assure that the literature review did not miss a valuable resource, and it provides opportunity to debate and strengthen the team expert's conclusions about how proposed actions are likely to affect the environment. After several team meetings and one-on-one discussions among team members on how each one's predictions might affect or be affected by all of the others, each team member wrote a section of this chapter. Then all of them reviewed the whole chapter to be sure they find the others' predictions clear and supportable.

In this chapter, team members' position titles accompany their written contributions to indicate that they believe the cited references are relevant, the inferences drawn from them are appropriate, and the predictions are supported by the cited literature and their own professional judgment. In this section, a single author uses "I"; when "we" is used, it means one or more other team members concur. Refer to appendix E for the list of team members that prepared or contributed to this document.

Predicted Effects of Actions to Address the Shortage of Late-Successional Habitat

Forest Stand Conditions (District Silviculturist)

Plantation Treatments and Associated Actions

The desired future condition objectives for plantations within the Lobster planning area include trees that are generally healthy and vigorous, variable spacing between trees, and a mix of different tree species. The existing forest stand conditions on lands administered by the Forest Service include 7,472 acres of natural stands and 7,253 acres of plantations.

Currently, plantations generally include dense, single-story Douglas-fir that range from 11 to 58 years old. These stands are declining in growth and health due to competition between trees. Integrated silvicultural treatments would be implemented to trend the plantations to the desired future condition. The effects of these treatments on forest vegetative conditions in plantations are based on the project design criteria (appendix A) that have been developed over time from monitoring of past similar thinning actions and research studies.

The following treatment strategies for plantations proposed for commercial thinning are guided by the integrated design criteria in appendix A and are illustrated in appendix B-2 and B-4:

> Create wide range of spacing tolerances to achieve the "average" desired leave trees per acre. Clumping trees, as well as generating small gaps or openings in canopies will be part of each prescription.

Retain shade-tolerant conifer species, all hardwood species, and those trees having unique phenotypic characteristics such as large branches. Also, retain some smaller trees to enhance vertical diversity.

Enhance stand structural and species diversity by creating snags and coarse woody debris, planting shade-tolerant and hardwood tree species in stand understories (including gaps).

Portions of each plantation (up to 30 percent of each stand) would not be thinned where: (1) stream buffers and headwall areas needed to protect streams and adjacent slopes, (2) concentrations of hardwoods exist, (3) commercial harvest is not feasible, and/or (4) the current health, vigor, and variable spacing of the conifer and hardwood vegetation is on a suitable, natural trajectory toward attaining late-successional forest habitat. These areas serve to enhance stand spacing and species diversity.

Stand variability would also be enhanced over time by inevitable natural events such as windthrow, endemic levels of disease (i.e. Phellinus weirii), insect infestations, and natural regeneration of conifers, hardwood, and brush species from sources in and adjacent to the thinned stands.

Alternative 1, no action

None of the stands would be treated under this alternative. About 7,253 acres of plantations would continue to develop mostly as dense, single-storied Douglas-fir stands. The untreated plantations would continue to grow over time, but would develop late-seral attributes at rates different than similarly aged natural stands that have later achieved old-growth dimensions (Tappeiner et al. 1997).

Growth projections and actual study results comparing thinned and unthinned plantations are summarized below:

Individual trees would continue to compete for limited resources, especially light. Trees would grow taller as they strive to obtain sufficient sunlight, but diameter growth would continue to slow in response to loss of crown (appendix B-1 compares average current diameter growth rates to average maximum growth rates). The trees would remain susceptible to insects, disease, and windthrow, as stand health continues to decline.

High mortality rates would continue as intermediate and suppressed trees lose their ability to compete. Snag and down wood would continue to increase, but their small diameters would have low value for wildlife because they would decay rapidly, compared to down wood with larger diameters.

Because the plantations are predominantly uniform monocultures; minus a major disturbance; opportunities for establishing species or structural diversity through natural processes would remain low for many years. Eventually, through mortality and natural disturbances, openings would be created, allowing other conifers and brush species to become established in the understory. The lack of western hemlock, western red cedar, and Sitka spruce seed sources in stands would be a major factor delaying the development of diverse tree species in the planning area.

The effects of the no action alternative are likely to be similar to those shown in the control plots on the Black Rock study site near Fall City, Oregon (Marshall, pers. comm.). The plots represent an 85-year-old stand that had 486 trees per acre at age 48. Although this stand contains more trees than most stands in the Lobster planning area, it does provide a basis for comparing the development of overstocked stands over time. Considerable mortality reduced stocking in this stand to 232 trees per acre by 1995, but little or no understory structure or diversity has developed. Although diameter growth has remained small, height growth has continued, producing tall, spindly trees prone to windthrow. Crown widths and lengths have receded making the trees less vigorous and more prone to effects of insects and disease, and little understory vegetation is present due to limited light conditions.

Similar results are predicted when overstocked plantations are modeled with ORGANON (Oregon Growth Analysis and Projection). When a modeled stand reached an age of 117: (1) the average crown ratio fell below 30%, (2) over 50% of the trees died, (3) the average diameter of co-dominants was 26 inches, (an average diameter growth rate of 2.2 inches per decade), and (4) the height of the 40 tallest trees per acre was 208 feet.

Additionally, the Siuslaw National Forest uses adaptive management information from an ongoing stand-density administrative study that has 3 replications on the Forest (Yachats study, Yachats watershed; Cataract study, North Fork Siuslaw watershed; and the Wildcat study, Hebo Ranger District). Along with partners from Oregon State University and the Pacific Northwest Research Station, the Siuslaw National Forest is evaluating the 10-year results following thinning on those sites. Preliminary study results for the un-thinned control blocks were recently received from Sam Chan, PNW silviculturist. The results include: (1) the continual decline of live crown-to-bole length and crown ratios, (2) increasing diameters, but at progressively much slower rates (less than 2.0 inches of DBH growth/decade) than the adjacent thinned plots, (3), light available to the understory remains less than 5% and (4), very low amounts of understory brush and shrubs.

In summary, Alternative 1 provides no opportunities to accelerate the development of complex, mature forest conditions in young plantations. Late-successional reserve objectives would likely be delayed for many decades in these plantations and may never be reached before a natural disturbance resets the vegetation succession cycle.

Commercial thinning under Alternatives 2 and 3

Under Alternative 2, about 3,003 acres in 77 stands would be commercially thinned to residual tree densities ranging from 40 to 120 trees per acre. Specifically, 21 percent of the acreage would be thinned to a range of 40 to 49 trees per acre, 60 percent would be thinned to a range of 50 to 64 trees per acre, and 19 percent thinned to 65 or more trees per acre.

Under Alternative 3, about 2,804 acres in 75 stands would be commercially thinned to residual tree densities ranging from 40 and 120 trees per acre. Specifically, 22 percent of the acreage would be thinned to a range of 40 to 49 trees per acre, 59 percent would be thinned to a range of 50 to 75 trees per acre, and 19 percent thinned to 65 or more trees per acre.

Growth projections and modeling of future stand conditions

To analyze commercial thinning effects, the ORGANON growth model was used to estimate individual tree growth following three thinning scenarios (40, 60, and 120 leave trees per acre) in a stand from the Five Rivers watershed. The results are summarized as follows:

> Diameter growth rates increased in individual trees. The model indicated that at age 80, the average diameter of the dominant trees in stands thinned to approximately 40 trees per acre would be 30 inches. The dominant trees in stands thinned to 60 trees per acre reached 30 inches in diameter at age 90, and stands thinned to 120 trees per acre reached 30 inches in diameter at age 120.
>
> Height growth rates were comparable for all treatments.
>
> Mortality rates decreased significantly in the thinned stands, but the mortality that occurred (estimated to be 2-5 percent per year by the model) came from the co-dominant crown classes. In un-thinned stands, mortality occurred from the suppressed and intermediate tree classes whose diameters are only 50-60 percent of the average co-dominant trees in the stands.
>
> Live-crown ratios increased for a period of 15 to 20 years, where crown size remained relatively constant. Crown growth, as well as diameter growth, was maintained by periodic thinning. Large individual tree crown ratios were maintained longer under in stands thinned to 40 trees per acre. Crown ratios remained above 30 percent in the stands thinned to 60 trees per acre until age 90. Live-crown ratio can be considered an index of individual tree vigor (Oliver and Larson 1996). Trees with large crown ratios will grow faster and will be more resistant to insects and diseases.

Response of residual trees commercially thinned in Forest study plots

The eight-year results from the treatment blocks of the Cataract-Wildcat-Yachats study on the Siuslaw National Forest, begun in 1993, indicate the following responses from thinning to 100, 60, and 30 trees per acre (TPA):

> There is no appreciable increase in available understory light in thinned stands that leave 100 or more TPA, compared to un-thinned areas.
>
> Percent available light was variable, (from only 7% in areas thinned to 100 TPA, to 37% in areas thinned to 30 TPA.

Live crown ratios have increased in all thinning treatments, with the greatest increases occurring in areas thinned to 30 and 60 TPA.

Diameter growth rates increased in all thinning treatments, with the greatest increase beginning to show in the areas thinned to 30 TPA.

Live crown development response has been decreasing the available light to the understory by 2% per year, but is not linear. This suggests that periodic thinning will be necessary to provide sufficient understory light to sustain the development of understory conifers where more than 30 leave trees per acre are retained.

Crown closure is occurring at a faster rate in the areas thinned to 100 TPA than the areas thinned to 30 TPA.

In a study on 10 sites in the Oregon Coast Range, Tappeiner et al. (1997) found that mature trees in old-growth stands experienced minimal inter-tree competition over their life time because of a low initial stocking of TPA. The plantations in the Lobster watershed were planted initially with 400 to 600 TPA, and currently average 180 to 220 TPA, as a result of an earlier non-commercial thinning treatment. Plantations that were not thinned average 330 trees per (appendix B-1). Given Tappenier's study and the inventory results from Chapter V, Table 9 of the Late-Successional Reserve Assessment (USDA, 1997; version 1.3), thinning stands to 40 to 75 TPA would allow the remaining trees to develop on a trajectory more consistent with natural old-growth stand development.

Tappeiner et al. (1997) also found that self-thinning was uncommon during the development of the older stands studied, indicating that the creation of canopy gaps in these forests were most likely caused by the mortality of individual, large trees. Therefore, selecting trees for thinning based on a variable distribution should create numerous small openings in these stands that more closely mimic natural stand development.

Insects, disease, and wind effects on commercially thinned plantations

Thousands of acres of plantations have been commercially thinned in the Siuslaw National Forest, beginning in the late 1980’s. Thinning prescriptions ranged from leaving 30 trees per acre to at least 100 trees per acre. Most of the thinning done on the Siuslaw is in plantations 30 to 40 years old, with residual diameters averaging 13 to 15 inches; therefore, the average leave basal area roughly equates to one square foot per tree, or 30 to 100 square feet per acre. The majority of the residual stocking is in the 60 to 80 square foot range. Observations of the residual trees in these plantations, including those in the Siuslaw Thinning and Underplanting for Diversity Study—a collaborative effort between PNW Forest Service research and Oregon State University Forest Sciences—indicate no measurable effects from insects and disease, and negligible overall effects from wind.

A few thinned plantations have experienced up to 5-acre patches of windthrow. This is considered within the range of acceptability, given the stand diversity objectives of managing for late-successional habitat. Windthrow observed in all other stands has generally been limited to a few individual, scattered trees, which serves to add to the desired variable distribution of residual trees in the plantations. Areas most susceptible to windthrow are generally on the leeward side (northern aspect) of ridge systems that have elevations high enough to be exposed to the brunt of storm winds. Design criteria (appendix A), such as retaining more trees or square feet (basal area) per acre and minimizing gap creations, are included to mitigate the potential effects of storm winds. In about 3 to 5 years after thinning, observations indicate that trees are substantially less prone to windthrow. Any trees that blow down—for up to 10 years after thinning—would count towards the desired down wood component, reducing the number trees that would need to be felled. Therefore, we expect windthrow effects in commercially thinned plantations to be compatible with the objectives for late-successional habitat.

Gap planting under Alternatives 2 and 3

To improve both the species and structural diversity within the thinned stands, about 296 acres of gaps (1/4 to 3/4 acre each) would be created in 77 stands under Alternative 2. Under Alternative 3, because of the lesser acres that would be commercially thinned, about 277 acres of similar-sized gaps would be created in 75 stands. Under both of these alternatives, the gaps would then be planted with an average of 150 trees per acre.

Thies and Sturrock (1995) compiled information from research findings and observations by forest pathologists and resource managers in the Pacific Northwest on the susceptibility of tree species to laminated root rot, Phellinus weirii. They found Douglas-fir highly susceptible, western hemlock intermediately susceptible, western red cedar resistant, and hardwoods immune. Although there are no substantial Phellinus infestations in the Lobster watershed, creating gaps in Phellinus infection centers would be emphasized. Secondarily, gaps would be located in relatively flat areas, such as benches. The gaps would be primarily planted with red alder, big leaf maple, western red cedar, and western hemlock.

As suggested in the results of the Yachats-Cataract-Wildcat thinning study, many of the planted gaps would likely need to be non-commercially thinned within 15 years to continue to accelerate the development of late-seral attributes.

Planting trees in thinned stands under Alternatives 2 and 3

Under Alternatives 2 and 3, about 736 acres and 683 acres, respectively, would be planted in 26 stands with an average of 50 trees per acre after thinning treatments are completed, not including gaps. The planted species would primarily include western red cedar, western hemlock, and red alder—all native species that would commonly occur in natural stands in the Lobster watershed, but noticeably absent in the Douglas-fir dominated plantations.

Based on the Yachats-Cataract-Wildcat thinning study, the following results were obtained on the survival and development of trees planted in thinned stands:

> Douglas-fir survival is sensitive to overstory levels. Only 64 percent survival occurred in stands thinned to 80 and 100 trees per acre. Western red cedar, western hemlock, and Sitka

spruce survival was relatively unaffected in similarly thinned stands, with a 90 percent survival rate.

Western hemlock had a better overall tree survival rate than Douglas-fir, western red cedar, and Sitka spruce.

Tree growth rates were the highest in stands thinned to 30 trees per acre.

Between 10 to 20 percent available light, which occurs in stands thinned to between 50 and 70 TPA, appears to be optimum to establish shade-tolerant species.

Where available light exceeds 20 percent, Douglas-fir appears to grow acceptably.

Trees planted in areas thinned to 100 TPA offer minimal opportunities for the creation and development of diverse two-storied stands, without additional future thinning treatments.

Two shrubs, which compete with planted seedlings, also respond to thinning. In general, salmonberry (Rubis spectabilis) shows the greatest increase in presence in areas thinned to 30 TPA. The more shade-tolerant salal (Gaultheria shallon) shows the greatest increase in presence in areas thinned to 100 TPA.

To maximize survival of planted trees, at least in the short term, planting would be concentrated in those stands thinned to 40 and 60 TPA. Additional thinning treatments may likely be needed in the next 10 to 20 years to maintain growth and survival of planted trees.

Non-commercial thinning under Alternatives 2 and 3

The objectives of non-commercial thinning include:

Reducing plantation tree densities to more closely mimic natural stand development;

Maintaining or enhancing growth rates for at least two decades;

Increasing species diversity by favoring, for retention, those species most poorly represented in the plantation;

Enhancing spatial diversity by not thinning some areas and clumping co-dominant leave trees; and

Increasing plantation resistance to insects and diseases.

Under Alternatives 2 and 3, about 162 acres of 10 to 20 year-old stands would be non-commercially thinned to a range of 135 to 200 trees per acre. The size of trees in these plantations is not large enough to be merchantable (less than 7.0 inches DBH). Cut trees would be left on site and not removed.

Some small, scattered patches in older plantations, totaling about 50 acres and scattered across the planning area, would be non-commercially thinned under Alternatives 2 and 3 to a range of 50 to 90 trees per acre. These small patches are generally characterized by sensitive riparian areas, sensitive soils, or areas not feasible for logging systems. Alternative 3 would also non-commercially thin about 199 acres of older plantations to a range of 50 to 90 trees per acre because these areas would not be accessible to logging systems. Cut trees in all stands that are non-commercially thinned would be left on site and not removed.

In summary, stand treatments and associated actions under Alternatives 2 and 3 would speed the development of complex, mature forest conditions in young plantations. Late-successional reserve objectives in the planning area would be met sooner, compared to Alternative 1.

Key and Non-key Forest Road Actions

Roadside vegetation management

Under Alternative 1, no roadside hazardous-tree removal, roadside clearing, or roadside thinning and salvage actions would be completed adjacent to key and non-key forest roads. The sections of roads adjacent to plantations or alder dominated stands require frequent maintenance, as these stands are more susceptible to windthrow and snow breakage, and can produce large numbers of hazardous snags. Under Alternative 1, the existing frequent road maintenance scenario would continue adjacent to about 14.4 miles.

Under Alternatives 2 and 3, roadside vegetation management actions, such as hazardous-tree removal, roadside clearing, and roadside thinning and salvage would be completed adjacent to about 14.4 miles of key and non-key forest roads. These actions would have little effect on achieving LSR objectives, with respect to accelerating individual tree growth or promoting structural or species diversity.

Roadside thinning of conifers and hardwoods would be completed in stands between 20 and 60 years old within 1/2 site tree distance (130 feet) from above and below the road. Thinning would accelerate the growth of remaining trees on about 225 acres. To satisfactorily daylight the roads, affected stands would be thinned to 50 to 70 trees per acre or a spacing of 25 to 30 feet between the remaining trees. Receipts from roadside treatments will help fund needed restoration work, such as non-commercial thinning and noxious weed control.

Road closure and decommissioning

No road closure or decommissioning is proposed under Alternative 1.

Under Alternatives 2 and 3, road closures could add to the cost of post-harvest stand treatments and monitoring, depending on the timing of closures. Where possible, road closures would be timed to minimize these effects.

Stand treatments in Matrix

Alternative 1 would not treat any acres in the matrix land allocation. Matrix lands total about 225 acres in the planning area and are scattered among several different plantations. These acres, basically on or near ridges, would continue to remain overstocked with predominately single-storied Douglas-fir.

In both Alternatives 2 and 3, the 225 acres would be commercially thinned similar to the adjacent late-successional acres in affected plantations. About 2.6 and 2.4 million board feet of commercial timber would be removed from matrix lands under Alternatives 2 and 3, respectively.

Harvest Plan (Resource Planner)

Skyline and Helicopter Operations

To facilitate skyline yarding of stands proposed for commercial thinning, Alternative 2 would build about 1.45 miles of temporary road and temporarily reopen about 7.77 miles of system and non-system roads. Building new temporary roads would access about 247 acres and temporarily reopening non-system roads would access about 977 acres (appendix B-3). Using these roads to access skyline landing sites would also minimize the need for sidehill and downhill yarding, which tends to result in greater damage to residual trees and greater soil disturbance. Additionally, use of these roads would permit landing sites to be located in areas where logs would be yarded away from riparian vegetation, not through them.

By not building temporary roads or temporarily reopening non-system roads, Alternative 3 would require about 685 more acres to be yarded by helicopter, compared to Alternative 2. Based on past experiences by Central Coast Ranger District timber sale administrators, helicopter yarding would result in slightly less ground disturbance in stands, a little less damage to residual tree boles, and slightly greater damage to tree canopies, compared to skyline yarding. Without use of temporary roads, about 50 to 100 more acres of sidehill and downhill skyline yarding, and about 50 more acres of skyline yarding through riparian vegetation may be likely, compared to Alternative 2. Due to the lack of helicopter service landings in the northeastern portion of planning area, about 199 acres would not be accessible to logging under Alternative 3. These acres would be non-commercially thinned, with cut trees left on site.

For safety reasons, loaded helicopter flight paths are prohibited over heavily traveled roads, power lines, and private property (unless permission is granted by the property owner). Under Alternatives 2 and 3, helicopter service landings and yarding areas would be located at least 0.5 mile from residences, with most landings and yarding areas over one mile away. Because of distance and topography, operations are expected to have a low potential for noise disturbance to landowners. Alternative 3 requires more helicopter yarding than Alternative 2. Therefore, the potential for disturbance to local landowners would increase with Alternative 3.

Under Alternatives 2 and 3, helicopter yarding would occur on about 554 acres and 1,229 acres, respectively, eliminating the need for skyline yarding corridors through these acres.

Timber-sale Economics

Under Alternative 2, about 42,365 thousand board feet (MBF) or 96,168 hundred cubic feet (CCF) would be produced. Alternative 3 would produce about 39,850 MBF or 90,459 CCF. A MBF to CCF conversion factor of 2.27 was used for this analysis.

Based on a recent average market rate for small-wood timber sales in Oregon and Washington, the advertised rates for the sale of timber would be about $57.30 per CCF for Alternative 2 and about $53.40 per CCF for Alternative 3. The advertised rate is the current market rate and includes the minimum amount needed to cover Forest Service expenses associated with planning, sale preparation, and sale administration; logging and associated costs; and the required minimum collection for the National Forest Fund (NFF). The lower advertised rate associated with Alternative 3 reflects the greater dependence on helicopter logging because of limited road access—logging with helicopters costs more per CCF than skyline logging. Moreover, under Alternative 3, limited road access would result in a lack of suitable helicopter service landings and shift some stands (about 199 acres) to the noncommercial-thinning category, reducing timber volume and timber-sale value.

Table 4 summarizes the timber-sale values and collections for Alternatives 1, 2 and 3, based on CCF dollars. The total sale value reflects the estimated advertised rates shown above. Collections; payments to counties, roads and trails; total cost for mitigation actions (such as road decommissioning and dead wood creation) and enhancement actions (such as tree planting), are deducted from the total sale value to obtain the remaining sale value. The remaining sale value is sent to the National Treasury.

Table 4: Summary of total sale value and costs for Alternatives 1, 2, and 3

Alternative	Total sale value	Minimum NFF collection	Payment to counties, and roads and trails	Cost of mitigation actions	Salvage-Sale Fund collection	Cost of enhancement actions	Remaining sale value
Alt. 1	0	0	0	0	0	0	0
Alt. 2	$5,510,400	$24,000	$1,928,640	$595,300	$548,200	$1,601,600	$812,660
Alt. 3	$4,830,500	$22,600	$1,690,680	$569,900	$515,600	$1,608,740	$422,980

Alternatives 2 and 3 are expected to provide sale values sufficient to cover the collections, payments, and costs of mitigation and enhancement actions. Due to the lesser acres that would be commercially thinned and the greater dependence on helicopter yarding, Alternative 3 would result in a lesser sale value than Alternative 2.

About 35 to 40 percent of the sales on the Central Coast Ranger District are sold at the advertised rate. However, there are many variables that influence the value of timber at the time of sale, including market conditions, competition during bids for timber sales, the type of timber-sale contract used (e.g., stewardship contract), and flexibility in the seasons of operations—any of these could cause bids for timber-sale contracts to rise above advertised rates.

Wildlife Habitat and Species (District Wildlife Biologist, USDA 2006)

Introduction

This section identifies the direct and indirect effects of proposed actions on Forest Service goals and desired conditions for wildlife (USDA 1991, Forest Service Manual 2602; USDA 1990, Siuslaw Forest Plan; USDA, USDI 1994, Northwest Forest Plan). Generally, beneficial effects to habitats and species are long-term, while potential adverse effects are expected to be short-term. Effects are based on detailed analysis from the wildlife report for this project (USDA 2006), and on the assumption that treatments are consistent with wildlife design criteria in appendix A, which includes "Standards Common to All Actions" identified through consultation with USDI Fish and Wildlife Service (USDI 2004b, p. 7-11).

Project actions would change existing conditions, and this change can either affect desired conditions immediately or cause a trend that affects desired conditions in the future. Analysis of potential project effects is required for species identified as Threatened or Endangered, Survey and Manage, Sensitive, Management Indicators, and certain land birds. This analysis is used to determine the effects to the Forest Service's desired condition for wildlife. Effects to these species are based primarily on effects to important habitats these animals need; secondarily on potential disturbance effects to individuals during breeding season from project implementation.

Species analyzed use the following habitats: grass/forb, shrub, sapling/pole forest, small forest, mature forest, old growth forest, caves/burrows, cliffs/rims, talus, down wood, snag, and riparian. Appendix C; table C-1, has additional information on these habitats.

This project, using information from landscape-scale assessments, combined with further analysis, identified habitat conditions well below their historic levels. Therefore, an emphasis of this project is to maintain and restore these habitats of concern. These deficit habitats are late-successional forest, grass/forb, shrub, and large dead wood. The habitat with greatest restoration emphasis is late-successional forest, because of the dependence two threatened species (northern spotted owl and the marbled murrelet) have on this habitat and the requirement to manage for late-successional forest (USDA, USDI 1994), the dominant land allocation in the project area.

The effects of each treatment on habitats will be qualitatively described for each activity and then quantified for each alternative at the end of the habitat effects section in table 5. The effects to species, from all treatments combined, will follow.

Plantation Treatments and Associated Actions

Plantation treatments and associated actions are described in chapter 2. Actions that affect wildlife habitat include commercial and non-commercial thinning in plantations, temporary road construction, temporarily reopening existing roads, maintain roads, maintaining meadows, increasing the amount of early seral habitat (grass/forb/shrub), tree planting and associated brush control (cutting competing brush near planted trees), and dead wood creation.

Grass/forb, shrub, and seedling/sapling habitats

Treatments would generally have similar effects to these habitat types; therefore, the effects are grouped together in the following section.

Grass/forb habitat is in meadows and forest under-stories. Meadows are dominated by grasses or forbs, and the abundance of grasses or forbs in forest under-stories could vary from one to over fifty percent groundcover.

Shrub and sapling/pole habitats are dominated by deciduous shrubs and generally contain some grass/forb habitat. Sapling/pole habitat is dominated by trees between 1 and 10 inches in diameter at breast height (DBH) and has some grass/forb habitat, but is generally dominated by shrubs for 2 to 15 years, until conifers establish dominance, usually when conifers grow into pole or small-sized trees. These habitats were once very common on the Forest; however, they are declining rapidly on Federal lands due to changes of forest management affected by the Northwest Forest Plan. Forested areas recently thinned near the project area exhibit some shrub recovery; however, the distribution and abundance of shrub species probably remains below historic levels. Therefore, these habitats are considered deficit, or habitats of concern.

Thinning, as well as creating dead wood, would have beneficial effects on these habitats, by increasing the amount of light reaching the forest floor and stimulating development of grass, forb, or shrub habitat.

Temporary road construction, re-opening and then closing existing roads, and maintaining existing roads would have minimal adverse effects to these habitats, because of the relatively small amount of area affected by these treatments (less than 1% of existing meadow, shrub, or sapling/pole acres in the watershed).

Burning would have beneficial effects on these habitats, because it would kill undesirable small woody plants in meadows and improve the potential for grasses, forbs, and shrubs to grow in the seedbed prepared by burning. Burning would also have minimal adverse direct effects and beneficial indirect effects to shrub and sapling/pole habitat, because the limited adverse effects would be very short-term (less than one year), and beneficial effects would be longer-term. Limited adverse effects could occur when burning kills above-ground portions of shrubs and some seedlings and saplings. However, longer term beneficial effects result because most shrubs re-sprout after burning and natural seeding or planting (where needed) would restore seedlings/saplings, thus improving the amount and quality of these habitats.

Seeding would have direct beneficial effects to grass/forb habitats and minimal indirect effects to shrub or sapling habitats in forested areas, because seeding would increase the amount of grasses or forbs, and low application rates of seed in forested areas should not adversely affect establishment or growth of shrub or sapling habitats. Seeding to restore areas in meadow boundaries after reducing encroachment of competing vegetation would benefit grass/forb habitats and have direct adverse effect to shrub and sapling habitats, because high application rates should create dense stands of grass, which resist establishment of shrubs and saplings. In addition, restoration of meadows with seeding could have indirect adverse effects to shrub and sapling habitats, because these areas would be managed for meadow habitat, and encroaching shrubs or saplings could be eliminated in the future to maintain meadow habitat.

Planting and associated brush control in forested habitats of plantations would have minimal effects to these habitats, if planting is implemented after burning. However, if planting is implemented before burning can occur, planting would adversely affect these habitats, because it could prevent burning from being implemented in planted areas. About 25 percent of an 8-acre meadow adjacent to Preacher Creek is proposed for riparian planting, affecting about 4 percent of the meadow acres on Forest Service lands in the watershed. This would eliminate meadow habitat in one or two decades in the planted areas.

Young/small forest habitat

Small forest is habitat dominated by trees between 10 and 21” DBH with canopy cover greater than 40 percent. This habitat comprises about 40 percent of the Lobster watershed and the Forest. Therefore this habitat is not considered to be a habitat of concern.

Thinning, as well as dead wood creation, would have beneficial effects on this habitat, because it would increase the health of trees and stand diversity by reducing the amount of competition among remaining trees for light and nutrients and increasing the amount of structural diversity, such as gaps (small openings) and skips/clumps (dense untreated areas). Over the long-term, thinning of young/small forest would benefit late-successional forest habitat, because these smaller forests should develop important late-successional forest characteristics (especially large trees), sooner than with no treatment.

Temporary road construction, temporarily re-opening existing roads, maintaining existing roads, and burning would have essentially have no direct or indirect effects to this habitat, because the relatively small amount of trees potentially affected would not reduce overall canopy cover enough to eliminate any of this habitat.

Planting and associated brush control as well as seeding would not directly affect this habitat, because it would not affect trees 10 to 21” DBH. Indirectly, these treatments could benefit this habitat, because planting and brush control would improve species and structural diversity over time.

Late-successional forest habitat

“Late-successional forests are those forest seral stages that include mature (21 to 32 inches DBH or 80 to 200 years of age) and old-growth (>32 inches DBH or >180 to 200 years old) age classes” (USDA, USDI

1994a, Vol. 1, p. 3, 4 to26, and Glossary, p. 9; and USDA, USDI 1994b, p. B-1). “Although the processes that created the current late-successional and old-growth ecosystems are not completely understood, they include: (1) tree growth and maturation, (2) death and decay of large trees, (3) low-to-moderate intensity disturbances (e.g., fire, wind, insects, and diseases) that create canopy openings or gaps in the various strata of vegetation, (4) establishment of trees beneath the maturing overstory trees either in gaps or under the canopy, and (5) closing of canopy gaps by lateral canopy growth or growth of understory trees” (USDA, USDI 1994b, p. B-2). Because this habitat is considered to be below historic levels, it is a habitat of concern.

The most unique characteristic of late-successional forest is large live trees. Although there are a number of characteristics in late-successional forest, quantification of mature or old-growth forest generally uses a combination of diameters (described above) and canopy closure (generally greater than 50 percent), because diameter and canopy closure are easily measured and because these are the types of stands where the characteristics of late-successional forest are likely to begin developing or may already occur. For example, a stand, which was clear-cut 60 years ago, could be dominated by 21 to 32 inches dbh trees with high canopy cover, but is not likely to contain giant trees, large cavities, or large limbs. This stand could contain a few large snags or large down wood and therefore, could be developing late-successional forest characteristics. Conversely, in natural stands where a fire killed most of the larger trees 60 to 100 years ago, there could be few giant trees surrounded by 21 to 32 inches dbh trees and a number of large snags and down wood. Although this stand could be suitable for nesting northern spotted owls or marbled murrelets because of the few giant trees, it would also be defined as a mature stand.

Thinning, as well as dead wood creation, would have negligible short-term adverse effects on this habitat, because these treatments are not proposed in this habitat. However, about 150 mature trees in this habitat could be used as guyline anchors in logging operations, and, based on past experience by Central Coast Ranger District timber sale administrators, about one to five percent of these trees (1 to 8 trees) may be felled to protect worker safety. In addition, based on past experience, about 15 to 20 mature trees along roads may be felled to eliminate safety hazards. Priority for felled trees would be to leave trees on site, use trees for fish structures for another project, remove trees through timber-sale contracts, remove trees through firewood permits, or remove trees through service contracts (appendix A). Felled trees would not eliminate any late-successional forest habitat, because the trees would be scattered throughout the watershed. Inoculation or tree topping should benefit the quality of late-successional forest habitat for species that nest or den in large tree cavities, because this would hasten development of these cavities.

Temporary road construction, re-opening and then closing existing roads, and maintaining existing roads would have minimal direct or indirect effects to this habitat, because of the relatively small amount of area affected by these treatments. Some large trees, determined to be road-side danger trees, could be felled adjacent to these roads. However, these treatments would indirectly benefit late-successional forest over the long term, because they allow access for commercial thinning of plantations, which accelerates restoration of this habitat.

Burning is not proposed in this habitat and, therefore, would have no effect.

Planting and associated brush control, as well as seeding, are not proposed in this habitat and, therefore, would have no direct effect. These treatments would indirectly benefit this habitat component in the watershed by accelerating the development of late-successional forest habitat components, such as species and structural diversity, in plantations.

Caves and burrows, cliffs and rims, and talus habitats

Caves and burrows are holes in the ground. Cliffs and rims are nearly vertical land, usually made of rock. Talus habitat consists of areas dominated by loose rocks, with essentially no soil in the spaces between the rocks; rocks range in size from small gravel to large boulders.

Caves, cliffs, and rims are not known to exist in the project area, and are not likely to occur because the local geology, sandstone, is not conducive to these habitat types. Talus is also very uncommon, existing primarily along streams, and proposed actions are not expected to impact talus habitat. Burrow habitat is likely to occur in the project area. However, actions are designed to avoid or minimize soil disturbance and compaction and, therefore, should have little effect on burrows. Therefore, proposed actions are not expected to have measurable effects to these habitats.

Large dead wood habitat

Large dead wood is down wood and snags that are greater than 20 inches in diameter. At the watershed scale, nearly 45 percent of Forest Service lands contain plantations with very few large snags. Historically, these plantations were mature or old growth forest that contained large snags and down wood. In other words, 45 percent of Forest Service lands in the watershed no longer have historic or adequate amounts of large dead wood. Therefore, this is a habitat of concern.

About 45 percent of the Lobster-Five Rivers watershed has natural levels of snags and down wood in late-successional forest habitat. Stands proposed for treatments are below desired levels for snags—especially large snags—and some stands are below desired levels for down wood—especially large (>21 inches in diameter) class 1 and 2 (hard material).

The dead wood prescription for the Lobster plantations would provide a steady supply, beginning with minimum levels, of down wood and snags over time, with emphasis on speeding the development of large trees. Large trees would provide quality future conditions for down wood- and snag-dependent species (USDA, USDI 1997; p. 68, CWD Alt. #3 prescription). Deadwood prescriptions avoid creating average amounts in a single decay class, because the average amounts in the LSR Assessment include all decay classes. Also, young trees, with relatively small diameters, decay fairly rapidly in the Oregon Coast Range and their overall value as a dead wood component in plantations is less than that associated with larger trees.

Created dead wood would be clumped and scattered, as described in Appendix A, which should provide for the many species needing high densities of down wood or snags and the few species that need scattered distribution of dead wood (Mellen et al, 2003).

The amount of existing and created dead wood in treated and untreated areas of plantations would provide quantities nearer the average minimum recommended by the LSR Assessment. Existing down wood should persist in all areas of plantations. Future dead wood in treated and untreated areas will be created naturally or artificially through possible future treatments in 10 to 20 years. Should these areas be treated in the future, some of the existing snags would need to be felled for safety reasons before thinning operations could begin, adding to the down wood component.

Although some large snags might be felled adjacent to roads used as access to worksites for safety reasons, the long-term benefit to dead wood habitat from thinning would outweigh the loss of snags. Thinning promotes the development of many more large trees and future large snags than would be felled to protect workers. Additionally, smaller snags would be created in plantations, partially compensating for the loss of snags.

Temporary road construction, re-opening existing roads, and maintaining existing roads would have minimal effects to this habitat, because of the relatively small amount—less than 1 percent of these habitats in the watershed—affected by these treatments.

Burning would have minimal effect on this habitat, because burning prescriptions would be governed by fuel moisture levels, so that only the fine fuels would be consumed. This would avoid the potential for consuming large dead wood. Burning, however, can consume portions of large dead wood pieces, especially where pitch is present.

Planting and associated brush control, as well as seeding, would not directly affect this habitat, because it would not affect large dead wood. Indirectly, planting and brush control could slightly benefit this habitat, because planting and brush control would improve structural diversity, including dead wood, over time.

Key and Non-key Road Actions

Key and non-key road actions include repairing and maintaining existing roads, replacing culverts, closing roads, and decommissioning roads (including removing culverts).

Maintaining existing roads, culvert replacement or removal, and road decommissioning, would have minimal adverse direct or indirect effects to grass/forb, shrub, sapling/pole, small or mature forest, caves/burrows, cliffs/rims, talus, or down wood habitats, because of the relatively small amount of area affected by these treatments (less than 1 percent of existing acres of these habitats in the watershed). Road closures can reduce the potential for maintaining meadows by making access more difficult and increasing the cost of treatments. However, overall, the value of wildlife habitat is improved by road closures, because of reduced disruption from vehicle traffic.

These treatments would have minimal direct adverse effects to late-successional forest habitat, because some road-side danger trees may be felled. Although this would degrade the quality this habitat, no late-successional forest habitat would be removed by these treatments. In addition, these treatments would indirectly benefit late-successional forest over the long term, because most roads would be retained for future stand treatments designed to accelerate the development of this habitat.

Although some large snags might be felled adjacent to roads used as access to worksites for safety reasons, the long-term benefit to dead wood from thinning (which is facilitated by roads) would outweigh the loss of snags. Thinning promotes the development of many more large trees and snags than would be felled to protect workers.

Water quality and the quality of aquatic habitat needed by some species, such as the southern torrent salamander, would be improved over the long term by road actions, especially where culverts are removed and replaced.

Road closing and decommissioning would have both beneficial and adverse affects to agency wildlife goals, such as reducing disturbance, maintaining access for future restoration treatments, and maintaining opportunities for use of wildlife resources. Beneficial effects would result from closing roads, because of reduced disruption from people associated with driving. Actions that reduce the potential for driving to areas would have slight adverse effects, because closing or decommissioning roads could decrease access for future restoration treatments and decrease opportunities for people to use wildlife resources. Open roads would be very limited in the drainages of Minotti, Bear, Phillips, Silt, and Camp Creeks. However, because the highest priority restoration treatment (thinning) would be completed before roads are closed, roads can be reopened when needed in the future, closed roads can be used by people, and remaining open roads would continue to provide road access to several drainages in the project area, these adverse effects would be minor.

Stand Treatments in Matrix

Stand treatments in Matrix would have the same effects to wildlife habitats as those previously described for plantation treatments and associated actions.

Wildlife Habitat Summary

Effects from all actions on habitats are considered in aggregate and summarized below. Table 5 quantifies the effects described above for plantation treatments and associated actions—combined with stand treatments in Matrix—and for key and non-key road actions. Table 6 summarizes the effects to habitats of concern, based on qualitative and quantitative information.

Table 5. Quantitative beneficial effects to wildlife habitats by alternative

Indicator for beneficial habitat effects	Habitats affected	Alternative		
		1	2	3
Acres of commercial thinning with 40 to 60 percent canopy cover after treatments	Grass/forb, shrub, LSF* acceleration, forest diversity	0	2,400	2250
Acres of gaps (small openings with < 40% canopy cover) in commercial thinning. (Includes gaps from harvest and gaps from dead wood creation.	Grass/forb, shrub, LSF* acceleration, esp. very large trees	0	300	280
Acres of "skips" (untreated areas of plantations with commercial-sized trees)	Snags, down wood	4,600	1,560	1720
Acres of commercial thinning with >60% canopy cover after treatments	LSF* acceleration, forest diversity	0	600	600
Acres of non-commercial thinning	LSF*acceleration, forest diversity	0	210	360
Number of trees inoculated with fungi to create cavities in large trees near plantations	LSF* habitat quality	0	300	280
Number of snags created in plantations	Snags; forest diversity	0	17,800	17,000
Number of trees felled to create down woody material	Down wood; forest diversity	0	14,900	14,100
Acres of meadow treatments	Grass/forb	0	54	54
Acres of under-burning	Grass/forb, shrub; forest diversity	0	775	710
Acres of seeding (portions of all units, esp. gaps and under-burned areas)	Grass/forb, shrub; forest diversity		1,000	950
Comparative Ranking of Alternatives, summarizing effects to primary project goals for wildlife. High = highest potential of all alternatives for maintenance or restoration of late successional forest or grass, forb, shrub habitats. L = Low, M = Moderate potential		L	H	H to M

* LSF = late successional forest

Determination of effects to wildlife Habitats of Concern

Table 6 summarizes the beneficial effects to habitats of concern for each alternative.

Table 6: Summary of beneficial effects to wildlife habitats of concern by alternative

Habitat objective	Alternative			
	1	2	3	
Acclerate restoration of late successional forest, especially large live trees	L	H	M	Reducing the density of small trees and creation of gaps and dead wood are beneficial
Restoration of grasses, forbs and shrubs in forest under-story.	L	H	M	Reducing the density of small trees, creation of gaps and dead wood, seeding,

				and under-burning are beneficial
Maintenance and restoration of meadows	L	H	H	Encroachment reduction, burning, and seeding are beneficial
Maintenance of Large Dead Wood	H	M	M	Some large snags may need felled for human safety during implementation of treatments
Restoration of Large Dead Wood	L	H	H	Accelerating restoration of large trees is beneficial. Creation of cavities in large trees is beneficial
Overall ranking for wildlife habitats of concern Comparative ranking of alternatives, summarizing effects to habitats. 0 = no beneficial affect; L=low potential for beneficial effects; H = high potential for beneficial effects	L	H	H to M	Over time, the no action alternative could have adverse effects to many of these habitats; and therefore, to agency wildlife goals

Effects to Wildlife Species Analyzed

Long-term effects to habitats and, thus to species, are expected to generally be neutral or beneficial (as described in the habitats section). However, there may be short-term adverse effects to habitats (previously described) or species. The following section discloses potential short-term adverse effects to species.

Although there may be differences between alternatives in the degree of a specific effect on a species, any adverse effect, regardless how minor, automatically triggers an adverse effects determination. The degree of affect to species is directly related to the amount of effect on habitat, with which each species is associated. Effects also result from the potential for disturbing nesting individuals.

Effects to species rely heavily on effects described for habitats and information in table WL-1 in Appendix C. This table contains a complete list of species-analyzed that may occur on the Siuslaw National Forest, their special status (Threatened, Endangered, Sensitive, etc.), and their habitat associations.

For all species, the determination for Alternative 1 (No Action) is No Effect, No Impact, or Neutral because no actions would occur; therefore, no short-term effects. However, long-term effects from the no-action alternative could be adverse to all species associated with late-successional forest, large dead wood, and grass/forb/shrub habitats, because it would take longer to restore large trees and large dead wood in plantations, and the abundance of grass/forb/shrub habitats would continue to decline.

For Alternatives 2 and 3, determinations are typically the same for both alternatives. This is in part due to the applications of the design criteria in appendix A, which minimize the adverse effects to species and habitats, and the fact that any effect results in a determination, regardless of magnitude. For example, one acre or 100 acres of disturbance during breeding season each results in an adverse effect determination for marbled murrelets.

Table 7 displays the determinations of effects to each species analyzed. Some species are found elsewhere on the Siuslaw National Forest, but are not expected to occur in the project area. These species include the Oregon Silverspot butterfly, evening field slug, Columbia torrent salamander, brown pelican, snowy plover, Aleutian Canada goose, Bufflehead, streaked horned lark, wolverine, and Baird's shrew, and therefore, are not included in this table.

Table 7: Effects determination for wildlife species in the project area

Species	Alternative			
	1	2	3	Comments
Threatened and Endangered wildlife				
Bald eagle	NE	LAA	LAA	No known active nests, but foraging birds could be disturbed by project activities (NLAA) and habitat could be degraded (LAA) from individual tree removal—hazard, guyline, tailhold.
Northern spotted owl*	NE	LAA	LAA	Disturbance (NLAA); and habitat degradation from thinning in dispersal habitat (NLAA) and from individual tree removal—hazard, guyline, tailhold—in nesting/roosting habitat (LAA)
Northern spotted owl critical habitat (CHU OR-48)	NE	MA	MA	Habitat degradation (individual tree removal—hazard guyline, tailhold)
Marbled murrelet	NE	LAA	LAA	Disturbance and habitat degradation from individual tree removal—hazard, guyline, tailhold—in suitable habitat (both are LAA)
Marbled murrelet critical habitat (CHU OR-04-a, b, and j)	NE	MA	MA	Habitat degradation from individual tree removal—hazard, guyline, tailhold—in suitable habitat (MA)
Survey and Manage or Protection Buffer Species				
Bats (fringed, long-eared, and long-legged myotis; silver-haired, pallid, and Townsend's big-eared bats)	Nt	M	M	Minimal effects to these species, but some adverse impacts to existing snags or trees with cavities
Sensitive Species – Forest Service R6				
Foothill yellow-legged frog	NI	MIIH	MIIH	Minimal impacts, but some habitat degradation and disturbance could occur for these species. Habitat quality for turtles is low in the project area. If present, a few yellow-legged frogs could be adversely affected
Northwestern pond turtle	NI	MIIH	MIIH	
Southern torrent salamander	NI	MIIH	MIIH	

				by riparian planting in the meadow adjacent to Preacher Creek.
American peregrine falcon	NI	MIIH	MIIH	No nesting habitat, but foraging birds could be disturbed by project activities.
Harlequin duck	NI	MIIH	MIIH	Possible nesting along fast streams. Minimal, but some disturbance could occur.
Fisher	NI	MIIH	MIIH	Minimal impacts, but some habitat degradation and disturbance could occur for these species.
Pacific fringe-tailed myotis	NI	MIIH	MIIH	
Pacific Pallid bat	NI	MIIH	MIIH	
Red tree vole	NI	MIIH	MIIH	
Pacific shrew	NI	MIIH	MIIH	Minimal impacts, but some habitat degradation and disturbance could occur.

*Although thinning would degrade dispersal habitat, trees retained after thinning would maintain at least a 40 percent canopy cover, resulting in no removal of dispersal habitat.

Table 7: Effects determination for wildlife species in the project area (cont.)

Species	Alternative			Comments
	1	2	3	
Management Indicator Species				
Bald eagle, northern spotted owl, and peregrine falcon	Covered above			
Pileated woodpecker	Nt	M	M	Minimal effects to these species, but some adverse impacts to existing snags or trees with cavities
Woodpeckers (Downy, Hairy, Northern flicker, and Red-breasted sapsucker)	Nt	M	M	
Red-breasted nuthatch	Nt	M	M	
Ruffed grouse	Nt	B	B	Beneficial effects from improvement of hardwoods and forage; i.e., more grasses, forbs, and shrubs.
American marten	Nt	M	M	Minimal effects, but canopy reduction may reduce habitat suitability until forest under-story shrubs and over-story trees grow and restore over-head cover.
Roosevelt elk	Nt	B	B	Beneficial impacts from improvement of forage; i.e., more grasses, forbs, and shrubs.
Neotropical Migratory Birds/Landbirds				
Band-tailed pigeon	Nt	M	M	Variable effects, but no more than M for any species, because the scale of impacts is small, compared to the range of these species. The project also emphasizes restoration of important habitats for declining species, habitats such as late-successional forest and grasses/forbs and shrubs.
Black-throated gray warbler	Nt	M	M	
California quail	Nt	M	M	
Hammond's flycatcher	Nt	M	M	
Hermit warbler	Nt	M	M	
Hutton's vireo	Nt	M	M	
Pacific-slope flycatcher	Nt	M	M	
Rufus hummingbird	Nt	M	M	
Vaux's swift	Nt	M	M	
Wrentit	Nt	M	M	

Threatened & Endangered Species: NE = No Effect BE = Beneficial Effect NLAA = May Affect, Not Likely to Adversely Affect LAA = May Affect, Likely to Adversely Affect CHU = Critical Habitat Unit; MA = May Affect	**Sensitive species**: BI = Beneficial Impact NI = No Impact MIIH = May Impact Individuals or Habitat, but will not likely contribute to a trend towards Federal listing or cause a loss of viability to the population or species WIFV = Will Impact Individuals or Habitat with a consequence that the action may contribute to a trend towards Federal listing or cause a loss of viability to the population or species
All other categories of species **Nt**—neutral effect **M—**may affect some individuals or some habitat but effect is minimal **Ng**—negative effect to habitat and species **B**—beneficial effect	

Note: Some species are on more than one list.

Threatened Wildlife Species

Three species listed as threatened under the Endangered Species Act are found on federal lands in the project area: bald eagle, northern spotted owl, and marbled murrelet.

A bald eagle site was identified in 1986 on Lobster Creek near Wilkinson Creek in section 35. This site was not surveyed in 2001, 2002, 2003, or 2004 and is currently considered unoccupied, because no sites have been reported in recent years, even though they are easily observed.

Under Alternatives 2 and 3, the effects determination for bald eagle is May Affect and Likely to Adversely Affect (LAA), because of habitat degradation by hazard-tree felling and by the potential for mortality of mature trees that could be used for anchors during logging operations. There is no critical habitat designated for the bald eagle. There would also be a May Affect but Not Likely to Adversely Affect (NLAA) determination, because there is potential for disturbance of foraging bald eagles.

There are no known occupied spotted owl activity centers in the project area. One activity center, located in 1986, is currently unoccupied by spotted owls. The majority of spotted owl habitat in the project area has not been surveyed; however, this project assumes all suitable habitat is occupied. The southern half of the project area is in a spotted owl Critical Habitat Unit (CHU OR-48). Most units in Camp Creek and all units in Preacher, Jasper, and Chilcotte creeks are in this Critical Habitat Unit.

The effects determination for the northern spotted owl is May Affect and Likely to Adversely Affect (LAA), because of habitat degradation (LAA and NLAA) and disturbance during breeding season. Habitat degradation occurs when a few trees are felled or removed, and habitat removal occurs when canopy cover is reduced below 40 percent for nesting and roosting habitat or below 30 percent for dispersal habitat (USDI 2004b). None of the alternatives would remove any of these habitat types.

Nesting and roosting habitat would be degraded (LAA) by hazard-tree felling (about 15 to 20 mature trees) and by the potential for mortality of mature trees that could be used for guyline anchors during logging operations (about 1 to 8 trees). Although dispersal habitat would be degraded (NLAA) by thinning, dispersal habitat would not be removed, because at least 40 percent of the tree canopy cover would be maintained in thinned stands. The determination for northern spotted owl Critical Habitat is May Affect, because of habitat degradation in CHU OR-48.

About five marbled murrelet occupied sites are known in the project area. The majority of suitable habitat in the project area has not been surveyed; however, this project assumes all suitable habitat is occupied. Most of the project area is in marbled murrelet critical habitat: Critical Habitat Units OR-04-a, OR-04-b, or OR-04-j.

The effects determination for marbled murrelet is May Affect and Likely to Adversely Affect (LAA), because of habitat degradation and disturbance during breeding season. Suitable habitat would be degraded by hazard-tree felling (about 15 to 20 mature trees) and by felling about 1 to 8 trees that would be used as guyline anchors during logging operations. The determination for marbled murrelet critical habitat is May Affect, because of habitat degradation in CHU's OR-04-a, OR-04-b, or OR-04-j.

The Habitat Modification Biological Opinion (BO) for 2005 and 2006 (USDI 2004b, p.141) allocated up to 260 mature trees on the Central Coast Ranger District of the Siuslaw National Forest that could be felled or removed due to hazardous trees or trees used as anchors in logging operations. Felling or removing these trees would degrade bald eagle, northern spotted owl, or marbled murrelet habitat. Alternatives 2 and 3 may fell up to 28 of these mature trees to facilitate worker safety.

Operating seasons are established to control the amount of adverse effect to listed species from disturbance. Seasonal operating restrictions are also needed to reduce the potential for the spread of invasive weeds, and to minimize adverse impacts to fish, water quality, and road surfaces from damage that can occur when wet roads are used during commercial thinning operations.

To help facilitate ecosystem restoration, The USDI Fish and Wildlife Service (FWS) accounted for a certain amount of adverse effect from habitat degradation and disturbance to spotted owls and marbled murrelets on the Siuslaw National Forest (USDI 2004b, p. 113). Adverse effects result from certain actions to these species if they are too close to occupied or potentially suitable habitat and actions occur during critical breeding periods.

The FWS Habitat Modification Biological Opinion (BO) for 2005-2006 allocated up to 1,425 acres of adverse effect from disturbance for commercial thinning in the Lobster project area: 1,325 acres, with beginning date of 8 July and ending date of 28 February; and 100 acres, with beginning date of 6 August and ending date of 28 February. Breeding northern spotted owls may be affected, but are not likely to be adversely affected by up to 1,425 acres of commercial thinning treatments between 8 July and 30

September. Breeding marbled murrelets may be adversely affected by up to 1,425 acres of commercial thinning between 8 July and 15 September.

For bald eagle, spotted owl, critical habitat for spotted owl, marbled murrelet, and critical habitat for the marbled murrelet, the amount and type of potential adverse effects determinations from this project are consistent with the current BO from the FWS (USDI 2004c, p. 142-144, 150). Therefore, this project is not likely to jeopardize the continued existence of these species (USDI 2004c, p. 82, 83).

This project is consistent with this BO, because implementation of the design criteria in Appendix A ensures that no suitable habitat would be removed and potential adverse effects to these species from project-related disturbance or habitat degradation would be within the limits allowed by this BO for the Central Coast Ranger District of the Siuslaw National Forest (USDI 2004c, p. 141-143).

Survey and Manage or Protection Buffer species

All alternatives were evaluated for their effects to survey and manage species following The Record of Decision (ROD) dated January 2001, entitled “Record of Decision and Standards and Guidelines for Amendments to the Survey and Manage, Protection Buffer, and other Mitigation Measure Standards and Guidelines” and includes any amendments or modifications to the 2001 ROD that were in effect as of March 21, 2004.

No species with current Survey and Manage status were identified that could be affected by this project. Analysis identified the Puget Oregonian snail, evening field slug, and red tree vole as currently having Survey and Manage status on the Siuslaw National Forest, but this status only applies to the Hebo Ranger District. The great gray owl also has Survey and Manage status in the Oregon Coast physiographic province; however, this status only applies east of the crest of the Oregon Coast Range (USDI, USDA 2004d, p. 5), and lies outside the project area.

The effects determination for protection-buffer bats (fringed, long-eared, and long-legged myotis; silver-haired, pallid, and Townsend’s big-eared) is minimal (M), because some potential habitat would be removed. Some large snags, which are habitat for these bats, may be felled during treatments under both action alternatives. Other protection-buffer species identified in the Northwest Forest Plan are not expected to occur in the project area. These species are the white-headed and black-backed woodpeckers, pygmy nuthatch, flammulated owl, and Canadian lynx.

Sensitive Species

Under Alternatives 2 and 3, the effects determinations for sensitive species that are likely to occur in the project area are “May Impact Individuals or Habitat, but would not likely contribute to a trend towards Federal listing or cause a loss of viability to the population or species” (MIIH). The determination is MIIH because of potential disturbance to individuals and limited negative effects to habitat from treatments. Negative effects are limited because the scale of impacts is very small compared to amount of habitat available and the scale of the distribution of these species.

The determinations are No Impact (NI) for Sensitive species that are *not* likely to occur in the project area. These species include the Columbia torrent salamander, Aleutian Canada goose, Bufflehead, streaked horned lark, wolverine, and Baird's shrew.

The Pacific fisher is a candidate for listing as a threatened or endangered species in Washington, Oregon, and northern California; (USDI 2004a) and is included on the Region 6 Regional Forester's Sensitive Species List. The Pacific Fisher has not been observed on the Siuslaw National Forest for several years. However, this species could occur in the project area, because existing populations are known in the central to southern Cascade Mountains and southwestern Oregon, including along the Oregon coast, and the Pacific Fisher has the ability to disperse long distances and can occupy large home ranges (USDA 2002a).

Determination of effects from all proposed actions to the Pacific fisher is "May Impact Individuals or Habitat, but Will Not Likely Contribute to a Trend Towards Federal Listing, or Cause a Loss of Viability to the Population or Species" (MIIH). This determination was made because, although both action alternatives would avoid removing suitable habitat (late-successional forest), actions associated with harvesting or smoke from prescribed burning could disturb individuals. Seasonal restrictions for marbled murrelets and northern spotted owls would indirectly benefit fishers, because they could reduce the amount of potential disturbance to fishers.

Management Indicator Species

Management Indicator Species (MIS) species are animals that represent a larger group or guild of species and are used as indicators of habitat conditions. The MIS species on the Siuslaw Forest include certain species as indicators of threatened and endangered species habitat (i.e., Aleutian Canada goose, bald eagle, brown pelican, Oregon Silverspot butterfly, and peregrine falcon), marten for mature or older aged stands, northern spotted owl for old-growth conifer communities, pileated woodpecker for large snags and defective trees, primary cavity nesters (i.e. downy and hairy woodpeckers, red-breasted sapsucker, flicker, and red-breasted nuthatch) for small to medium size dead and defective trees, ruffed grouse for hardwood and deciduous mixed habitats, Roosevelt elk for a mix of forage and cover areas, and western snowy plover for open sand near estuaries.

The effects on the northern spotted owl and bald eagle are addressed under threatened species effects. The effects on the peregrine falcon are addressed under sensitive species effects. The determinations for woodpeckers (pileated, downy, hairy, acorn, northern flicker, red-breasted sapsucker) and red-breasted nutchatch would be minimal under both action alternatives, because although some snag habitat would be removed, adequate amounts of snag habitat would be created or sustained in the watershed to attain habitat productivity goals for woodpeckers. However, the amount of large snags and down wood in the project area would remain well below historic levels.

The determinations for Roosevelt elk and ruffed grouse are beneficial (B) for both action alternatives, because these species benefit from thinning, meadow restoration, and other treatments that increase the amount of grasses, forbs, and deciduous shrubs. In addition, for ruffed grouse, the quality and amount of hardwoods should increase in commercially thinned areas, because existing hardwoods would be released and new hardwoods planted.

The determination for American marten would be minimal (M), because late-successional habitat would not be removed, but disturbance could adversely affect some individuals and canopy cover reduction could reduce habitat quality, until canopy cover increases. However, the scale of impacts is small, compared to the range of this species.

Neotropical Migrant Birds

The effects to neotropical migratory birds are variable depending on the habitat associations of the individual species, but no more than minimal (M) for any species.

It is expected that commercial thinning would remove some snags, resulting in a potential negative effect on cavity nesting birds in certain areas. However, analysis has shown that all alternatives leave or create amounts of dead wood sufficient for the needs of cavity-dependent species.

Overall, potential population numbers for birds that use grass and shrub habitats are expected to increase, which is important for those species dependant on these habitats for local viability. These species include California quail, Rufus hummingbird, and wrentit.

Summary of Effects to Wildlife Habitats and Species Analyzed

Over the long-term, all alternatives are consistent with Forest Service goals for wildlife. However, Alternatives 2 and 3 provide better support than the no-action alternative for recovery of threatened or endangered species, for maintaining species viability, and for providing diverse opportunities for esthetic, consumptive, and scientific uses of wildlife. Alternatives 2 and 3 increase the restoration rate or maintain and restore habitats that are below their natural range of variability in the project area. These habitats (in terrestrial and aquatic areas) are late-successional forest, grass/forb or shrub, and large dead wood.

Alternatives 2 and 3 are designed to maximize long-term benefit and minimize short-term detrimental effects to habitats and species analyzed. Both action alternatives accomplish these goals, primarily through application of the design criteria in appendix A.

Both action alternatives restore similar amounts of late-successional forest, grass, forb, shrub, and large dead wood habitats, although Alternative 2 would have slightly more benefit to these habitats (refer to table 5 for relative differences between Alternative 2 and 3). These habitats, especially late-successional forest, are below their historic abundance, and two animals listed as threatened (northern spotted owl and marbled murrelet) and a number of other species are dependant upon late-successional forest for survival. In addition, maintenance and restoration of grass, forb, and shrub habitats are important for species dependant on these habitats for local viability, including the California quail, Rufus hummingbird, and wrentit.

Both action alternatives would have similar amounts of short-term, adverse effects to habitats and species, because they have similar amounts of treatments. Adverse effects are minor, especially compared to the long-term beneficial effects to species and ecosystem sustainability.

Plantation treatments and associated actions are designed to emulate characteristics of late-successional forest habitat. Treatments attempt to create as many of these characteristics as possible for nearly immediate benefit, and to hasten development of others for anticipated future benefits. Characteristics expected almost immediately after treatments are canopy gaps, under-story development, increased structural and species diversity (especially grasses/forbs, and shrubs), and dead wood. Characteristics expected to develop faster, due to these treatments, include larger patches of contiguous late-successional forest on the landscape, large and giant trees (conifers and hardwoods), large dead wood, large limbs, and large cavities in trees.

Some species that use late-successional forest habitat should benefit from the nearly immediate improvements of within-stand diversity. Species associated with grass/forb or shrub or dead wood habitat should begin benefiting within two to five years after treatments. These species include a number of bird and bat species, chipmunks, mice, and voles. Animals, such as the northern spotted owl, which prey on some of these species, should benefit from the increase of available prey.

Species that depend upon late-successional forest habitat for nesting, such as the northern spotted owl or marbled murrelet, are not expected to have suitable nesting conditions in treated plantations for decades after treatments. However, hastening development of giant trees, large limbs, and large cavities should improve the potential for these rare animals to find suitable nesting structures earlier in treated stands, compared to no treatment (Alternative 1).

Road actions that maintain open roads help provide access for restoration treatments and easy access for people to use wildlife resources. Actions that close roads could limit these benefits; however, the current highest priority restoration treatments would be completed before roads are closed, roads can be reopened when needed in the future, closed roads can be used by people, and remaining open roads would continue to provide access to several drainages in the project area. In addition, road actions that improve water quality, thus the quality of aquatic habitat, would improve viability of aquatic species.

Alternatives 2 and 3 differ mostly in the amount of temporary roads built or existing roads temporarily opened—then closed—to facilitate commercial thinning. Alternative 3 proposes no new temporary roads or temporarily reopening existing roads. However, these roads, as proposed under Alternative 2, would only have minor direct adverse effects to wildlife habitats or species. Therefore, the amount of these roads would have essentially no direct effect on agency goals for wildlife. Indirectly, these roads would benefit wildlife goals, because the major difference between the action alternatives is economics. By using temporary roads, Alternative 2 is able to depend more on skyline harvest systems than Alternative 3, which is less costly than helicopter harvesting. Consequently, Alternative 2 would generate more revenue from the sale of timber, resulting in more funds available for treatments that benefit wildlife, such as dead wood creation, under-burning forests, and improving meadows.

Considering all the agency goals for wildlife, I consider Alternative 2 is better than Alternative 3.

Proposed, Endangered, Threatened and Sensitive Plants (Forest Botanist)

All alternatives were evaluated following Forest Service policy regarding proposed, endangered, threatened, and sensitive (PETS) species (Forest Service Manual 2671, USDA 2005b).

At the time of project initiation, no documented sites of PETS botanical species were known to occur within or adjacent to the project area. A pre-field review determined that there is potential for one vascular plant, two bryophyte, six lichen and ten fungi species to occur. Field surveys designed to detect the presence of these species were conducted in the project area between July 20 and September 20, 2005. The surveys located one site of Methuselah’s beard (*Usnea longissima*), a PETS lichen species. The surveys were not able to determine the presence or absence of the ten fungi species with potential habitat because they do not reliably fruit every year. Therefore, it is assumed that these species are present in the project area.

Plantation treatments and associated actions

The Methuselah’s beard located in the project area is growing on the branches of a big-leaf maple (*Acer macrophyllum*) in a relatively open stand of Douglas-fir (*Pseudotsuga menziesii*). This species is strictly arboreal, growing on the branches of both conifers and hardwoods. Project design criteria (appendix A) retain all hardwood trees and shrubs, so the maple tree hosting the Methuselah’s beard would not be impacted by these actions. Thinning adjacent Douglas-fir trees would open the forest canopy, resulting in increased light at the site. The lichen—thought to have relatively high light requirements—usually occupies the outer-most branches of the tree crown, where light is strongest. Therefore, proposed actions under Alternatives 2 and 3 are not expected to impact the Methuselah’s beard. Alternative 1 would have no impact on this species.

PETS fungi species identified as having potential habitat in the project area are *Cordyceps capitata*, *Cortinarius barlowensis*, *Leucogaster citrinus*, *Phaeocollybia attenuata*, *Phaeocollybia californica*, *Phaeocollybia dissiliens*, *Phaeocollybia piceae*, *Phaeocollybia pseudofestiva*, *Phaeocollybia sipei*, and *Sowerbyella rhenana*. All are associated with conifers, either occurring on the roots as symbiotic mycorhizae or, growing in soil under conifer trees. Threats to these species include the removal of host trees, and soil disturbance and compaction. Prescriptions for stand treatments include leaving an average of 40 to 80 trees per acre after treatments and associated actions are completed. Soil disturbance and compaction would primarily occur on temporary roads under Alternative 2 and on landings under both Alternatives 2 and 3, resulting in a small percentage of the total project area being affected. Therefore, proposed actions under Alternatives 2 and 3 are not expected to impact any of the ten fungi. Alternative 1 would have no impact on these species.

Key and non-key forest road actions

None of the proposed road actions under Alternatives 2 and 3 would impact the lichen or any of the fungi species. Alternative 1 would have no effect on these species.

Stand treatments in Matrix

Because effects in the matrix land allocation are the same as those described for "Plantation treatments and associated actions", none of the proposed stand treatments under Alternatives 2 and 3 would impact the lichen or any of the fungi species. Alternative 1 would have no impact on these species.

Northwest Forest Plan Survey and Manage Botanical Species (Forest Botanist)

All alternatives were evaluated for their effects to survey and manage species following The Record of Decision dated January 2001, entitled "Record of Decision and Standards and Guidelines for Amendments to the Survey and Manage, Protection Buffer, and other Mitigation Measure Standards and Guidelines" and includes any amendments or modifications to the 2001 ROD that were in effect as of March 21, 2004.

At project initiation, a record search did not find documentation of any known survey and manage species sites in or adjacent to the project area. Survey and manage standards and guidelines require that field surveys be conducted for species in Management Categories A and C, if potential habitat exists in or adjacent to the project area and this habitat could be impacted by project actions. Consequently, field surveys were conducted in the project area between July 20 and September 20, 2005 for one vascular plant, two bryophyte and three lichen species. The surveys located two sites of *Pseudocyphellaria perpetua*, a survey and manage Category A lichen (USDA 2005f).

Plantation treatments and associated actions

At both *P. perpetua* sites, the lichen occurs on the branches of a 50-year old Douglas-fir tree. Project actions could impact populations by removing the host tree or by changing the micro-site conditions of light and relative humidity that result from a reduction of tree density. To maintain both populations, project design criteria (appendix A) would retain live trees and exclude equipment within a 100-foot radius around each site large enough to buffer the effects of the adjacent thinning. Therefore, proposed actions under Alternatives 2 and 3 are not expected to impact *P. perpetua*. Alternative 1 would have no impact on this species.

Key and non-key forest road actions

None of the proposed road actions under Alternatives 2 and 3 would impact the lichen. Alternative 1 would have no effect on this species.

Stand treatments in Matrix

Under Alternatives 2 and 3, none of the proposed stand treatments in the matrix land allocation would impact the lichen. Alternative 1 would have no effect on this species.

Noxious and Undesirable Weeds (Forest Botanist)

Several populations of noxious and undesirable weeds exist in the project area. The desired condition is to control weeds at existing sites, with the goal of eradication, while minimizing conditions that favor weed introduction, establishment, and spread.

Plantation treatments and associated actions

Ground-disturbing actions, that result in exposed mineral soil on sites, with moderate to full sunlight exposure, greatly increase the potential for noxious or undesirable weed colonization and establishment. Ground-disturbing actions, unique to Alternative 2, include building new temporary roads and temporarily reopening roads. Ground-disturbing actions, which occur under Alternatives 2 and 3, include removing and depositing sidecast waste material, removing culverts, creating landings, and prescribing stands to be thinned to an average density of 40 to 80 trees per acre. These actions increase the potential for weed colonization and establishment of disturbed sites. Stands accessed by road systems that support high-risk weed populations (maps 2 and 3) are at greater risk of weed colonization and establishment.

The project area was surveyed in the summer of 2005 for noxious weeds. The Forest noxious weed coordinator evaluated the potential for weed colonization of disturbed sites, based on actions proposed by the alternatives. It was determined that Alternatives 2 and 3 have a weed-risk rating of high for introducing and spreading weeds. Weed species established in the project area that are classified as noxious and require remedial action to prevent further spread include false brome (*Brachypodium sylvaticum*), English ivy (*Hedera helix*) and quackgrass (*Agropyron repens*). These species are considered highly invasive and are still limited in the project area. False brome and English ivy have the potential to invade relatively undisturbed forest habitat.

Other noxious weed species, that are established and expected to colonize at least some of the affected areas, include Scot's broom (*Cytisus scoparius*), Himalayan blackberry (*Rubus disclolor*), bull thistle (*Circium vulgare*), tansy ragwort (*Senecio jacobaea*), and St. John’s-wort (*Hypericum perforatum*).

Twenty-nine (29) other undesirable weed species, not classified as noxious, are established in the project area. Commonly found along roads, in areas of soil disturbance, and in other waste areas, it is anticipated that these species will continue to persist and they are expected to colonize at least some of the affected areas.

Preventive measures identified in appendix A are expected to provide adequate resistance to the introduction of noxious weeds not currently established in the project area. These measures will also reduce the risk of spread of established weed species beyond their current boundaries. Remedial treatment, in addition to preventive measures, would be prescribed for high-risk stands that have infestations of false brome, English ivy, or quackgrass in, adjacent to, or on roads accessing the stands. The KV plan includes high-priority funding for controlling the spread of weeds in these areas because noxious weed control is deemed to be mitigation. An "early treatment" vegetation management strategy will be implemented in high-risk stands, using manual and mechanical treatment methods. The objective of these treatments is to try and deplete the amount of weed seed in disturbed sites, reduce the area occupied by the weed, and establish competitive desirable vegetation prior to project implementation.

In summary, by following preventive measures in appendix A and completing remedial treatments, the risk of noxious weed infestation on disturbed areas under Alternatives 2 and 3 should be reduced to acceptable levels over most of the project area. By monitoring the effectiveness of preventive measures and including additional weed treatments where warranted, weed infestation levels are not expected to exceed current levels and may likely be reduced below current levels in the project area in the foreseeable future. Alternative 1 is expected to maintain current weed infestation levels in the foreseeable future.

Key and non-key forest road actions

Culvert removal (road decommissioning), culvert replacement (road maintenance), and other actions associated with roadwork, would increase disturbed areas that can be colonized by noxious and undesirable weeds. Preventive measures listed in appendix A, remedial treatments of existing sites and post-project monitoring of disturbed sites will reduce the risk of introducing or spreading weeds. Decommissioned roads eliminate the frequent ground-disturbing actions associated with road maintenance operations and also eliminate the potential for weed-seed vectors associated with use of heavy equipment and vehicle traffic. Alternative 1 would maintain current infestation levels in the foreseeable future and would not eliminate these risks.

Stand treatments in Matrix

Alternatives 2 and 3 would thin and harvest stands in the matrix land allocation. Effects are similar to that in other land allocations where stand treatments would be conducted. Preventive measures listed in appendix A, remedial treatments of existing sites, and post-project monitoring of disturbed areas would reduce the risk of introducing or spreading weeds.

Soils and Water Quality (District Hydrologist)

Sediment Production

Sediment is fine and coarse geologic material as well as large wood added to streams through processes such as windthrow, mass wasting, surface soil erosion, and stream bank erosion. The Northwest Forest Plan Aquatic Conservation Strategy objectives include “5. Maintain and restore the sediment regime under which aquatic ecosystems evolved. Elements of the sediment regime include timing, volume, rate, character of the sediment, storage and transport."

The desired future condition for sediment in the project area includes large trees in sediment source areas, such as unstable slopes and riparian areas; minimal chronic sources of fine sediments that increase turbidity of streams, such as stream-adjacent roads, road-stream crossings, and bare soil next to streams; few barriers to sediment movement at road-stream crossings due to culverts; and low risk of mass wasting from roads, from unstable sidecast fills, and fills over culverts (USDA 1997).

The Lobster-Five Rivers Watershed Analysis (USDA 1997), stream surveys, and field reviews indicate that sand and silt in streams may be slightly elevated from historic conditions in Lobster watershed. No quantitative data exist on turbidity for streams in the project area. Large trees on unstable slopes and riparian areas provide large wood to streams. Some source areas in the Lobster planning area were previously logged, reducing the size and effectiveness of wood delivered to streams.

The watershed analysis identified the existing road system as the primary risk for sedimentation of streams. Unpaved stream-adjacent roads, such as the roads along Preacher and Elk Creeks, are chronic sources of fine sediment. Mid-slope roads, such as the road nearest Bear Creek, often contain plugged or partially plugged culverts, culverts that are too small to pass sediment and wood, and failing sidecast material—all of which are potential sources of fine sediment.

Plantation treatments and associated actions

Of the actions associated with commercial thinning under Alternatives 2 and 3, yarding and transporting trees off National Forest System lands can directly produce fine sediment that could enter streams. Soil displaced outside riparian areas due to yarding is not connected to streams, and documented hydrologist observations from past, similar actions indicate that fine sediment generated by yarding is unlikely to enter streams or is not measurable. Thus, Alternatives 2 and 3 are not expected to generate measurable amounts of fine sediment that could enter streams as a result of skyline yarding. Observations of helicopter yarding indicate even less soil displacement than skyline yarding. Therefore, Alternative 3, with its greater reliance on helicopter yarding, would have even less potential for fine sediments entering streams than Alternative 2.

Alternative 2 proposes to temporarily reopen 7.7 miles of system and non-system roads and build 1.4 miles of new temporary roads, followed by road closure. Several roads proposed for reopening were reviewed by members of the planning team to determine their suitability for use and opportunities for removing chronic sources of sediment. New temporary roads would be limited to stable areas, such as ridgetops or flat areas, with no stream crossings. None of the roads proposed for reopening cross streams. Thus, these roads have no mechanism for introducing sediment to streams.

About 240 cubic yards of unstable sidecast material adjacent to streams on two roads were identified in the planning area. Should this material fail, up to 40 cubic yards of fine sediment could enter Elk Creek and 200 cubic yards of fine sediment could enter a tributary of Preacher Creek over a span of several years or in a single pulse, affecting water quality. Alternative 2 would remove this material and eliminate the potential for future pulses of fine sediment to enter streams from these sources. Although Alternatives 1 and 3 would not temporarily reopen roads or build new temporary roads, the sites containing unstable sidecast material would remain on the landscape.

Alternatives 2 and 3 propose to use existing system roads, with most roads to be waterbarred and closed following harvest operations (maps 2 and 3). Waterbarring and closing the roads after use would reduce the likelihood that roads would be a chronic source of sediment. Use of system roads during the wet season, especially from log hauling, can introduce fine sediment to streams at road-stream crossings. Roads would be monitored during wet-season log hauling to determine if measures are needed to reduce sedimentation of streams (appendix A).

Under Alternatives 2 and 3, creating snags in natural stands, creating coarse wood in plantations, and planting trees would result in minor, localized displacement of soil in areas not connected to streams. No measurable effects to sediment production are expected from these actions.

Alternatives 2 and 3 propose to create grass, forb, and shrub habitats in some commercially thinned stands by burning and seeding designated areas. Project design criteria (appendix A) would include no-burn buffers and other mitigating factors to protect water quality. Therefore, any turbidity increases from burning that may affect water quality are expected to be minor and short term.

Alternatives 2 and 3 would implement non-commercial thinning. This action would have minor, localized effects on soil disturbance and is not expected to cause fine sediment to enter streams. Because thinning these areas would speed the growth of residual trees, the development of future large wood that could enter streams would occur more quickly than if left untreated.

Alternatives 2 and 3 propose to maintain existing meadows by burning or mowing to maintain grasses and forbs and control invasive weeds, and to create grass, forb, and shrub habitat in some commercially thinned plantations through burning. Many of the meadows are near streams, separated by a buffer of trees. Because mowing generally does not disturb soil, and burning does not consume all vegetation (re-growth is usually rapid) and would avoid areas near streams, no measurable amount of sediment is expected to enter streams from maintaining meadows or creating grass, forb, and shrub habitat.

Key and non-key forest road actions

Several road culverts are undersized (not capable of passing a 100-year flow), some are deteriorating and at risk of collapsing and obstructing water flow, and some road sections lack an adequate number of ditch-relief culverts, increasing the potential for fine sediment to enter streams. These conditions result in adverse effects to water quality through chronic and pulse sedimentation of streams. In addition, some roads may also reduce the quantity and quality of coarse sediment introduced to streams by preventing the transport of wood and coarse sediment at culvert locations.

Alternative 1 would maintain the existing road drainage network and would not add pulses of fine sediment to streams from actions such as culvert removal. Chronic sources of fine sediment would be maintained. No management actions to remove impediments to the natural sediment production processes would occur. Unstable sidecast material associated with roads would eventually detach from the hill slope and run down the slope to a stable location. This material may or may not enter streams, depending on distance to streams, amount of material released, and topography and vegetation between the sidecast material and streams. No trees, which are a potential source of large wood to streams, would be planted in the Preacher Creek riparian area.

Road decommissioning, as proposed under Alternatives 2 and 3, is designed to reduce runoff and fine sediment production from road surfaces, remove barriers (culverts) to allow natural movement of large wood and coarse sediment, and allow vegetation to grow on road surfaces. These actions are expected to benefit water quality in the long term. Although some minor, short-term sediment may be produced where culvert fills are removed, these effects would be minimized by placing woody debris in the streams and on excavated slopes during the project. Native vegetation would further stabilize excavated sites by colonizing exposed slopes in two years. Culvert removal serves to eliminate the potential for future major pulses of sediment due to culvert failure.

Under Alternatives 2 and 3, road repair and maintenance would minimize sediment production from roads by improving road surface drainage and preventing mass wasting from roads. Alternatives 2 and 3 would replace about 25 stream-channel culverts, replace and/or add about 180 ditch-relief culverts, remove about 16 stream-channel culverts during road decommissioning, and remove or replace about eight culverts on a road that parallels Elk Creek and accesses private land. Actions designed to replace and remove culverts would benefit water quality in the long term as road drainages improve and the potential for culvert failure is reduced. Adding ditch-relief culverts would more efficiently remove surface water from the road system, reducing the road drainage network and allowing sediment to filter onto stable, vegetated slopes.

Based on the design criteria in appendix A, minor, short-term pulses of fine sediment (with associated turbidity) may be produced from removing or replacing stream culverts (generally larger ones), adding ditch relief culverts, or cleaning culvert inlets. These actions help prevent plugging and failure of the stream culverts, which can result in substantial adverse effects to streams.

Thinning and salvage logging adjacent to key forest roads include falling young trees adjacent to roads, with occasional yarding of trees to roads (usually less than 50 feet in distance). Yarding can displace soil and has the potential to introduce sediment to streams by way of drainage ditches flowing into streams. Any sediment introduced in this way would be a small pulse. Design criteria, such as trapping sediment before it enters streams, would cause sediment entering streams to be minor. Vegetation would occupy the site within two years, resulting in short-term effects. Thus, the adverse effects on sediment production from Alternatives 2 and 3 are minor and short-term.

Stand treatments in Matrix

Stand treatments in the matrix land allocation, as proposed under Alternatives 2 and 3 are basically on ridge systems, so the potential for sediment to enter streams is extremely low. Therefore, these stand treatments are not expected to impact streams with sediment.

In summary, based on the project design criteria, the effects of Alternatives 2 and 3 include minor, short-term increases in fine sediment production due to plantation treatments and associated actions, key and non-key forest road actions, and stand treatments in matrix. Alternative 2 would remove unstable sidecast material from roads that would be temporarily reopened for use, preventing the potential for pulses of sediment over the long term. Because Alternatives 1 and 3 would not reopen and use these roads, sites with unstable sidecast would remain. However, removing the vegetation in these roads would largely offset the benefits of removing the sidecast. In the long term, Alternatives 2 and 3 would move the existing sediment regime—timing, volume, rate, character, storage, and transportation of sediment—to one that is influenced more by natural processes.

Soil Productivity

The desired future condition for the planning area is to improve soil productivity (FSM 2550.3) or prevent future loss of soil productivity through erosion (USDA 1990). Actions that prevent erosion, such as decommissioning roads to prevent further loss of soil productivity and allow natural processes to function, improves soil productivity.

Soil productivity in the planning area has been affected by a number of human actions, including compaction and soil displacement from road construction, timber harvest, and homesteading; loss of organic material due to soil displacement, loss of down wood sources, or broadcast burning of clear-cut units; and erosion due to road or landing drainage problems. No indications of heavily burned soils were observed in the planning area.

Siuslaw National Forest Plan standards and guidelines state: "Do not allow the total acreage of all detrimental soil conditions to exceed 15% of the total National Forest Land within each harvest unit, excluding roads and landings" (USDA 1990; D-11). Effects to soil productivity were analyzed using Pacific Northwest Regional advice contained in "Preparing Soil Resource Analyses for Inclusion in NEPA Documents" (USDA 2002d).

Plantation treatments and associated actions

Commercial thinning can displace soil during skyline and helicopter yarding. Field observations of numerous thinning units indicates that skyline yarding displaces small areas of soil (about 2 feet wide, up to 20 feet long), especially near landings. Log suspension requirements (appendix A) prevent soil displacement. Compaction is restricted to roads and yarding corridors, and compaction in yarding corridors is minimized by yarding trees with limbs attached. Skyline yarding displaces and compacts more soil than helicopter logging, which lifts the trees rather than dragging them over soil and branches.

Field observations of previously harvested thinning units indicate that effects to soil productivity are much less than 15 percent of a unit, regardless of yarding method. Therefore, it is expected that all commercially thinned stands under Alternatives 2 and 3 would be under the 15 percent threshold. Through its greater dependence on helicopter yarding, Alternative 3 would have less impact on soil displacement and compaction than Alternative 2.

The no-action alternative does not remove any organic material, or displace or compact soil, thus avoiding adverse effects on soil productivity. Although Alternatives 2 and 3 remove trees from commercially thinned stands, some organic material (limbs and tops of trees) is left on the ground as a result of tree felling and either yarding method. Remaining trees and more prolific development of understory vegetation would serve to maintain sufficient sources of organic material for long-term soil productivity.

Non-commercial thinning would enhance soil productivity, since the felled trees would not be removed.

Under Alternative 2, new temporary roads would compact about 2.6 acres of soil. Temporarily reopening roads would either restart the soil recovery process or create new areas of compaction due to minor road realignment to avoid problem areas. Most new temporary and reopened roads would be used during the dry season, reducing the depth and extent of compaction. Alternative 2 would remove some culverts and unstable sidecast material, reducing sources of erosion. By not using temporary roads, the no-action alternative and Alternative 3 avoid these adverse effects.

Alternatives 2 and 3 would create down wood and snags in plantations and snags in natural stands. These actions would not compact or displace soil, and would increase the amount of organic material on the soil surface, either immediately or in the future, when snags fall. The no-action alternative would not create these benefits.

Planting trees in commercially thinned plantations and riparian areas displaces soil at the site by scalping the site to remove competing vegetation and digging a hole for the tree. These small sites are typically about 2 feet in diameter, resulting in minor and short-term adverse effects to soil productivity. Surviving planted trees provide a long-term source of high quality organic material. The no-action alternative would avoid both the adverse and beneficial effects of this action.

Alternatives 2 and 3 would maintain existing meadows by burning and mowing, and would create grass, forb, and shrub habitats through burning in some commercially thinned stands. Burning would be prescribed to avoid heat that could damage soil. Mowing involves equipment that could create some minor soil compaction and displacement. The meadows have been previously mowed, so impact from compaction will not be substantially increased by this action. The no-action alternative would maintain the existing conditions in meadows, avoiding soil compaction and displacement.

Key and non-key forest road actions

Under Alternatives 2 and 3, decommissioning roads serves to improve soil productivity. Traffic-caused erosion from roads would be eliminated and natural processes, such as growth of vegetation, would restore soil productivity over time. Fill removal eliminates the potential for mass wasting due to fill failure, preventing erosion of productive soils. The no-action alternative would maintain the existing condition, raising the risk of mass wasting due to fill failure.

Alternatives 2 and 3 would repair and maintain forest roads, substantially reducing the potential for mass wasting and erosion. Thinning and salvaging adjacent to forest roads can displace soil during yarding, but this generally occurs on previously disturbed ground. The no-action alternative maintains existing road conditions, which result in periodic mass wasting and erosion.

Timber harvest and early-seral creation actions in Matrix

Commercially thinning plantations, as proposed under Alternatives 2 and 3, would have minor, short-term effects on soil productivity because either existing landings and roads would be used, or use of most new landings and temporary roads would be limited to the dry season.

In summary, based on the design criteria, Alternative 2 would create minor adverse impacts to soil productivity due to yarding and temporary road use. Under Alternatives 2 and 3, decommissioning roads would improve soil productivity in the long term, and repairing and maintaining forest roads would reduce the potential for adverse effects. Minor adverse effects would occur from yarding, tree planting, and meadow maintenance under Alternatives 2 and 3. Non-commercial thinning, as proposed by Alternatives 2 and 3, would benefit soil productivity.

Water Quality—Temperature

The desired future condition for the planning area is to de-list any streams that are listed as water quality limited for summer stream temperature by the Oregon Department of Environmental Quality under the Clean Water Act (DEQ 2002). All streams should produce clean, cool water consistent with their natural thermal potential (OAR 340-041-0028).

The Lobster planning area includes a number of streams listed as water quality limited for summer stream temperature. These include Camp Creek, Little Lobster Creek, Phillips Creek, Preacher Creek, and South Fork Lobster Creek. The Lobster Creek Water Quality Restoration Plan (USDA 2004) outlines the many variables (topographic and vegetative shade, air temperature, flow, channel morphology, groundwater inflows, geology, etc.) that interact to determine stream temperatures. The Plan suggests that summer stream temperatures can be reduced by riparian planting (improves stream shade) and placing large wood in streams (increases storage of channel sediment and ground water).

Riparian areas are key to maintaining cool summer stream temperatures, since riparian areas provide shade. The width of riparian areas needed to provide shade varies depending on stream size, aspect, and topography, but 12 to 60 feet is generally needed to provide primary shade to streams (USDA, USDI 2003).

Plantation treatments and associated actions

Thinning in riparian areas and yarding corridors have the potential to remove trees that provide shade to perennial streams and affect stream temperature. Most perennial streams adjacent to thinning units are very narrow (1 to 3 feet wide), with many of them shaded by topography and dense brush. Almost all units (74 of 77 units) are located more than 80 feet away from 303(d) listed streams. The three units (502184, 502217, and 502231) will thin a total of about 0.5 acres (225 feet of stream length) within 80 feet of 303(d) listed streams.

Beschta et al. (1987) stated that buffer widths of 98 feet (adjacent to clearcuts) generally provide the same level of shading as that of an old-growth stand and they presented data showing that a no-harvest buffer of about 30 feet in width can provide similar shading as a 145 ft larger buffer. More specifically, in western Oregon, Brazier & Brown (1973) found that the maximum shading ability of the average buffer strip (adjacent to clearcuts) was reached within a width of 80 feet, and 90 percent of the maximum was reached in 55 feet. In the western Oregon Cascades, Steinblums (1978) found that an 85 feet buffer (adjacent to clearcuts) shades a stream as well as an undisturbed canopy, and 75percent of the undisturbed canopy shading can be achieved with a 52-foot buffer.

Buffer width by itself is not a good predictor of shading, without considering adjacent management activities (i.e. clearcut versus thinning), vegetation height (250 feet versus 80 feet) and density, understory vegetation, stream width and orientation, and topographic features (Brazier and Brown 1973, Steinblums 1978, Beschta et al. 1987, Spence et al. 1996). Many researchers suggest using variable width buffers, like that planned for the Project, consider these factors in buffer layout (FEMAT 1993; Spence et al. 1996; IMST 1999). Zwieniecki and Newton (1999) found that 80 percent of existing shade was maintained adjacent to clearcut units, with no-harvest buffers of less than 33 feet on 14 forested streams in western Oregon.

Alternative 1 would maintain existing riparian and stream channel conditions. Thus, no effect on stream temperature would be expected in the short term. In the long term, summer stream temperatures on most Forest Service lands are expected to decrease due to: 1), increasing tree height and the resulting increase in shade, particularly adjacent to larger, wider stream reaches; and 2), increasing stream complexity from periodic tree fall that would increase storage of ground water.

Alternatives 2 and 3 would also maintain existing stream temperatures in and adjacent to stands that would be commercially thinned. Most stream shading would be maintained because the first two rows of conifers within 100 feet of perennial streams would be part of no-cut, stream-protection buffers, and harvest units would maintain about 44 to 70 percent of the canopy cover adjacent to these buffers. Measurements of similarly designed commercial thinning harvest on the Siuslaw National Forest has found that the first two rows of conifers above perennial streams and adjacent-thinned conifers provide about 80 percent canopy cover over streams. Before and after monitoring of stream temperature from two sites in the Big Blue Project in the Cape Creek watershed (USDA 1996)—which used similar design criteria as the Lobster Project—has found no increase in stream temperature after harvest.

Alternatives 2 and 3 would thin about six percent of the riparian vegetation adjacent to perennial streams in the planning area to within 30 feet of streams. Because thinning would be spread out over numerous, widely dispersed stream reaches, thinned areas would average less than two acres per unit, and thinning would occur over a 10 year period, no measurable effects to stream temperature are expected.

The harvest plan under Alternatives 2 and 3 emphasizes yarding logs away from stream buffers, not through them. Where it is necessary to yard through buffers, the corridors would be limited to 10 to 20 ft wide and no more than 20 percent of the canopy would be removed in a given 1,000-foot reach of stream. These design criteria would prevent increases in stream temperature in and downstream of these sites.

Under Alternative 2, temporarily reopening some roads and removing some culverts and unstable sidecast from these roads would remove some trees near streams. Because roads are generally less than 20 feet wide, few trees would be removed, with little effect on stream shading. In addition, trees retained after thinning would ameliorate loss of shade as crowns close. Therefore, no measurable increases in stream temperature are expected from these actions. Alternatives 1 and 3 would not temporarily reopen roads.

About 212 acres of non-commercial thinning would be implemented under Alternatives 2 and 3. Trees felled in riparian areas, under some circumstances, would allow a minor increase solar radiation striking the stream surface, which is not likely to measurably increase stream temperatures. Crowns of residual trees would recover most lost shade in less than 10 years. Non-commercial thinning would enhance the growth and species diversity of residual trees in riparian areas, improving shade over the long term.

Under Alternatives 2 and 3, creating down wood and snags in plantations, creating snags in natural stands, and planting trees in commercially thinned plantations and riparian areas may also create small breaks in tree canopies near streams, potentially increasing amount of solar radiation on stream surfaces. These increases would be widely spaced and small in size. Thus, no measurable increases in stream temperatures are expected from these actions. Alternative 1 would not implement these actions, avoiding these effects.

Under Alternatives 2 and 3, existing meadows would be maintained, with no reductions to stream shade where meadows are in close proximity to streams. Maintaining the meadows may preclude creating more stream shade, except for a five-acre area adjacent to Preacher Creek, where riparian planting is planned. Thirty feet or more of trees are currently growing in riparian areas between maintained meadows and streams, providing shade and a source of large woody debris. Alternative 1 would permit trees to grow in meadows, increasing shade and the source of large woody debris over the long term, though this increase would likely be slowed by blackberries or other invasive shrubs.

Key and non-key forest road actions

Under Alternatives 2 and 3, decommissioning roads, removing fill, and repairing and maintaining forest roads may remove trees adjacent to streams, particularly at road-stream crossings. Because the number of trees that would be removed at each site would be small and residual trees would still provide shade, temporary increases in solar radiation to streams from these actions are not expected to measurably increase stream temperatures. These actions would also allow trees to grow at road-stream crossings and on decommissioned valley-bottom roads, improving stream shade in the long term. Alternative 1 avoids these short-term effects, but does not include the long-term benefits.

Under Alternatives 2 and 3, thinning and salvaging trees adjacent to forest roads can create small openings in the canopy in riparian areas at stream crossings. These openings are short term, because remaining tree crowns would grow, closing the small openings in a few years. Therefore, no measurable increases in stream temperatures are expected from these actions. Alternative 1 would maintain existing vegetation conditions adjacent to forest roads, with no effects on stream shade.

Stand treatments in Matrix

Stand treatments in the matrix land allocation would not affect stream shade because of the distance between treatment sites and streams. Consequently, none of the stand treatments proposed by Alternatives 2 and 3 would affect stream temperature. Alternative 1 would maintain existing stand conditions, with no effect on stream temperature.

In summary, Alternative 1 would maintain existing shade and stream temperatures, but would not improve stream shade in the long term. Alternatives 2 and 3 would create a minor, temporary reduction of canopy shading and increase solar radiation in the short term, but no measurable increases in stream temperatures are expected. Alternatives 2 and 3 would improve stream shade in the long term.

Aquatic Habitat and Species (District Fish Biologist)

The effects to fish species and their habitat are based primarily on the information contained in the coho salmon biological evaluation for this project (USDA 2005a) and the project design criteria (appendix A). The effects to the Regional Forester's sensitive species are described in this section. Although the coho biological evaluation describes effects to coho, the effects are similar for all other salmonid species, considering they occupy identical habitat for most of their distribution.

Plantation Treatments and Associated Actions

Stream temperature

The desired condition for stream temperature in the planning area is to reduce maximum summer stream temperatures that are above preferred temperatures for salmonids, where ecologically feasible. Preferred stream temperatures for salmonids range from the mid- to upper 50's Fahrenheit (DEQ 1995).

Currently, there are four streams (Lobster, Phillips, Camp and Preacher Creeks) with maximum summer stream temperatures that range from 68^{o}F to 72^{o}F. These warm stream temperatures reduce the availability of suitable habitat for salmonids, can alter species composition to favor warm-water species (e.g., dace) at the expense of cold-water species such as salmonids, and can reduce salmonid growth and survival (DEQ 1995). Salmonids in stream reaches, where temperatures exceed the upper 60's^{o} Fahrenheit, periodically migrate to areas that contain colder water, such as tributaries, deep pools, areas downstream of sediment accumulations, or areas of ground-water intrusion (Neilsen et al. 1994, DEQ 1995, Ebersole et al. 2003). Only three stands (502184, 502217, and 502231) are located within 80 feet of 303(d) listed streams. About 0.5 total acres of these stands would be thinned within 80 feet of listed streams, affecting a total stream length of about 225 feet.

Alternative 1 would maintain existing stream temperatures in the short term. Thus, no effects on salmonids and other aquatic species would be expected. In the long term, summer stream temperatures on Forest Service lands would be expected to decrease. Suitable habitat for salmonids in summer would be expected to expand downstream and in cold water pockets, particularly near tributary junctions.

Based on the project design criteria (appendix A) that minimizes impacts to stream shading, and type and location of actions proposed, none of the plantation treatments and associated actions proposed by Alternatives 2 and 3 are expected to measurably affect existing stream temperatures in the short term. In the long term, stream shading is expected to improve in affected areas as tree crowns grow closed and the shrub layer adjacent to streams respond to increased light.

Large wood production

The desired future condition for aquatic habitat in the planning area would include an abundance of large-sized (at least 24 inches in diameter and at least 200 feet in height) conifer in riparian areas, and an abundance of down wood on floodplains and in stream channels.

Large wood benefits salmonids by creating deep pools for cool-water refugia and rearing habitat in the summer; providing slack-water refugia in stream channels and on floodplains during winter high flows for fish and other aquatic species; and by collecting and storing nutrients and sediment, including gravel required for spawning habitat.

Properly functioning streams contain at least 32 (OWEB 1999) to 80 (USDC 1996, PFMC 1999) pieces of large wood (greater than 24 inches in diameter) per mile. Stream surveys in the Lobster Creek watershed found that large wood averaged less than 10 pieces per mile for most streams. Past clear-cut harvesting has replaced large-diameter trees on about 7,000 acres in the planning area with small-diameter trees, such as those proposed for thinning under Alternatives 2 and 3 (USDA 1997). This conversion to smaller trees has substantially reduced the availability of large-diameter trees adjacent to stream channels. This has contributed to the low abundance of large wood pieces in stream channels and on floodplains in the Lobster area.

Alternative 1 would maintain existing dense conifer in plantations. The conifer would be left to develop at a natural rate. Eventually, large trees would develop in these areas, but it would take about 50 years longer to obtain an average stand diameter of 24 inches DBH, compared to thinned plantations. This alternative would extend the duration of low abundance of large wood (greater than 24 inches DBH) in streams and floodplains, compared to Alternatives 2 and 3.

Commercial and non-commercial thinning, as proposed under Alternatives 2 and 3 would result in trees obtaining 24-inch diameters about 50 years sooner in riparian areas, compared to no thinning. Most existing trees that have the potential to be recruited to fish-bearing stream channels and floodplains would be maintained with no-cut buffers. These buffers would be a minimum of 30 feet on each side of the stream and include at least the first two rows of conifer on the streamside edge of each thinning unit (appendix A). Additional trees that could enter streams include the trees left after thinning the stands.

Thinning would affect only about one percent of the area within 80 feet of salmonid habitat in the planning area. The remaining 99 percent of un-treated salmonid riparian areas and residual trees in thinned stands would maintain small trees (less than 24 inches DBH) near streams in the short and long term under Alternatives 2 and 3. Therefore, Alternatives 2 and 3 are not expected to substantially reduce small wood recruitment to aquatic habitat. In the long term, large wood would increase more rapidly after thinning, moving aquatic habitat towards the desired condition sooner than with no plantation treatments, and improving salmonid habitat in the long term.

Key and Non-key Forest Road Actions

Sediment

Alternative 1 would maintain the existing road drainage network in the planning area. Existing conditions chronically add fine sediment to streams, with periodic pulses of sediment due largely to road culvert and sidecast failure. These conditions affect the timing, type, and quantity of sediment that occurs in the planning area by accelerating entry of fine sediment into streams above natural levels. Too much fine sediment, deposited in a constricted time frame, can reduce survival of fish eggs and fry, reduce aquatic invertebrate abundance and diversity that may affect fish forage, and fill pools needed for juvenile rearing and adult holding habitat (Naiman and Bilby 1998).

Under Alternatives 2 and 3, culverts would be removed or replaced to address the existing drainage problems in the planning area. Removing or replacing culverts on perennial streams have the potential to increase turbidity (fine sediment) during implementation in the local area in the short term. Most perennial streams affected by culvert work have very small drainage areas and are several hundred feet from salmonid habitat. Observations of this type of culvert work on the Siuslaw National Forest indicate that turbidity is rarely transmitted more than a few hundred feet downstream. Thus, these actions are unlikely to adversely affect salmonid habitat.

A few minor, short-term turbidity pulses are expected in salmonid habitat at three culvert-replacement sites and one culvert-removal site. Three culverts are in salmonid habitat—two on two different unnamed tributaries to Preacher Creek and one unnamed tributary to Crooked Creek—and the other culvert is on the western end of Forest Service road 3412, a few hundred feet from salmonid habitat in the Five Rivers watershed. Turbidity increases from these four sites may be large enough to temporarily redistribute salmonids for a few hundred feet downstream, as they either avoid the increase or move into it to feed on drifting invertebrates. Salmonids would resume a more natural distribution as turbidity decreases. Based on monitoring of similar projects on the Siuslaw National Forest, turbidity increases would be largest at the work site, last for a few minutes, and quickly decrease in magnitude as it moves downstream. Therefore, effects to fish-rearing habitat and fish distribution at these sites would be minor and short-term.

Prior to implementing work at two culvert-replacement sites in salmonid habitat, fish and other aquatic species would be removed and excluded from the sites and placed in adjacent areas upstream and downstream of the work sites. Devices would be installed upstream and downstream of the sites primarily to prevent fish from re-entering the work areas until culvert installation is completed. Handling of aquatic species may result in physiological stress, scale removal (fish), increased risk of secondary infection, and other miscellaneous injury during capture. Captured individuals released into adjacent habitats may temporarily overcrowd other fish in these areas, until the construction barriers are removed and the fish are allowed to redistribute into the construction site.

Actions designed to replace and remove culverts would improve salmonid spawning and rearing habitat in the long term as road drainages improve and the potential for culvert failure is reduced. Adding ditch-relief culverts would more efficiently remove surface water from the road system, reducing the road drainage network and allowing sediment to filter onto stable, vegetated slopes.

Large wood

Alternative 1 would maintain wood recruitment sources near all culverts since no culverts would be replaced or removed.

Under Alternatives 2 and 3, replacing or removing 24 culverts (11 in Lower Lobster, 9 in Preacher, 2 in Five Rivers, 1 in Bear, and 1 in Alsea watersheds**)** would result in very minor reductions in the number of trees available for recruitment to streams. The very small areas of fish habitat affected, the widely dispersed geographic distribution of the effects, and the unnaturally high abundance of similar-sized trees (as those being removed) currently in riparian areas would maintain abundant small trees adjacent to streams, providing future sources of wood in the short and long term.

Physical barriers

The desired future condition would not contain any human-caused barriers, including road culverts, to migration of fish and other aquatic organisms in the planning area. Currently, barriers to upstream fish migration are located in the Preacher, Lower Lobster, and Lower Middle Lobster watersheds.

Alternative 1 would maintain three existing barriers to upstream fish passage. These barriers affect about 1.3 miles of coho, steelhead, and cutthroat habitat.

Alternative 2 and 3 would remove or replace the three fish passage barriers, allowing fish to migrate upstream. Barriers caused by two culverts in tributaries to Preacher Creek would be replaced, while another barrier caused by a culvert on a tributary to Crooked Creek would be removed during road decommissioning. These actions would benefit coho, steelhead, and cutthroat in the long term by making about 1.3 miles of additional spawning and rearing habitat available.

As much as 50 to 100 cubic yards of graded streambed-simulation rock may need to be added to the two new culverts in tributaries to Preacher Creek and to areas immediately downstream from them. This rock would create a stable gradient for fish passage through each culvert. Rock input into salmonid habitat would kill small numbers of salmonid forage species, aquatic invertebrates, and reduce the availability of these species where the rock is placed (about 200 feet per site). This would likely reduce the abundance of salmonids rearing in these areas until aquatic invertebrates re-colonize affected sites in a few months, following the installations. Therefore, impacts to affected species are expected to be minor and short-term.

Stand Treatments in Matrix

Alternative 1 would have no effect on aquatic species or their habitat because no treatments in this land allocation would be implemented. Actions proposed by Alternatives 2 and 3 would be over 500 feet from fish habitat and over 250 feet from any stream channel. Therefore, stand treatments in this land allocation are not expected to measurably impact aquatic species.

Sensitive Species

The project has been designed to minimize adverse effects to sensitive fish species, including Oregon coast coho and chinook salmon, Pacific coast chum salmon, Oregon coast steelhead and coastal cutthroat trout, and Umpqua dace. Pacific coast chum salmon and Umpqua dace are not known to occur in the project area. Actions designed to benefit aquatic species, such as fish passage and road drainage improvements, would create minor, short-term adverse effects during implementation. Therefore, I have determined that the Lobster Landscape Management Project has the potential for short-term, adverse effects to Regional Forester Sensitive Species Oregon coast coho and chinook salmon and Oregon coast steelhead and coastal cutthroat trout at the site scale. These adverse effects would be limited to the duration of the work being done, and for up to a few months after work is completed.

Essential Fish Habitat

The Magnuson-Stevens Act of 1976, as amended, directed Regional Fishery Management Councils to identify Essential Fish Habitat (EFH) for commercial fish species of concern. EFH of two species—coho and chinook salmon—may be impacted by this project. There are 345 miles of EFH habitat in the Alsea basin, including 61 miles in the Lobster watershed (Streamnet.org). About 70 percent of EFH is located on private lands in the Alsea and Lobster Creek basins. The Project planning area contains about 40 miles of EFH. Coho salmon are found in Five Rivers, Bear, Elk, Lobster, McGlynn, Crooked, Phillips, Camp, Silt, Wilkinson, and Preacher Creeks; and in a couple of unnamed tributaries to Lobster Creek. Chinook salmon are distributed primarily in the mainstem of Lobster and Preacher Creeks. Juvenile chinook generally migrate out of fresh water by June, and continue rearing in estuary areas over the summer. There is some overlap in freshwater habitat areas, and the analysis conducted for coho is sufficient for chinook.

The Forest biological assessment (BA) (USDA 2005a), NOAA-Fisheries EFH Consultation (USDC 2006b; reference # 2005/06511), and associated correspondence (USDA 2006b) document the effects to essential fish habitat if the proposed action (Alternative 2) was implemented. Per the NOAA-Fisheries consultation policy, the effects of the no-action alternative and Alternative 3 were not consulted on for their potential effects on essential fish habitat. NOAA Fisheries primary elements of concern associated with the project are stream temperature (commercial thinning), sediment (culvert replacement) and wood recruitment (commercial thinning).

Alternative 1 No Action—This alternative would maintain the existing vegetative cover and would not improve or degrade current shade. Thus, there would be no change or effect on current essential fish habitat stream temperatures from management activities. None of the 24 stream-channel culverts would be replaced; thus, no short-term (less than 1 year) introduction of sediments would be expected under this alternative. These existing culverts will remain undersized, increasing the potential for failure and contributing fine sediments during major winter storm events, resulting in potential adverse effects to essential fish habitat. Retaining an existing culvert in occupied essential fish habitat would result in the continued presence of a migration barrier to fish and other aquatic organisms. Thus, this culvert would continue to adversely affect essential fish habitat.

Managed stands would continue to carry an unusually high number of conifers per acre. Stand development would be driven by competition. As a result of competition, conifer tree growth would have reduced growth rates not reflected in the development of adjacent natural stands. The development of large trees, and associated late-successional forest characteristics would be slowed or prevented. The Forest Service concluded that not accelerating the development of late-successional forest conditions in plantations, thereby reducing the size of trees potentially recruited into streams, would retard the recovery of the large-wood component of essential fish habitat (PFMC 1999). NOAA-Fisheries determined the current size (less than 24 inches DBH) of plantation trees is adequate to naturally restore the large-wood (greater than 24 inches DBH) component of essential fish habitat in streams up to 66 feet wide. They concluded the no-action alternative would restore the large-wood component more quickly to these streams than the action alternatives (USDC 2006b; reference # 2005/06511).

Alternatives 2 and 3—Commercial thinning and replacing culverts would remove some trees and brush that help shade streams. The Forest Service and NOAA-Fisheries consider the streams affected, the project design criteria, the quantity and distribution of activities, and pertinent literature to evaluate the effects of activities associated with the alternative. The Forest Service concluded the effects on temperature from the vegetation being removed could not be measured and determined commercial thinning and culvert replacement would have no adverse effect on essential fish habitat stream temperatures (USDA 2005a; USDA 2006b). NOAA-Fisheries concluded from the same information that effects on stream temperature were adverse to essential fish habitat (USDC 2006b; reference # 2005/06511).

Replacing 24 stream-channel culverts has the potential to introduce sediments into streams during and after installation. The Forest Service and NOAA-Fisheries considered the culvert size, location, season of installation, and design criteria to evaluate the effects of culvert replacement on essential fish habitat. Sediment is generated through the disturbance of the channel bed during installation and through effects of rainfall on disturbed fill slopes. Effects are generally limited to the period from initial activity through the first few rainfall events. The Forest Service concluded replacing one culvert within occupied essential fish habitat and one perennial stream culvert 260 feet from essential fish habitat would produce measurable amounts of sediment above background levels to adversely affect essential fish habitat (USDA 2005a; USDA 2006b). NOAA-Fisheries assumes that replacing two additional culverts in perennial streams and five culverts in intermittent streams within 400 feet of essential fish habitat would produce measurable amounts of sediment above background levels to adversely affect essential fish habitat (USDC 2006b; reference # 2005/06511).

The commercial thinning of managed stands has the potential to remove trees that could fall into a stream or become entrained as part of a debris torrent. The Forest Service and NOAA-Fisheries considered the design criteria, location of thinning units, the average size of the trees in managed stands, the silvicultural prescription for each stand, recruitment mechanisms of large wood into streams, and the ecological function of trees proposed for removal may play in the hydrologic process. Both agencies agree that deep over-wintering pool habitat is not functioning properly in the watershed. Wood volume is directly related to pool area (Bilby and Ward 1989). Since no trees over 24 inches DBH are proposed for removal, there is no effect from commercial thinning on the current number of large trees available for potential recruitment into essential fish habitat. Both agencies concluded pool habitat is functioning properly in the project area.

The Forest Service further concluded that the 4.5 acres of thinning that would retain about 100 trees per acre, resulting in the potential recruitment loss of 10 to 20 trees per acre within 80 feet of essential fish habitat, would not adversely affect essential fish habitat (USDA 2005a; USDA 2006b). The Forest Service also concluded that accelerating the growth of larger trees (greater than 24 inches DBH), with potential recruitment into essential fish habitat, would accelerate the restoration of the large wood component associated with essential fish habitat (PFMC 1999).

NOAA-Fisheries concluded that since the quantities of large wood (greater than 24 inches DBH) in stream channels are not functioning properly, the amount and function of small wood (less than 24 inches DBH) is also not functioning properly. NOAA-Fisheries concluded that trees proposed for removal (8 to 20 inches DBH) were of adequate size in the near and long term to provide a functional benefit—primarily pool habitat formation—to Lobster essential fish habitat. NOAA-Fisheries also concluded that the potential loss of in-stream recruitment of trees by harvesting trees between 30 and 250 feet (site potential tree height) from a stream would adversely affect essential fish habitat in the near and long terms. They concluded there is no benefit to accelerating the development of larger trees for potential recruitment into essential fish habitat for streams up to 66 ft wide (USDC 2006b; reference # 2005/06511).

Public and Management Access (Forest Transportation Planner)

The desired condition of the Forest transportation system is a safe and efficient network that serves public needs and management objectives within available funding.

The Forest has more roads than it can afford to maintain. To address this problem, and other issues, the Siuslaw National Forest completed a Forest level roads analysis in January 2003 (USDA 2003). A roads analysis was also conducted at the project scale as a guide for managing the National Forest System (NFS) roads in the project's planning area. Roads analysis considered such road-related items as risk to safety and resources, future expected use, public and private access, emergency access, and maintenance costs. The recommendations of the Forest Roads Analysis and the project-level roads analysis are included in this project.

The Forest Roads Analysis selected a set of key forest roads to keep open for public access, permitted commercial use, and administrative use. Key forest roads selected include those that make connections between communities and those that provide recognized public and administrative traffic needs.

There are about 770 miles of key forest roads in the Siuslaw National Forest (USDA 2003). This is about 25 percent of the total miles of roads managed by this Forest. The miles of road not managed as part of the key road network are called non-key roads and are considered project or administrative roads, which are maintained through individual project funding.

Existing roads are deteriorating. The Forest is funded at about 20 percent of the amount needed to accomplish annual routine maintenance on the key forest road system. The Forest prioritizes available funding across the key forest road system as needs arise. Consequently, few roads receive full routine maintenance because funding is limited to prioritized road segments. This reduction in funding is resulting in continued deterioration of the key forest road network in the watershed, which increases driving hazards, risk to natural resources, and road repair costs. In the planning area, there are about 17.6 miles of key forest roads with a backlog of maintenance needs.

In their current condition, key forest roads needed for transporting logs will not safely support commercial traffic, such as log trucks. These roads are currently being used by noncommercial recreation and administrative traffic (passenger cars and light pickup trucks). Sight distances, uneven road surfaces, and structural strength are inadequate to allow safely mixing the traffic with commercial-sized vehicles.

Most Forest roads not selected as part of the key forest road network (non-key roads) were stabilized by installing waterbars and either closed with physical barriers, or left to be closed naturally by vegetation encroachment. Non-key roads are typically maintained only when access is needed for specific project activities, such as habitat restoration. The lack of maintenance on open non-key roads has resulted in many of these roads being accessible only with a high-clearance vehicle, sometimes requiring four-wheel drive. Moreover, aggregate road surfaces have degraded due to accumulation of organic material.

Alternative 1 (no action) would maintain the current road management objective to keep the existing key forest roads open in the project area. While currently suitable for non-commercial traffic, with no immediate threat of failure from non-commercial use, maintenance needs on key forest roads would continue to accumulate due to lack of funding, further deteriorating the existing key forest road system. Prioritized road maintenance and repair would continue to be accomplished within existing budgets, addressing some of the needed maintenance and correcting critical maintenance items, as they are identified. At some point, all or portions of key forest roads would become unsuitable for administrative and public uses, resulting in additional road closures, reduced access, loss of capitol investments, and adverse impacts to aquatic resources from road failures.

Non-key roads would continue to grow closed and become less accessible for vehicle use, including high-clearance vehicles. Under the no-action alternative, no additional road miles would be either actively opened or closed to public use on the National Forest System. The result would be a continued reduction in miles of roads accessible by vehicle as they deteriorate or become overgrown with vegetation. No additional miles of existing roads would be decommissioned, and those roads considered for decommissioning in the action alternatives would continue to deteriorate over-time, due to lack of maintenance.

Alternatives 2 and 3 would change current road management objectives for key roads in the planning area by removing road 3412 from the key road network and designating it a project-maintained road. This road would remain open to public travel.

A portion of road 63—not associated with this project—was removed from the key-road network in 2005, following decommissioning of about three miles of road 63 south of the planning area. Access from the Lobster Valley county road to the Deadwood county road is provided by roads 35 and 3515, south to the Deadwood area. The portion of road 63 in the Lobster planning area would remain open to provide a connection to adjacent public lands administered by the Bureau of Land Management.

Alternatives 2 and 3 would address the backlog of needed maintenance and repair on five key forest roads (3225, 3305, 3500, 3505, and 3515), including roads or road segments used for log hauling that are outside the Lobster watershed. Maintaining and repairing these roads would improve structural strength and road surfaces to support commercial timber haul and safely accommodate mixed commercial and passenger traffic. Thus, road-management objectives for a safe and efficient key-road system for mixed traffic types would be met on these roads. Conversion from asphalt to gravel surfacing may be considered where it is economically more beneficial than repairing failed asphalt surfacing and sub grade.

Safer driving conditions would also be achieved by implementing roadside clearing to maintain sight distances on key roads associated with commercial haul, and repairing surface cracks and depressions associated with failing road fill and shoulder settlement. If the existing driving conditions are not improved, drivers would not be able to clearly locate road turnouts or safe-stopping areas when dealing with oncoming traffic on single-lane roads.

Road maintenance and repair would also reduce the risk of resource damage from roads and reduce risk of major road damage. By increasing structural strength, replacing culverts, and adding surfacing to roads, the risk of resource damage and road failure decreases, the potential for culverts to become plugged or to fail decreases, and the potential for sediment associated with log hauling decreases. During wet-weather conditions, log hauling may be suspended or additional rock may be added to road surfaces if it is determined that substantial damage to roads or natural resources would occur.

There are five locations in the planning area where road-retaining structures have been constructed on key roads planned for commercial haul. These retaining structures are typically placed at sites where steep side-slopes require additional reinforcement to make the roads stable. All structures were inspected by a qualified engineer. Based these inspections, none of the structures would need maintenance prior to log hauling.

Generally, public traffic is allowed on key roads used for log hauling. Some of the safety concerns associated with mixed commercial and public traffic can be addressed by posting reduced speeds, rerouting traffic to alternative routes if available, temporarily closing key roads to all public traffic, or setting scheduled times the public could use the roads. Timber sale contracts require posting of warning signs and may require use of traffic flaggers in the vicinity of logging operations. The contracts allow limited short-term road closure during logging operations. Non-key roads are typically closed to public access during logging operations.

Table 8 summarizes total miles, miles to be treated, and funding needed to repair and maintain the five key forest roads under two different scenarios. Maintenance beyond the minimum to facilitate project access and transportation of timber would be accomplished with funding not associated with this project. Continued deferral of non-critical maintenance would normally result in an increase of maintenance costs.

Table 8. Estimated miles and costs associated with the five key forest roads

	3225	3305	3500	3505	3515	Total
Total miles in the Project's planning area	0	7.9	4.0	5.7	0	17.6
Miles to be treated*	2.6	7.9	4.4	7.3	4.1	26.3
Funding needed to meet standards for mixed-traffic use	$65,000	$176,000	$227,800	$140,000	$123,000	$731,800
Funding needed to meet all road-management objectives	$80,000	$467,000	$354,800	$219,500	$163,000	$1,284,300

*About 8.7 of these miles reflect roads used for hauling that are outside the Project's planning area.

Alternatives 2 and 3 would also change management of many non-key roads by closing them. Open-road density for National Forest System (NFS) roads would be reduced from the current 2.8 miles per square mile to 1.3 miles per square mile under Alternatives 2 and 3. When state, county, and other public agency road miles and ownership acres in the analysis area are considered, the open-road density is reduced from 2.6 miles per square mile to 1.6 miles per square mile (USDA 1997). The project makes no changes in roads administered by other public agencies or private landowner roads in the project area.

Alternatives 2 and 3 would close about 47 miles of non-key roads, which are currently not routinely maintained due to lack of funds. About 17 miles of these roads are currently not accessible by vehicle due to minor slides, slumps, fallen trees, or debris in the roadway. These alternatives would also keep in effect the 12 miles of road closure that are gated, with access limited to permit users and administrative traffic. These roads would continue to be maintained, using funds generated by projects, such as timber sales.

There is one road-retaining structure supporting the roadbed of non-key road 3509. Based on an inspection by a qualified engineer, this structure would require maintenance prior to log hauling to maintain roadbed stability. Alternatives 2 and 3 would implement this maintenance.

Alternatives 2 and 3 would decommission about five miles of existing non-key forest roads. These roads would be taken off the road system and closed to all vehicle traffic. Road treatments include removing stream crossings, waterbarring road surfaces, and closing entrances with barricades, such as earthen berms, large rocks, or guardrails.

Under Alternative 2, temporary roads opened or built for commercial thinning operations would be designed as low-standard access for logging vehicles. New temporary roads would be waterbarred and closed when not used, during or after commercial thinning operations. Roads that are temporarily reopened would be stabilized by removing unstable sidecast material and temporary culverts, and closed after completion of thinning operations. Temporary roads would generally be limited to commercial thinning use; these roads may provide opportunities for limited, short-term public use, such as firewood gathering, during the dry season.

Alternative 3 would have essentially the same effects on public and private access as Alternative 2, including decommissioning about five miles of existing non-key forest roads. However, Alternative 3 would not build new temporary roads or temporarily reopen existing roads, eliminating the opportunity for short-term public use of these roads.

A summary of the effects of the alternatives is shown below. Table 9 summarizes the estimated economic effects by alternative. Annual maintenance costs reflect funds needed to perform full routine maintenance operations on system roads.

Alternative 1:

- No changes in the current maintenance strategy of existing National Forest System roads, including key and non-key roads.
- No changes in key or non-key road maintenance costs.
- No changes in open-road mileages of open road on National Forest System lands.
- With limited maintenance funds under Alternative 1, vegetation adjacent to some roads will continue to grow and gradually close these roads.

Alternative 1 would have no short term effect to the desired condition for the Forest transportation system, which is a safe and efficient network that serves access needs within available funding. However, long-term effects would be adverse, because the majority of the road system would not receive needed maintenance due to inadequate funding. Adverse effects include more safety hazards and more adverse impacts to aquatic resources.

Alternative 2:

- Decommissions about 5 miles of National Forest System roads.
- Reduces open-road mileage of National Forest System roads in the watershed from about 60 miles to 31 miles.
- Repairs and maintains 17.6 miles of key forest roads and 41.7 miles of non-key forest roads.
- Reduces the current key forest road network by designating about five miles of road 3412 as a project-maintained road.

Alternative 3:

- Decommissions about 5 miles of National Forest System roads.
- Reduces open-road mileage of National Forest System roads in the watershed from about 60 miles to 31 miles.
- Repairs and maintains 17.6 miles of key forest roads and 41.7 miles of non-key forest roads.
- Reduces the current key forest road network by designating about five miles of road 3412 as a project-maintained road.

Alternatives 2 and 3 would have both adverse and beneficial affects to a safe and efficient road network that serves access needs within available funding. Adverse effects result from the reduced amount of open roads to serve access needs, although high priority needs are met. Beneficial effects are improved safety on open roads and a reduction of adverse effects to aquatic species from roads. These improvements are made possible by funds generated by timber harvest.

Table 9. Road cost summary by alternative

Alternative	Routine annual road maintenance	Decommission costs	Key forest road repair and maintenance	Total decommission and repair costs
1-No Action	$60,810	$0	$0	$0
2	$34,100	$44,100	$731,800	$775,900
3	$34,100	$44,100	$731,800	$775,900

Fire (Forest Fuels/Fire Planner)

Based on Forest fire records since 1975, the Siuslaw National Forest has averaged 11 fires per year, burning about 35 acres a year. About 95% of the fires are human-caused; in other words, on this Forest, most fires are in accessible areas. As roads continue to deteriorate under Alternative 1, access will continue to become more difficult or be reduced. Therefore, the risk of human-caused fire ignitions is likely to be reduced over time.

Plantation treatments and associated actions

Because the potential for fire ignition cannot be eliminated under Alternatives 2 and 3, the team is obligated to disclose the potential for wildfire as a result of an ignition in a thinned plantation. The effects described here are those more associated with stands that would be commercially thinned.

Andersen (1982) developed aids to assist fuels and fire-behavior analysts in determining an appropriate fuel model or models for estimating potential fire behavior. He developed 13 fuel models representing the various components of living and dead vegetation in forest or rangelands across North America. Andrews' (1986) fire-behavior program (BEHAVE) predicts fire behavior characteristics such as fireline intensity, rates of spread, and resistance to control. Using these tools—along with local knowledge and weather variables measured from Cannibal Mountain—I expect thinning under Alternatives 2 and 3 to have the following effects on fuels and the potential results from fire ignitions:

> Thinning in the managed stands will increase fuels on the forest floor, as will gradually adding down wood to commercially thinned stands.

- Fuels created from thinning slash in units fall under the light-slash fuel model (fuel model 11) in the light-to-moderate thinning units and the medium-slash fuel model (fuel model 12) in moderate to heavy thinning units.
- The fuels are expected to decay over time, decreasing the risk of wildfires. Observations of past thinning have shown decomposition of the fine fuel component (needles and twigs) in 3 to 4 years. During this period, thinning slash could support a surface fire.
- Leaving whole trees on the ground as down wood increases resistance to control by fire suppression resources beyond that for fine fuels. Down wood does not contribute much to fire hazard because it is mainly the fine fuels that contribute to rapid rates of fire spread. With the addition of down wood, fire hazard is expected to remain low due to climate, incremental additions of coarse wood over time, location of coarse wood within stands (less risk in lower, more moist slopes), average coarse wood pieces per acre throughout the watershed, and reduced vehicle access to thinned plantations.

Alternative 3 would create about 199 acres of heavy down-wood concentrations in the northeastern portion of the planning area, through non-commercial thinning. These concentrations would elevate the risk of wildfire in affected areas, compared to Alternative 2.

Fire behavior in thinning slash in late summer would create fireline intensities and flame lengths difficult for hand and engine crews to suppress safely and successfully by direct attack.

- Roads and skid trails would be the primary control lines in indirect suppression, likely increasing the number of acres that would burn.
- The late-successional reserve objective to limit the size of all wildfires in the reserve would be difficult to meet.

Increased fireline intensity could increase the cumulative effects on other resources.

- Soils could be damaged by fire if nutrients and organic matter are consumed, increasing the potential for overland flow.
- The severity of any damage would be directly linked to the intensity of the fire.

Increasing the number of thinned units in a given area increases the hazard due to a larger area of contiguous fuels. Spotting from one thinned unit to another would be likely, given the wind speed that would be expected on a high fire-danger day.

Under Alternatives 2 and 3, thinned stands that lie adjacent to key forest roads would be treated to reduce the volume of fuels. Fuel treatments, such as burning hand-piled slash (about 36 acres total) and landings (about 68 acres total), would be done adjacent to and within 25 feet of these roads after thinning operations are completed.

Hand piles and landing piles would be burned in the fall to winter season after one or more inches of precipitation have occurred. This would reduce the potential for fire spread, and scorch and mortality to the residual trees. High soil and duff moisture would also prevent soil damage from occurring. Patrol and mop-up of burning piles would occur when needed to prevent treated areas from reburning or becoming an escaped fire.

To create short-term grass, forb, and shrub habitats in plantations, up to 775 acres under Alternative 2 and 740 acres under Alternative 3 would be underburned under controlled conditions after units are commercially thinned. Underburning is the application of prescribed fire in areas where residual trees and shrubs are present. The prescribed-fire objective is to help create openings for growth of desired plant species. Burning would also reduce the amount of fuel associated with dead and down woody material.

The timing of prescribed burns for underburning depends on the parameters identified for burning hand piles and landing piles, and a contingency plan, ensuring the availability of adequate fire-suppression resources in the event of an escaped fire.

Proposed fuel treatments, proximity of commercial thinning units to private property structures, and the generally northerly aspect of units in the wildland-urban interface (WUI) would result in a low risk of fire starting and spreading in the WUI. Therefore, no additional fuel treatments would be needed specifically to reduce the fuel loading in the WUI.

All prescribed burning would be designed to be consistent with the requirements of the Oregon Smoke Management Plan (ODF 2005) and the Department of Environmental Quality's Air Quality and Visibility Protection Plan (DEQ 2003). Because slash volumes are relatively small or treatment areas are scattered, adverse effects to air quality from burning are expected to be short-term and localized.

Key and non-key forest road actions

Although commercial and noncommercial thinning would temporarily increase fuel loading under Alternatives 2 and 3, reduced access to thinned stands associated with road decommissioning and closure would reduce the risk of human-caused fire ignitions and increase the fire response times in the rare event of a naturally caused wildland fire.

Stand treatments in Matrix

Access to thinned plantations would be closed after thinning operations, reducing the risk of human-caused fire ignitions in these areas.

Human Uses and Influences

Domestic Water Sources (District Hydrologist)

The Siuslaw National Forest Plan states that "Best Management Practices are designed largely to protect fish and water for domestic use" (USDA 1990; D-10). The desired future condition is to maintain or improve water quality for downstream water users by reducing the potential for sudden pulses of increased turbidity due to mass movement, or chronic increased turbidity due to chronic fine-sediment sources.

There are 16 water rights in the Lobster planning area. Ten are solely for irrigation or other uses, such as fire protection or road construction. Three of the domestic-use water rights would not be affected by the project because no actions are planned upstream from these sites. Of the three remaining water rights, one is ½ mile below stands 190, 193, and 221; one is 1 mile below stand 047; and one is for human consumption in Lobster Creek, at least 1 mile below the nearest stand. The water quality parameter of concern for all waters users in the Lobster planning area is fine sediment, as detected by turbidity.

Plantation treatments and associated actions

Yarding trees to landings, as proposed by Alternatives 2 and 3, can introduce minor amounts of fine sediment to streams. Because of the distance between planned actions and water diversion sites, the small amount of sediment produced from yarding would not affect downstream water users.

By thinning stands, Alternatives 2 and 3 would allow ground vegetation to develop and stabilize soils. The growth rate of trees near streams would increase, improving stream shade. These actions would serve to protect water quality in the long term.

Alternative 2 would temporarily reopen roads and remove some unstable sidecast from them. Roads proposed for temporary reopening do not cross streams. No removal of road fills is planned in the small watersheds containing the two nearest water rights. Temporary road actions are planned upstream of the Lobster Creek user, though the intake for this user is more than two miles below these activities. Because of the distance between these actions and streams, Alternative 2 is not expected to increase turbidity for this user. Alternative 3 would not reopen these roads.

Under Alternatives 2 and 3, non-commercial thinning, creation of snags and down wood, and meadow maintenance are not expected to increase turbidity for downstream water users because of the small impacts associated with these actions and the distances to water-diversion sites.

Key and non-key forest road actions

Under Alternatives 2 and 3, decommissioning roads, repairing and maintaining forest roads, and thinning and salvaging adjacent to forest roads can introduce fine sediment to streams and locally increase turbidity. These actions are not planned in the watersheds containing the two nearest water rights. The Lobster Creek user is very unlikely to see an increase in turbidity due to these actions, again due to distance from the action sites. Therefore, no effects are expected from these actions to water quality at the diversion points of these water users. Alternative 1 (no action) would maintain existing water quality parameters. However, by not treating the roads, the no-action alternative would increase the risk of culvert and unstable sidecast failure, potentially causing large pulses of sediment to enter streams at some point in the future. The two domestic water rights on small streams closest to action sites are most likely to be affected by a large pulse of sediment from culvert or unstable sidecast failure.

Timber harvest and early-seral creation actions in Matrix

Under Alternatives 2 and 3, commercially thinning plantations in matrix is very unlikely to introduce fine sediment to streams because these actions would not be near streams. Consequently, these actions are not likely to increase turbidity for any downstream user.

In summary, based on project design criteria and distance between action sites and water diversion sites, Alternatives 2 and 3 are not expected to increase turbidity for domestic water users. The no-action would maintain existing conditions for water users.

Heritage Resources (Forest Archaeologist)

A thorough literature search was conducted to determine if heritage resources (prehistoric or archaeological sites) are known to exist in the planning area, or have the potential to be adversely effected by proposed project activities. Included in the literature search were district site files, homestead records, land and cultural resource surveys, maps, land status atlas and local historical publications. The literature search indicated that no known sites will be impacted by proposed activities described for Alternatives 2 and 3. These findings are consistent with known cultural landscape patterns across the steep-sloped uplands of western Oregon, where cultural activities were focused near major watercourses with limited, transient cultural activities in upland forest areas. No treaty resources are in the project planning area. Activities will be consistent with our programmatic agreement with the State Historic Preservation Office and will meet the requirements of the National Historic Preservation Act (USDA 2005e).

Except for riparian planting and actions in stand 345, proposed activities such as commercial thinning, building or reopening temporary roads and landings, and underplanting conifers and hardwoods in existing plantations, are on previously disturbed sites and will not require field inventories, based on our 2004 Programmatic Agreement with the State Historic Preservation Office (appendix A).

Stand 345 was reviewed in the field to determine the presence of heritage resources. To avoid potential impacts to unknown sites, a certified cultural resource technician would monitor new temporary roads and landings for stand 345 and riparian planting areas (appendix A). Should heritage resources be discovered as a result of any project actions, work would be stopped in that area and the Forest Archaeologist would be consulted. The sites would be protected, preserved, and treated in accordance with the National Historic Preservation Act. Based on field reviews and past experiences with similar projects, no effects to heritage resources are expected from implementing Alternatives 1, 2, and 3. Therefore, proposed activities will meet the requirements of the National Historic Preservation Act.

Recreation (Recreation Planner)

The primary consequence of the proposed actions under Alternatives 2 and 3 would be to reduce motorized access in the interior forest, a process already happening through closing and decommissioning non-key roads across the Forest. These actions would reduce dispersed recreation opportunities for motorized travelers, but increase them for non-motorized travelers (hikers). Dispersed recreation opportunities affected would primarily be hunting, wildlife viewing, and hiking. Existing recreational fishing opportunities would be maintained, as access to fishing sites would not be changed. Thinning in riparian areas and road decommissioning are expected to improve fish habitat in the long term in the watershed, potentially benefiting recreational fishing.

No developed recreation sites or established Forest Service trails exist in the planning area; therefore, no effects to such facilities will occur.

Scenery (Forest Landscape Architect, USDA 2005d)

Most of the land affected by proposed thinning actions is out of view from County roads 807 and 808. Where the land is visible, human-caused lines of high contrast exist as the result of different unnatural appearing vegetation patterns, often along land ownership boundaries. For valley scenery, the western plantations, particularly 502004, 502073, and 502074 are the most visible stands from the county roads. Proposed stand treatments would increase spacing variability, trending the stands to a more natural appearance and enhancing the view of the hillsides.

On a more landscape scale, the scattered appearance of un-thinned plantations in the planning area detracts from the natural landscape pattern. Plantations proposed for thinning were harvested and planted about 20 to 50 years ago, resulting in stand boundaries that appear unrelated to the natural forms that make up the landscape. Under Alternatives 2 and 3, thinning prescriptions are expected to increase the scenic quality in the planning area in the long term by restoring a somewhat more continuous appearance to the forested hills, as viewed from the county roads.

Generally, helicopter logging tends to have less short-term impact on scenery because no cable corridors would be created. However, stands that can be viewed from the county roads are planned for cable yarding under Alternatives 2 and 3. Therefore, there would be no difference between the action alternatives on scenery in this case.

Under Alternative 3, less ground disturbance would be done than Alternative 2 because no temporary roads would be reopened or built. However, the temporary roads are not expected to be visible from County roads 807 and 808, the main travel routes through the valleys. Therefore, the view along these routes is not expected to be affected by these temporary roads, except where vegetation screening may be reduced over time.

Special forest products (Small Sales Specialist)

Opportunities to gather special forest products through permits and leases will continue in the area encompassed by the Project. Alternatives 2 and 3 would reduce vehicle access, making collection of special forest products more difficult. Reduced vehicle access has a lowering effect on the sale values of special forest products such as evergreen huckleberry, firewood, moss, mushrooms, salal, and swordfern.

Predicted Effects of Actions to Provide Timber from Matrix Lands

Commodity production is associated with the matrix land allocation. Under Alternative 1, matrix lands would continue to develop as dense, single-story Douglas-fir plantations. Because the stands would not develop the structure and size that thinned stands of a similar age will, the value and return on previous investments made to manage these lands for timber production would be reduced. Commercial thinning would produce about 2,600 thousand board feet of timber under Alternative 2 and about 2,400 thousand board feet of timber under Alternative 3. In the project area, all units proposed for commercial thinning that contain designated matrix, also include the late-successional or riparian reserve designation within their boundaries. Therefore, the environmental consequences associated with commercial thinning to meet the need for commodities are the same as those actions required to meet the need for increased late-successional habitat in late-successional and riparian reserves.

Other Predicted Effects

Cumulative Effects (The Team)

The Council on Environmental Quality defines cumulative effects on the environment as those that result from the incremental actions of a proposal added to other past, present, and reasonably foreseeable future actions, regardless of what agency or person undertakes them (40 CFR 1508.7).

For purposes of analyzing cumulative effects, the geographic area potentially affected by the alternatives is the 18,617-acre planning area in the western portion of the Lobster watershed. The Team also considered the entire Lobster watershed (37,329 acres) for each of the affected resources, because the effects would be more meaningful.

The Lobster-Five Rivers Watershed Analysis (USDA 1997) indicates that current forest conditions—primarily influenced by past timber harvesting on federal and non-federal lands—lack late-successional forest habitat to support species such as the northern spotted owl and the marbled murrelet. According to the watershed analysis, past timber harvesting has also reduced the suitability of late-successional forest habitat by reducing the amount of interior forest habitat.

On federal land in the planning area, plantations are the result of past clear-cut harvesting, which began in the late 1940's and ended in the early 1990's. About 7,253 acres were harvested—88 acres in the 1940's, 570 acres in the 1950's, 2,265 acres in the 1960's, 1,720 acres in the 1970's, 2,065 acres in the 1980's, and 545 acres in the 1990's. The residual logging slash in units was broadcast burned to prepare units for tree planting. Prior to 1976, about 4,162 acres were clear-cut harvested, using mostly high-lead logging systems (generally no suspension of logs during yarding), causing substantial soil disturbance. Few (if any) trees were left to buffer streams. Roads were constructed by placing excess excavated soil on adjacent side-slopes below roads (sidecast method), using undersized culverts in streams and for draining ditches, and using insufficient numbers of ditch-relief culvert for proper drainage of water from roads, with ditches frequently draining directly into streams.

Beginning in 1976 and ending the 1990's, about 3,091 acres were clear-cut harvested. Harvest practices on federal land during this time were improved by the requirements of the 1976 National Forest Management Act. Consequently, skyline yarding (one-end or full suspension of logs during yarding) replaced highlead yarding, reducing soil disturbance; trees were retained in units to buffer at least the larger streams to reduce sedimentation of streams and provide shade; and excess excavated soil from road building was hauled to and deposited on stable sites instead of using the sidecast method, reducing the potential for road failure and stream sedimentation. Culvert size and placement improved, but size and number used for streams and ditch drainage was still inadequate. Beginning in the late 1980's, some trees were left in units to provide snag and down wood habitat for various wildlife species.

The watershed analysis also discloses that timber harvesting, road building and maintenance, and converting forest to agricultural uses have reduced the number of large conifer trees in riparian areas and accelerated sedimentation. Valley-bottom and mid-slope roads also interrupt natural stream-channel processes such as debris flows and aquatic species migration. These past actions on federal and private lands have resulted in current conditions that fall short of the habitat capability of streams to support coho salmon and other aquatic species. In the 1990's, in recognition of the shortage of large wood in streams, agencies added large wood to key fish-bearing streams such as Camp and Preacher Creeks.

Based on field reviews, effects from past clear-cut actions have basically stabilized. In the past 10 years, many of the road culverts in streams have been replaced with larger ones that can handle 100-year flood events, and larger and more numerous ditch-relief culverts were added to some roads. These actions were designed to reduce the potential for road failure and sedimentation of streams. However, there are still many roads in the planning area that are chronic sources of fine sediment due to failing sidecast material and failing or improperly functioning culverts.

In this document, the analysis provided for each alternative and resource area reflects the sum of most planning actions on federal lands—including lands managed by the Bureau of Land Management—in the foreseeable future. Future actions on federal lands in the Lobster Landscape Management Project area are likely to include changes in the transportation system for Forest users and adjacent landowners; actions associated with ongoing road maintenance and repair of key forest roads; and harvesting of special forest products, such as firewood, salal, swordfern, and moss.

The Bureau of Land Management (BLM), which manages about 15,327 acres in the watershed—including about 1,077 acres in the Project area—has replaced about 70 failing small culverts with new and larger ones and decommissioned about 7.87 miles of roads in 2005. Road decommissioning included roads near Coal Creek, Briar Creek, Wilkinson Creek, Bear Creek, and Lobster Creek. The BLM plans to replace several culverts on the Briar Creek Briar Creek road system in 2006. Adding wood to streams is planned for Lobster, Little Lobster, Briar, and Bummer Creeks during the late summer and fall of 2006. All recently completed and planned actions are east of the Project area.

Benton, Lane, and Lincoln County road departments are expected to continue maintaining roads in the planning area. Maintenance work generally includes roadside brushing, repair of road surfaces, ditch cleaning and drainage maintenance, and replacement of some culverts, especially those that are known to hinder fish passage.

Private land comprises 15 percent (about 2,815 acres) of the Project area, and 38 percent (about 14,219 acres) of the watershed. Most of these acres have been clear-cut harvested, beginning about 50 years ago. The Team expects landowners to continue current practices and uses of their land, following current county and state land-use regulations. Current uses include industrial timber harvesting, farming, rural-residence living, livestock grazing, and limited non-industrial timber harvesting. Based on local industrial timber management objectives and practices, we expect harvest activities on industrial lands before those stands reach 80 years of age. Based on current trends, industrial timber harvest in the Lobster watershed may increase in the foreseeable future. Considering current national-development trends in similar rural areas, an increase in the quantity of rural residences in the watershed is expected.

Cumulative effects are measured relative to the baseline conditions described in chapter 1. Where specific effects are not described for a particular resource, cumulative effects are not expected to be measurably different from those under baseline conditions. Actions under Alternatives 1, 2, and 3 are expected to have the following cumulative effects:

Alternative 1 (No Action)

- Managed-stand health and growth will continue to decline, increasing the severity and extent of damage from insects, disease, and wind; late-successional forest conditions in managed stands will take longer to develop.
- Habitat preferred by species dependent on late-successional forest would take longer to develop; mid-seral species habitat will remain on the landscape longer; habitat preferred by early-seral species would gradually decline as trees encroach on existing meadows and other forest openings; and short-term cumulative effects would be limited to noise disturbance from maintaining and repairing key Forest roads.
- Aquatic species habitat recovery would depend on natural processes and take much longer.
- Sedimentation from non-key roads would increase as roads deteriorate from lack of maintenance.
- Shading and large wood for streams would take longer to develop before temperature would be reduced.

- Watershed function would not be improved because of continued use of nearly the entire road network.
- Fire response time would increase as roads fail or roadside vegetation grows and closes roads naturally.
- Recreation experiences would become more non-motorized as roads close naturally, landscape scenic conditions will take longer to achieve a more natural setting, and public and management access and road maintenance costs would remain unchanged, except where roads fail.

Alternatives 2 and 3

Forest stand conditions—Thinning managed stands under Alternatives 2 and 3 would speed the development of late-successional forest characteristics on about 3,003 acres and 2,804 acres of commercially thinned stands, respectively; and on about 212 acres and 411 acres of non-commercially thinned stands, respectively. These changes would reduce fragmentation and accelerate development of late-successional forest characteristics on federal land. Stands adjacent to private industrial lands and rural-residential properties may likely be subject to more frequent harvesting, increasing fragmentation between land ownerships (Alig 2003).

Terrestrial species (federally listed, sensitive, survey-and-manage, management-indicator, and land birds)—In the short term, disturbances from noise associated with treating managed stands and repairing, closing, or decommissioning roads are likely to have minor adverse effects on all terrestrial species to some degree. The dispersal in timing and distribution of these actions across the watershed, however, are such that impacts are expected to be localized and not lead to adverse cumulative effects.

In the long term, this project would mitigate or begin to mitigate past adverse cumulative effects to wildlife, especially past adverse effects to late-successional forest habitat. Overall, cumulative effects to wildlife would be beneficial, because this project would improve the quality or quantity of habitats that are below historic levels in the watershed and in the Oregon Coast province. It would accelerate restoration of late-successional forest, improve diversity of young/small forest, maintain or restore grass/forb/shrub habitat, and improve dead wood habitats on lands administered by the USDA Forest Service. Considering past, present, and reasonably foreseeable actions on other land ownerships in the watershed, the cumulative effects of this project would not change; they would remain beneficial to wildlife.

Listed, sensitive, and survey-and-manage plants—Based on field surveys and protection measures, no adverse cumulative effects on these species are expected. Thinning managed stands would accelerate the development of late-successional forest habitat as well as result in greater tree and shrub species diversity. In the long term, this would be beneficial to survey and manage species associated with late-successional forest.

Noxious and undesirable weeds—Current weed infestation levels would not be exceeded and are likely to be reduced due to remedial treatments and prevention measures.

Sediment production—No measurable cumulative additions of fine sediment are expected to enter streams from stand treatments. Using, repairing, and decommissioning roads would increase fine sediment in the short term. Stabilizing and closing reopened roads, and repairing, closing, and decommissioning other roads would reduce sedimentation of streams in the long term. Potential pulses of sediment associated with harvesting timber on private land, along with chronic sources of sediment from rural residences and livestock grazing are expected to continue. Overall, Alternatives 2 and 3 are expected to cumulatively reduce sedimentation in the project planning area.

Soil productivity— Considering past and proposed logging operations, the detrimental soil condition (i.e., soil compaction and displacement) for each commercially treated plantation is expected to be less than 10 percent. Therefore, each plantation will be under the 15-percent threshold established by the Siuslaw Forest Plan for National Forest system lands.

Stream flow— Thinning managed stands would not measurably affect stream flows. Decommissioning roads would reduce peak and storm flows resulting in a net cumulative decrease over the long term. Continued development of small rural residences is likely to require minor increases in water withdrawal for domestic and agricultural use.

Stream temperature— Based on project design, thinning managed stands and other actions are not likely to cause any measurable increase in stream temperature. Road decommissioning is likely to improve watershed function and negligibly lower stream temperatures, resulting in a cumulative decrease in temperature. Cooler water on Forest Service lands may result in cooler water on private lands near the Forest boundary. Stream temperatures on private land may increase or decrease, depending on riparian and stream-channel activities that may occur on private lands.

Aquatic species— When viewed as a whole, proposed actions are likely to have minor, short-term adverse effects on aquatic species during project implementation and up to 2 years later. In the long term, net improvements to aquatic habitat are expected to accrue with reduced sedimentation and risk of failure from roads and accelerated growth of trees in riparian areas of managed stands. These actions are expected to substantially benefit aquatic species on federal lands. Considering no significant changes in management of private lands are expected, streams in and immediately downstream from these lands are expected to have lower quality habitat for salmonids due to higher stream temperatures, shortage of large wood, and higher stream sedimentation.

Essential fish habitat— Past and future actions (commercial thinning and connected actions) in the adjacent Five Rivers watershed are governed by the Five Rivers Landscape Management Project FEIS (USDA 2003). These actions and associated project design criteria are similar to those identified for the Lobster Landscape Management Project EA. Under the FEIS, NOAA-Fisheries did not document any adverse effects to EFH from commercial thinning activities (USDC 1999, USDC 2001). Although the Lobster Landscape Management Project includes similar actions and project design criteria, commercial thinning actions under the Lobster project was determined by NOAA-Fisheries to adversely affect EFH.

Grazing and timber harvesting on private lands, under State and County regulations, are expected to continue. In the coho listing review (USDC 2006a), NOAA-Fisheries determined that the Oregon Forest Practices Act was adequate to protect coho habitat on State, County, and private lands. Although the Lobster Landscape Management Project includes design criteria that provide greater protection for coho habitat than the Oregon Forest Practices Act, NOAA-Fisheries determined that the Lobster project criteria were not adequate.

NOAA-Fisheries effects determinations for the Lobster Landscape Management Project were based under the assumption that the Forest Service would reenter the Lobster planning area in less than 10 years to implement additional activities. However, there has been no timeline identified for reentering the Lobster planning area. Typically, the timing of projects of this scope and nature is driven primarily by the rate of stand development and the need to speed the development of late-successional habitat. Based on growth rates of plantations on the Siuslaw, timelines for reentry into a planning area generally range from 15 to 20 years.

Currently, the Forest Service is planning another project (West Alsea Landscape Management Project) in the western portion of the Alsea River watershed, downstream from the Lobster planning area. The West Alsea project is expected to propose actions and project design criteria similar to the Lobster Landscape Management Project, the Yachats Terrestrial Restoration Project (USDA 2005c), the Lower Siuslaw Landscape Management Project (USDA 2002b), and the Five Rivers Landscape Management Project (USDA 2002c). Like these four projects, the Forest Service expects the commercial thinning actions of the West Alsea project to benefit EFH in the long term, without creating adverse effects. Because the NOAA-Fisheries commercial thinning effects conclusions differ among these four projects—no adverse EFH effects conclusions for the Yachats, Lower Siuslaw, and Five Rivers projects; and adverse EFH effects conclusion for the Lobster project—it is uncertain what their EFH effects conclusion for the West Alsea Landscape Management Project will be.

Based on NOAA-Fisheries determinations of past, similar projects, and for activities on lands governed by the State Forest Practices Act; the environmental analyses associated with this project and past, similar projects; and the Project's timeline, we expect project actions to substantially benefit essential fish habitat in the long term.

Public and management access— Closing and decommissioning roads across the watershed would reduce public and management vehicle access to public lands for several activities including hunting, sight-seeing, special forest products gathering, and Forest Service monitoring. Road maintenance costs would be reduced and limited maintenance funds would be shifted to maintaining the key forest road system. Open-road mileage in the watershed would be reduced from 60 miles to 31 miles.

Private landowners, federal agencies, and commercial and community interests have various easements, permits, and access agreements in effect at the time of this project. All project alternatives are designed to facilitate existing agreements. Additional access needs would be reviewed and authorized case-by-case as requested. Generally, permit holders would be required to perform maintenance items on National Forest System roads related to the permitted uses.

Fire— Thinning managed stands is expected to increase fuel loading and associated wildfire risk in the short term (3 to 4 years). By reducing public access, however, road closure and decommissioning would cumulatively reduce the risk of human-caused fire ignition in the long term. Although fire suppression response time would increase where roads are closed or decommissioned, the cumulative effect on wildfire risk over time would be reduced.

Domestic water sources— Based on distance between proposed actions and water sources and protection measures designed to minimize or prevent fine sediment from entering streams, no cumulative impacts to domestic water sources are expected.

Heritage resources— Treating managed stands and proposed roadwork would have minimal risk because actions are generally on previously disturbed ground. Adverse cumulative effects are not expected.

Recreation— Treating managed stands would not substantially change the recreation experience. Closing and decommissioning roads would cumulatively shift the recreation experience from motorized to non-motorized.

Scenery— All actions would be consistent with the scenic quality objectives for the project planning area. By speeding the growth and development of trees in plantations, thinning actions are expected to move landscape scenic conditions to a less fragmented, more natural forest setting sooner.

Special forest products— The opportunity for gathering these products would be maintained in the watershed, but closing and decommissioning roads would cumulatively increase access time. Thinned plantations would allow for the growth of commercial shrubbery in the long term. Short-term opportunities for firewood collection would be created after plantations are commercially thinned.

In summary, considering other ongoing and likely actions on federal lands and on other lands in the Lobster Creek watershed, Alternatives 2 and 3 are expected to reduce the adverse cumulative effects of past actions on the landscape, thereby accruing net beneficial cumulative effects for most resources. The cumulative effects are generally beneficial over time and an improvement over existing conditions.

Comparing Likely Effects

Table 10 compares how well the alternatives address the problems (issues) and other objectives and outcomes.

Table 10. Comparing likely effects of Alternatives 1, 2, and 3 based on the issues, objectives, and outcomes.

Issue, objective, and outcome	Alternative 1 (no action)	Alternative 2	Alternative 3
Increase late-sucessional habitat in late-successional and riparian reserves:	Stand health and growth would continue to decline Stands would develop at a rate different from natural stands of comparable age	Maintains stand health and speeds growth of trees in plantations Increases stand complexity and diversity in plantations	Maintains stand health and speeds growth of trees in plantations Increases stand complexity and diversity in plantations
Maintain meadow habitat and create grass, forb, and shrub habitats	Grass, forb, and shrub habitats would continue to decline	Maintains existing meadow habitat and creates grass, forb, and shrub habitats in plantations	Maintains existing meadow habitat and creates grass, forb, and shrub habitats in plantations
Improve watershed function	Maintains existing road density Maintains effects of road-related fine sediment on streams Does not reconnect stream channels	Reduces existing road density Reduces effects of road-related fine sediment on streams Reconnects stream channels	Reduces existing road density Reduces effects of road-related fine sediment on streams Reconnects stream channels
Maintain the function and diversity in matrix lands, while providing timber and other products and amenities	No commercial harvest in mature stands Does not increase complexity and diversity in plantations Does not provide timber for wood products	No commercial harvest in mature stands Increases complexity and diversity in plantations Provides 2.6 MMBF of timber for wood products	No commercial harvest in mature stands Increases complexity and diversity in plantations Provides 2.4 MMBF of timber for wood products

Issue, objective, and outcome	Alternative 1 (no action)	Alternative 2	Alternative 3
Aquatic conservation objectives	Watershed differs from historical conditions and does not meet all objectives	Moves watershed to historical conditions and meets all objectives	Moves watershed to historical conditions and meets all objectives
Repair and maintain key and non-key forest roads	No changes in the current management strategy	Implements repair and maintenance on 17.6 miles of key forest roads and 41.7 miles of non-key forest roads	Implements repair and maintenance on 17.6 miles of key forest roads and 41.7 miles of non-key forest roads
Estimated revenue and costs	Does not provide revenue from the sale of timber No costs associated with implementing mitigation and enhancement actions	Provides about $5.5 million from the sale of timber Estimated total cost for mitigation and enhancement actions is about $2,179,000.	Provides about $4.8 million from the sale of timber Estimated total cost for mitigation and enhancement actions is about $2,071,000.

Aquatic Conservation Strategy

On March 22, 2004 the USDA Under Secretary for Natural Resources and the Environment signed Record of Decision (ROD) amending the Northwest Forest Plan. The decision clarifies provisions relating to the application of the ACS. Specifically, the amendment removes the need for deciding officials to certify that individual projects meet ACS objectives at the site-specific level and short time frames. Instead, the ROD requires individual projects to meet ACS standards and guides and that ACS objectives be met at watershed or larger scales (5th field hydrologic fields or greater) and over longer time periods of decades or more. Project records must also demonstrate how the decision maker used relevant information from watershed analysis to provide context for project planning.

Relevant information from the Lobster-Five Rivers Watershed Analysis (USDA 1997), the Water Quality Restoration Plan, Lobster Creek Planning Area (USDA 2004), and the fisheries Biological Assessment, Lobster Landscape Management Project (USDA 2005a) was incorporated by reference into this environmental analysis. Based on this information, all project activities will meet the ACS standards and guides, and all ACS objectives will be met at the 5th-field watershed scale and over longer time periods of decades or more.

Short-Term Uses and Long-Term Productivity (The Team)

The use or protection of natural resources for long-term, sustained yield is the legislated basis of management and direction for the Forest Service (USDA, USDI 1994a, p. 321). Short-term uses include actions such as commercial thinning and road decommissioning. The design criteria were developed to incorporate the standards and guides of the Siuslaw Forest Plan as amended by the Northwest Forest Plan. We expect that applying them to the proposed management actions will reduce the potential for long-term loss in productivity of forest soils that may result from short-term uses. They will also allow for the long-term development of late-successional habitat and improvement of watershed function.

Unavoidable Adverse Effects (The Team)

Implementing any alternative would result in some adverse environmental effects that cannot be avoided. The design criteria, along with Forest standards and guides, are intended to keep the extent and duration of these effects within acceptable rates, but adverse effects cannot be completely eliminated. The following adverse environmental consequences would be associated to some extent with Alternatives 2 and 3:

- Short-term, localized reductions in air quality from dust, smoke, and vehicle emissions resulting from management actions and forest users.
- Short-term, localized inputs of fine sediment from road decommissioning.
- Temporary increase in fire hazard from waste material left on the ground from commercial thinning, non-commercial thinning, and brush-release actions.
- Disturbance to wildlife when their habitat is disturbed by management actions or recreation activities.
- Decrease in habitat for wildlife species dependent on grasses, forbs, and shrubs, and deadwood.
- Temporary increase in large vehicle traffic during commercial thinning operations.
- Loss of vehicular access through the Forest as roads are closed or decommissioned.

Irreversible Resource Commitments (The Team)

Irreversible commitments of resources are actions that disturb either a non-renewable resource (for example, heritage resources) or other resources to the point that they can only be renewed over 100 years or not at all. The design criteria--along with Forest standards and guides--are intended to reduce these commitments, but adverse effects cannot be completely eliminated. For example, the continued use of existing roads that access the Forest is an irreversible commitment of the soil resource because of the long time needed for a road to revert to natural conditions.

Irretrievable Commitment of Resources (The Team)

An irretrievable commitment is the loss of opportunities for producing or using a renewable resource for a period of time. Almost all activities produce varying degrees of irretrievable resource commitments. They parallel the effects for each resource discussed earlier in this chapter. They are not irreversible because they could be reversed by changing management direction. The following irretrievable commitments of resources are expected:

- Loss of soil productivity as a result of new temporary roads and landings (Alternative 2).
- Loss of vehicular access through the Forest as roads are closed or decommissioned (Alternatives 2 and 3).

Environmental Justice (Resource Planner)

Based on local knowledge, small pockets of low-income populations live in the planning area and some augment incomes through actions such as gathering firewood and picking brush to sell. Some farms exist in the planning area and domestic-use water systems include individual wells and spring-fed systems.

Although road decommissioning and closure actions will reduce vehicle access to areas that provide shrubs for picking or wood for firewood gathering, access to these areas will be maintained. Thinning plantations will improve conditions for shrub growth and provide opportunities for firewood gathering. Some proposed actions in the planning area may provide opportunities for jobs. None of the proposed actions are expected to physically affect farms or water quality of domestic-use water systems.

In summary, effects of alternatives on the human environment (including minority and low-income populations) are expected to be similar for all human populations regardless of nationality, gender, race, or income. No disproportionately high and adverse human health or environmental effects on minority populations and low-income populations are expected as a result of implementing actions described for the action alternatives.

Other Disclosures (The Team)

Based on the Team's evaluation of the effects, we concluded:

- This environmental assessment is tiered to the Siuslaw Forest Plan FEIS, as amended by the Northwest Forest Plan, and is consistent with those plans and their requirements.
- None of the alternatives would affect minority groups, women, and consumers differently than other groups. These groups may benefit from employment opportunities and by-products that proposed actions will provide; the no-action alternative would have neither adverse nor beneficial effects. None of the alternatives adversely affects civil rights. All contracts that may be awarded as a result of implementation would meet equal employment opportunity requirements.
- None of the proposed actions will affect known prehistoric or historic sites because no new disturbance on previously undisturbed ground is expected. As outlined in the American Indian

Religious Freedom Act, no effects are anticipated on American Indian social, economic, subsistence rights, or sacred sites.

- No adverse effects on wetlands and flood plains are anticipated; and no farm land, park land, range land, wilderness, or wild and scenic rivers will be affected.
- The proposed project is not in or adjacent to an inventoried roadless area.
- The proposed project is consistent with the Coastal Zone Management program.
- None of the proposed actions are expected to substantially affect human health and safety.
- Proposed activities are consistent with the Clean Air Act because effects from activities such as log hauling (dust) and prescribed burning are localized and short-term.
- Because of the design criteria to be applied (appendix A), this project is expected to be consistent with the Clean Water Act.
- The proposed project is not expected to measurably affect global warming. The USDA Forest Service will continue an active leadership role in agriculture and forestry regarding the reduction of greenhouse gas emissions (Joyce and Birdsey 2000).
- These actions do not set a precedent for future actions because they are similar to actions implemented in the past.

Who was consulted about this project? Chapter 4

Introduction

As described in chapter 1, comment on the proposed action was solicited through letters, local newspapers, and the Siuslaw National Forest's quarterly "Project Update" publications. The results of specific government and agency consultations are summarized below.

Local Confederated Tribes

The Confederated Tribes of Siletz, the Confederated Tribes of Coos, Lower Umpqua, and Siuslaw, and the Confederated Tribes of Grand Ronde were informed of the Project's proposed actions during the initial public-notification process. No comments on the proposed actions were received from them.

Federal Agencies

National Marine Fisheries Service (or NOAA-Fisheries)

The National Marine Fisheries Service (NMFS) has been consulted about potential impacts to essential fish habitat (EFH) (USDA 2005a). In their response letter (USDC 2006; reference # 2005/06511), 16 conservation recommendations were listed, mostly pertaining to water and substrate quality.

On August 18, 2006, Forest Supervisor Jose Linares and Scott Woltering (PNW Regional Aquatic TES coordinator) met with NMFS State Habitat Director, Mike Tehan and Branch Chief Cathy Tortoricci to clarify the issues disclosed during consultation. The Forest responded to the recommendations (USDA 2006b), adopting recommendations 1 to 10 and choosing to not adopt 11 (monitoring requirements), 12 and 13 (fish passage design), and 14 to 16 (stand-treatment criteria). An alternative was considered to address recommendations 14 and 15, but was eliminated from detailed study, as discussed in chapter 2.

US Fish and Wildlife Service

The US Fish and Wildlife Service (FWS) is responsible for the wildlife species listed under the Endangered Species Act. Listed species that may occur in the project area include the bald eagle, northern spotted owl, and marbled murrelet. The Forest Service is responsible for supporting recovery of these species, and meets this obligation by working with the FWS through a required consultation process and by implementing their terms and conditions. These terms and conditions are included in appendix A. Consultation for this project is completed, and the FWS concurred with our finding that this project will not jeopardize the continued existence of the bald eagle, northern spotted owl, or marbled murrelet (FWS references: 1-7-05-F-0005 and 1-7-05-F-0664).

Bureau of Land Management

The Bureau of Land Management (BLM) has been consulted regarding any plans they may have for the Lobster watershed. The information obtained was considered in the development of the cumulative effects analysis. Actions that the BLM plans for the watershed include replacing culverts in roads and adding large wood to streams. No conflicts between BLM's planned actions and actions under the Project are expected because they would not occur in the same areas.

US Congressional Representatives

Senators Gordon Smith and Ron Wyden and Representatives Peter DeFazio were contacted about the proposed project. No comments were received from them.

State of Oregon

All proposed actions were evaluated under the programmatic agreement (2004) with the State Historic Preservation Office (SHPO). No further consultation with SHPO was needed.

Oregon Department of Forestry, Oregon Coastal Zone Management Program, Oregon Department of Fish and Wildlife, and State Senator Joanne Verger were notified about the proposed project. No comments were received.

Local Governments

County commissioners of Benton, Lane, and Lincoln Counties; county soil and water districts; the mayors of Waldport and Yachats; and the City Manager of Florence were notified, with no responses.

Watershed Councils

Members of the Alsea and Mid-Coast watershed councils were contacted. The project was discussed during the general meeting in October and at least two technical-team meetings. Project support was expressed by both groups.

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Appendix A

Design Criteria for the

Lobster Landscape Management Project

Introduction

Design criteria for actions identified in the Lobster Landscape Management Project EA (EA) were developed 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, Oregon Coast Province—Southern Portion.

The objectives of this project are linked to the project needs identified in the EA, chapter 1: speed development of late successional forest habitat, improve watershed function, and provide timber from the Matrix land allocation. The actions proposed to attain these objectives are listed in table A-1.

The design criteria apply to all action alternatives, unless otherwise specified. Appropriate specialists will be consulted before any design criteria for proposed activities are changed.

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.

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

Project Objectives	**Actions**
Speed development of plantations into late-successional forest for dependant species in riparian and upland areas. Large (32-45" DBH) and giant (>45" DBH) trees with unique characteristics, such as large limbs or cavities are especially important.	Forest thinning (commercial and non-commercial). 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 (>45" DBH) trees with large limbs. Inoculate some trees with fungi that create cavities.
Improve habitat diversity in stands by increasing tree diversity and abundance of grass, forb, or shrubs. Restore conifers near streams, where needed.	Plant and tend small trees, grasses, and forbs. Under-burn some stands. Maintain or create early seral habitat areas. Remove encroaching woody plants from existing meadows. Modify prescriptions near streams.
Maintain or restore adequate numbers of snags and down wood	Maintain un-thinned areas (skips/clumps) that naturally create dead wood, and create snags and down wood.

Project Objectives	**Actions**
Maintain dispersal habitat for the northern spotted owl	Maintain > 40 percent canopy cover in about 90 percent of treated areas of commercially thinned stands.
Protect or improve water quality, fish habitat, and soil productivity.	Protect domestic waters sources. Establish no-cut buffers near streams and minimize logging or road impacts to streams to protect water quality and fish habitat. Create future sources of large in-stream wood. Maintain or create down wood. Minimize adverse impacts to water quality and fish from roads, especially due to sediment and migration barriers.
Maintain safety and structure of key forest roads. Maintain stability of non-key roads and manage long-term access.	Repair road surfaces and replace failing culverts. Fell existing hazard trees. 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' hazard and maintenance costs), and to reduce potential for hazard trees to develop near roads. Stabilize and close roads not needed for continuous access. Decommission unneeded roads.
Produce timber and meet late-successional objectives in the matrix land allocation.	Treat portions of stands in the matrix land allocation similar to adjacent late-successional reserve.

Criteria Common to All Actions

Proposed, Endangered, Threatened, or Sensitive Species (PETS), and Essential Fish Habitat

Fish

The NOAA Fisheries has been consulted about effects on Essential Fish Habitat through two fisheries biological assessments that were completed on October 9, 2002, and December 7, 2005. Based on their biological opinion (February 25, 2003; reference 2002/01254 (FS)) and Level 1 Team discussions in December 2005, project activities, such as fish passage culvert replacements with streambed simulation rock, are likely to adversely affect Essential Fish Habitat in the short term, but these same activities will have long term benefits to Essential Fish Habitat. NOAA Fisheries has not responded to the Forest's December 7, 2005 biological assessment, but their response is expected in the near future and will be included in this project's environmental assessment.

Follow the conservation recommendations, the reasonable and prudent measures, and the terms and conditions of the biological opinion (February 25, 2003; reference 2002/01254 (FS)).

In all plantations proposed for commercial thinning, prohibit commercial thinning within 30 feet of perennial streams.

Generally limit the season of operation for in-stream work—such as replacing or removing culverts in roads and road decommissioning—to July 1 through September 15. Obtain a waiver from the State where needed to conduct the work after September 15.

Wildlife

Design criteria must include the most current requirements from the US Fish and Wildlife Service (FWS) for federally listed wildlife. These requirements are described in a biological opinion (BO) and a corresponding letter of concurrence (Habitat Modification BO 2005-2006; reference number 1-7-05-I-0665).

The current BO (Habitat Modification BO 2005-2006, primarily from p. 7-11) provides the following requirements:

A wildlife biologist would participate in the planning and design of all projects affecting listed species.

Heavy and light to moderate thinning operations may occur in Matrix land-use allocation within suitable habitat or in other land-use allocations where stands are not yet suitable habitat for bald eagles, northern spotted owls, or marbled murrelets. In addition, heavy and light to moderate thinning could occur in suitable northern spotted owl or marbled murrelet habitat if it has been surveyed to protocol and determined to be unoccupied.

No action would result in the loss of a tree containing a bald eagle nest.

Minimize adverse effects to trees that are needed to facilitate harvest operations, because some of these trees could be suitable nest trees for bald eagles, spotted owls, or marbled murrelets. These trees are generally large trees (>21" DBH) with large limbs and include those needed for tailholds, guylines, and intermediate support.

All garbage (especially food products) would be contained or removed daily from the vicinity of any activity. This should minimize the risk to spotted owls or marbled murrelets from the predators attracted to food at work sites.

Seasonal restrictions are described in the Habitat Modification BO 2005-2006 for many activities proposed by this project. These restrictions are designed to minimize or avoid potential ***adverse effects*** to bald eagle, northern spotted owl, or marbled murrelet. Restrictions are based on type of human activity, time of year, and distances from occupied or potentially occupied suitable nesting habitat. Restricted time periods and distances vary between the bald eagle, spotted owl, and marbled murrelet. However, this BO grouped time periods for these species to decrease the complexity of implementing seasonal restrictions (habitat Modification BO 2005-2006, p. 111):

For the bald eagle most activities proposed by this project are limited if within ¼ mile or ½ mile line-of-site of occupied nest sites (Habitat BO for 2006-2007, p. 59).

For the northern spotted owl most activities proposed by this project are restricted if in close proximity to occupied or un-surveyed suitable habitat. Disturbance distances vary by activity, ranging from 35 yards for heavy equipment, to 65 yards for chainsaws, to ¼ mile for burning, to ½ mile for large helicopters, to 1 mile for blasting. Certain activities are not restricted, such as road maintenance.

For the marbled murrelet most activities proposed by this project are restricted if in close proximity to occupied or un-surveyed suitable habitat. Disturbance distances vary by activity, ranging from 100 yards for heavy equipment and chainsaws, to ¼ mile for burning, to ½ mile for large helicopters, to 1 mile for blasting. Certain activities are not restricted, such as road maintenance.

No project or associated activities that could disturb bald eagles 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 blasting would occur during the entire breeding periods for bald eagle, spotted owl, or marbled murrelet.

Project activities are not allowed from 1 March to 5 August if activities could disrupt nesting and are near known spotted owl activity centers or occupied murrelet habitat. The combined critical nesting period for these species is from 1 March to 5 August. Disruption distances for activities are described on page 5 of the Habitat Modification BO 2005-2006. The unit wildlife biologist may modify the distance and timing based on site-specific information.

Essentially no helicopter yarding is allowed from 1 March to 5 August. Type I or II helicopters are used for logging, and these ships are restricted within 880 yards (vertical or horizontal) of suitable habitat, and the majority of the project area is within 880 yards of occupied habitat.

Time-of-day restrictions are required from March 1 to September 30 for all activities that could potentially disturb nesting murrelets. These activities would not begin until 2 hours after sunrise and would end 2 hours before sunset with the following exception: **When the Industrial Fire Precaution Level is 2 or above, the time of day restriction may be waived during the late breeding period (August 6 to September 30).** The time of day restriction may not be waived when the project is being implemented within 20 miles of the coast and under Option 3 of the Level 2 March 26, 2004 policy for the management of potential structure. (The time of day restriction is not required at any time for activities that occur beyond the disruption distance.)

Although actions might extend into the next time period(s) within a given year, no actions may occur in a more restrictive time period. For example, an activity slated to begin during the July 8 - August 5 time period may extend into the August 6 - September 30 time period, or even the October 1 - February 28 time period because the potential level of affect would be the same or less, but may not ever occur between March 1 and July 7 because the potential level of affect might be greater.

The Habitat Modification BO 2005-2006 (p. 142) estimated that commercial thinning in the Lobster project would use about 1425 acres of adverse effect from disturbance: 1325 acres with beginning date no sooner than 8 July, and 100 acres with beginning date no sooner than 6 August. If an acre is within a disturbance distance of suitable habitat and treated with a potentially disturbing activity during critical nesting season for spotted owl or marbled murrelet, then it is counted as an adverse acre.

Treatment actions must be one described in the current BO with an approved amount of adverse effect or has less impact than an identified treatment. For example, the BO estimated there would be over 600 acres of regeneration or heavy thinning harvest in the Lobster project during the time-period with adverse effects to the marbled murrelet only (July 8 – August 5), but this project will not use these harvest prescriptions; therefore, the adverse effects estimated for these prescriptions can be used for the less impacting light-moderate thinning during this same time-period.

Operating seasons were identified for each commercial thinning stand. See appendix B for stand-specific information.

Plants

Field surveys for PETS species located Methuselah's beard (*Usnea longissima*), a PETS lichen species, growing on a big-leaf maple. Design criteria for stand treatments will protect this site, as hardwood trees would not be removed.

Leaving 40 to 80 trees per acre and minimizing soil disturbance and compaction will maintain habitat for 10 PETS fungi species that have potential habitat in the project area.

Manage sites for the survey and manage lichen species *Pseudocyphellaria perpetua* in stands 022 and 198 by designating a no-cut, 100-foot radius buffer around each site. Avoid impacting the buffers by restricting all equipment to existing roads and directionally fell trees away from the buffer perimeter.

Water Quality and Heritage Resources

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

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 will meet applicable EPA requirements (40 CFR 112), including certification by a registered professional engineer. (SFP: FW-119, 120, 122).

The literature was searched for possible heritage resources (historical or archaeological sites) in the project planning area. No known sites were identified that could be affected by this project. Riparian planting and stand 345 may be on undisturbed ground. To avoid impacts to unknown sites, a certified cultural resource technician will monitor riparian planting areas and new temporary roads and landings for stand 345. Should heritage resources be discovered as a result of any project activities, cease work in that area and consult with the Forest Archaeologist. Protect, preserve, and treat sites in accordance with the National Historic Preservation Act.

Criteria for Plantation Treatments and Associated Actions

Thin and Harvest Actions

Stands

Criteria common to all commercial thinning prescriptions

Speed development of late successional forest habitat characteristics in plantations. These characteristics include (per acre) about 1 to 3 conifers > 45" diameter at breast height (DBH), 10 to 20 trees at 32-45" DBH, 15 to 30 trees at 21-32" DBH, 5 snags > 21" DBH, and 4 to 12 hardwoods > 9" DBH. Therefore, silvicultural prescriptions should trend managed stands towards these objectives. In addition, prescriptions should provide variable tree spacing across the landscape. In other words, do not apply an average density for all stands in the project area.

Retain 40 percent or greater canopy cover on at least 90 percent of treated stands.

Apply appropriate prescriptions for differing stand and site conditions.

Minimize short-term adverse effects and maximize long-term beneficial effects to water quality, fish, and wildlife.

Retain and develop large conifer and hardwood trees, trees with large limbs and cavities, large snags (where safely feasible), down wood, and species diversity.

Leave untreated areas in plantations across the landscape. This includes, but is not limited to, stream-adjacent buffers.

Include variable spacing in all prescriptions and variable distribution of minor species. For example, retain pockets of alder where they exist.

Specific commercial thinning prescriptions

Prescription 1—Leave 40 to 49 trees per acre (TPA) after all actions

Leave 40 to 49 TPA in 15 to 20 percent of the acres proposed for treatment.

Develop 4 to 6 large hardwood trees per acre, by thinning around existing hardwoods or planting. Preferred species are big-leaf maple and alder

Underplant about 50 percent of the treated acres with about 50 to 75 TPA.

Prescription 2—Leave 50 to 64 TPA after all actions

Leave 50 to 64 TPA in 60 to 70 percent of the acres proposed for treatment. Provide for variable spacing in all prescriptions.

Develop 7 to 10 large hardwood trees per acre by thinning around existing hardwoods or planting. Preferred species are big-leaf maple and alder.

Underplant about 25 to 30 percent of the treated acres with about 50 TPA.

Prescription 3—Leave 65 to 110 TPA after all actions

Leave 65 to 110 TPA in 10 to 15 percent of the acres proposed for treatment. Provide for variable spacing in all prescriptions.

Develop 10 to 14 large hardwood trees per acre by thinning around existing hardwoods or planting. Preferred species are big-leaf maple and alder.

Do not underplant any of the treated acres.

Consider first the areas with steep north and east-facing aspects.

Prescription 4—Canopy gaps

Create canopy gaps in all commercially thinned stands. Create gaps during harvest operations or through creating concentrations of snags and down wood after harvest operations are completed.

Limit size of gaps to between 1/4 and 3/4 acre. Limit gap presence in stands to no more than 10 percent of the total area thinned. Create gaps at least 100' away from stream channels and headwalls. Create some gaps adjacent to late-successional forest habitat.

Locate gaps, favoring the flatter (less than 50 percent slope) stands, with south and west facing aspects, and wind-protected areas.

Leave 1 to 5 trees in the larger gaps to speed the development of large trees and limbs.

Plant trees in each gap with about 150 TPA. Include western hemlock, western red cedar, and native hardwoods.

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

Insects, disease, and wind (NFP: p. C-12, C-13)

To reduce the potential for Douglas-fir bark beetle infestations, avoid felling trees for down wood during the period from May 1 through June 15 (adult beetle flight season)

Create gaps in laminated root disease pockets (*Phellinus weirii*) to reduce the infections and enhance stand species and structural diversity. When employing a leave tree, cut tree, or D x P designation, remove Phellinus-infected trees and all other Douglas-fir within 30 feet of the infected trees to slow the spread of laminated root rot from infection centers.

Where possible, meet stand gap creation targets within Phellinus infection centers and limit gap size to no more than ¾-acre.

When employing a D x D designation, delineate on the ground, gaps within Phellinus infection centers.

Plant gaps with Phellinus-resistant western red cedar or immune red alder or bigleaf maple, following the guidelines from the Lobster Silvicultural Report.

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

In units that are susceptible to windthrow, design silvicultural prescriptions to retain more leave trees per acre (75 or more TPA), maximize leave-tree clumping, and minimize gap creations. Additionally, where appropriate, defer thinning in high windthrow-risk areas.

Streams and riparian vegetation

Minimize log hauling on roads during the wet-season, where such use could adversely affect water quality.

Implement protective vegetation leave areas or buffers around all streams, potentially unstable areas, and wet sites to maintain stream temperature, maintain stream-adjacent slope stability (including headwalls), and protect riparian vegetation. These areas will not be commercially thinned; however, they may be non-commercially thinned.

Determine width of no-harvest buffers based on site-specific factors such as stream order, presence or absence of conifers, and slope-stability conditions. Buffers will at least include the inner gorge adjacent to streams and the active floodplain. Locate buffers for all perennial streams at least 30 feet slope distance from the edge of the floodplain; for intermittent streams at least 15 feet from the edge. Retain the first two rows of conifer trees within 100' of perennial streams. Increase buffer widths where needed to avoid unstable areas (SFP: FW-087, -088, -089, -112).

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 will influence thinning prescriptions. Retain an average of 40 to 60 trees per acre.

Directionally fell trees away from buffers to protect riparian vegetation from damage. Retain trees 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 (SFP: FW-091).

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 streams (SFP: FW-091, -092).

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 silviculture prescription. Where skyline corridors pass through riparian buffers, remove no more than 20 percent of the canopy in a given 1,000-foot reach of stream (SFP: FW-091). Locate corridors to avoid being directly over coho habitat.

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

To reduce sedimentation into streams from aggregate-surfaced roads, minimize blading of ditches, monitor roads during periods of heavy rain, and use straw bales to trap sediment where necessary.

Suspend log hauling when it is determined that active erosion control measures cannot prevent sediment from entering streams. Where haul is allowed during wet weather, apply mitigating actions such as requiring "constant reduced tire pressure" (steering axle tires at 85 psi and all other tires inflated to the tire manufacturer's recommended minimum pressure) to reduce sedimentation. Include a hydrologist in making determinations about use of straw bales and suspension of log hauling.

Domestic water sources

No known domestic water-diversion sites and equipment are located in or near stands proposed for treatment.

Soils

To minimize soil disturbance, use standing skyline cable or helicopter logging systems as the primary method of log removal for all thinning sales.

A combination yarder-loader, preferred over ground-based systems, may by used as an economical means of yarding logs. This equipment will remain on roads, with the capability of yarding up to 300 feet from roads, depending on affected slopes. The equipment will maintain one-end suspension of logs during inhaul.

Where a loader, from a road, cannot reach the small areas that are inaccessible to skyline yarding, consider use of ground-based logging systems in these areas where slopes are less than 30 percent. A soil scientist or hydrologist will be involved to determine use of ground-based systems case-by-case. Considering the trade-offs, the specialist(s) may determine that an alternative solution—such as building a short road, logging by helicopter, or thinning and leaving the cut trees on site may be more appropriate.

Retain—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 will be retained across at least 80 percent of each unit. This practice, coupled with limbs that normally break off during yarding, will serve to address soil nutrient, displacement, and erosion concerns. Observations indicate that less soil displacement occurs in units where whole-tree yarding is done than in units where log yarding occurs.

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

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).

Temporary (non-system) roads and skyline landings

[Reopening temporary roads and building new temporary roads only apply to Alternative 2.]

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

Do not reuse existing roads where road instability is likely a major concern. Refer to table A-2 for a list of roads not suitable for use.

Table A-2. Summary of roads not to be reopened

Stand*	Road number	Rationale
005, 006 and 007	Unnumbered road	Not needed for skyline harvest
016	3412-111	Not needed for skyline harvest and unstable
036	Unnumbered spur in northern portion of stand	Lower portion of the road is not needed for skyline harvest and is too steep
043	Unnumbered spur in stand interior	Road-fill failure at stream crossing
073	3307-001	Unstable and entrance of road was cut off by newer road
168	Unnumbered spur in stand interior	Not needed for skyline harvest
193	Unnumbered spur in southern interior	Road is too steep
231	3305-900	Through-cut areas with year-round water saturation
335 and 356	Unnumbered spurs that cross Preacher Creek to access the stands	Preacher Creek crossing no longer available
351	Unnumbered spur in southern portion of stand	Too steep on west end and no suitable stream crossing on east end
375	Unnumbered spur in SW portion of stand	Not needed for skyline harvest
404	Unnumbered spur below switchback of 3509	Too steep

*All stands have a 502 prefix.

Limit new temporary spur roads to stable ridges to minimize soil disturbance. No new Forest classified (system) roads will be built. Where feasible, design the logging plan to minimize the need for new temporary roads (SFP: FW-162, 163).

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

Scatter slash created through road building in the stands.

Use new temporary roads during the dry season whenever possible to avoid adding rock to native surfaces and to reduce costs. Identify these roads in the timber sale contract.

Limit to dry season, as much as possible, the use of the temporarily reopened non-system roads. This would minimize the need for additional rock and to reduce costs. If a road is to be used during the wet season, surface with rock aggregate where needed. Surfacing depth should allow for log trucks using constant reduced tire pressures.

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.

To minimize sedimentation from roads, waterbar and close temporary roads between operating seasons or as soon as the need for the road ceases.

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

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 will determine appropriate sites for machine piling and burning. These sites generally include roads and landings that have been rocked (SFP: FW-162).

A watershed specialist (such as a hydrologist, soil scientist, or geologist) will evaluate temporary roads used for timber removal (especially those used during the wet season) to determine need for ripping or subsoiling. Identify roads to be ripped in the timber-sale contract tf ripping is to be done by the timber-sale contractor. Avoid subsoiling in areas where residual tree roots may be adversely affected.

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

System Roads Associated with Commercial Thinning

(The Transportation Plan contains additional information).

Wet Season Log Hauling

When selecting key and non-key roads for potential winter wet-season log haul, 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. Selections of short, stable ridgetop roads or roads not located on north aspects are preferred.

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, specify 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. Smooth out existing waterbars, replace failing ditch-relief culverts, and apply needed surfacing materials.

During wet-season haul, limit potential sedimentation of streams by using 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. Use the guidelines in the Siuslaw Road Rules (1/98) to suspend log hauling when ground conditions will result in unacceptable road or resource impacts.

Key Roads

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

Repair and maintain key roads that will be used as haul routes. Repair and maintenance work is limited 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.

Consider conversion from asphalt to gravel surfacing where it is economically more beneficial than repairing failed asphalt surfacing and sub grade.

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.

Reestablish clearing limits along key forest roads 3225, 3305, 3500, 3505, and 3515, 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 will not be thinned under a timber sale contract.

Non-key Roads

Stabilize and close roads not needed for continuous access. Decommission un-needed roads.

Where needed for project access, temporarily reopen closed roads.

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

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

Replace water bars, remove temporary culverts, and close project-maintained roads when the project is completed. Follow the Water Bar Placement Guide for Siuslaw Forest Roads.

Locate road drainage (cross drains) in areas that will not discharge over unstable slopes. If unstable roads are to be used, stabilize them prior to their use.

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

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

Repair, resign, and lock existing gates in the Lobster planning area, following project actions. Roads affected include 3306, 3417, and 3506.

Remove existing culvert fill material and unstable sidecast material from system roads in stands, when roads are no longer needed for this project (table A-3). Use criteria identified for road decommissioning when working on these roads.

Table A-3. Culvert fill and unstable sidecast removal summary

Stand*	Subwatershed	Road number	Culvert fill to be removed (cu. yds.)	Sidecast fill to be removed (cu. yds.)
009/010	Bear	3412-113	1,400	0
041	Lower-Middle Lobster	3310-118	700	20
100	Lower Middle Lobster	3310 (lower portion)	750	200
135	Lower Lobster	3305-111	1,000	500
141	Lower Lobster	3305-114	450	0
191	Lower Lobster	3305-118	0	1,100
205	Camp	3305-130	100	0
217	Camp	3507-123	0	1,000
221	Preacher	3505-004	0	50
231	Camp	3305-900	0	100
242	Camp	3305-003	0	900
301	Preacher	3500-112	200	0
324/337	Preacher	6300-124; 6300-130	2,000	0
334/345	Preacher	3500-901	100	0
398	Preacher	3510-113	0	1,300
Total			**6,700**	**5,170**

*All stands have a 502 prefix.

Helicopter landings

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

Do not locate helicopter service landings near streams to minimize potential for petroleum spills affecting water quality.

Because the number of large helicopter log-landing sites is limited, use existing roads as log drop zones for helicopter logging by small ships, such as the K-Max and the Bell 204. 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.

When helicopter yarding stands 190 and 193, locate the primary log landing at the junction of roads 3505 and 3507, and locate the secondary log landing at the junction of roads 3507 and 3507-123. This will reduce the potential for damaging road 3507 during the wet season and minimize the need for rock.

Burn logging slash in the meadow below plantation 502378 after logging operations are completed. Use a brush blade when machine-piling slash to minimize the amount of dirt mixed with the slash. Seed burned areas.

Post-Harvest Mitigation Actions

These treatments focus on incorporating management elements for noxious and undesirable weeds, fire and fuels, and dead wood (snags and down wood).

Dead wood creation

Create dead wood (snags and down wood) in plantations by using the following prescriptions based on the Late-Successional Reserve Assessment, Oregon Coast Province, Southern Portion, version 1.3, p. 66-69:

Supply a steady input, at minimal levels, of down wood and snags over time. The dead wood prescription for this project recommends leaving portions of dead wood in snags. The minimum level of dead wood recommended in the LSR Assessment is 525 cubic feet per acre in young stands: “Drop trees or create snags to develop 525 to 2844 cubic feet per acre”. The average diameter of trees after commercial thinning will be about 15” dbh, which is about 50 cubic feet per tree. It will require 11 of these 15” dbh trees per acre to equal 525 cubic feet.

Retain an average of about 11 trees per acre in commercially thinned plantations to meet minimum goals for dead wood. Emphasize snag creation when creating dead wood in commercially thinned stands. Trees selected for dead wood will be greater than 10” DBH. These trees, coupled with the existing dead wood in plantations, will approximate the minimum amounts recommended by the LSR Assessment.

Use snag and down wood creation to create gaps in the canopies of stands. Use gaps in stands to help create early seral habitat.

Silvicultural prescriptions for plantations will ensure that dead wood will persist in all areas. Retain existing snags and down wood in un-thinned areas and recruit additional dead wood for the next 10 to 20 years through tree mortality.

Consider creating snags and down wood in areas that enhance development of large trees and large limbs, including conifer and hardwoods.

Concentrate about 70 percent of snags in clumps and 30 percent in a dispersed pattern.

Creating cavities in live trees

In natural stands adjacent to commercially thinned managed stands, promote development of large cavities by topping large (30 to 45" DBH) trees or inoculating them. These actions will mitigate for past losses of large trees with cavities. Inoculate large trees with native fungi (*Phellinus pini* and *Fomitopsis canjanderi*). These fungi species causes heart-rot that can result in cavities, but will allow for continued tree growth. Inoculation should occur in less vigorous trees to improve potential for successful creation of cavities from inoculum. Implement this treatment in about 300 trees in the project area.

Creating snags in plantations

Create about 6 snags per acre to mitigate for past losses of large snags and to mitigate for thinning that reduces the amount of snags in plantations. Create snags by girdling or topping trees. Create snags in clumps that are less than ¾-acre in size and retain a few live trees in these clumps.

Use existing snags > 10" DBH towards meeting the snag allotment for individual stands.

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

Do not create snags from trees that appear to contain stick nests, such as those used by red tree vole or raptors.

Do not use blasting to create snags from between March 1 and September 30, to avoid potential disturbance to spotted owls and murrelets.

Defer creating snags in harvested units until three years after harvest to allow for canopy recovery, where needed, and to allow for blow-down. At that time, monitor the canopy cover before the trees are killed to ensure canopy cover remains at or above 40 percent in all units.

Include about seventy percent of snags in clumps, with at least one clump for each five acres, and the remainder scattered. Distance between larger clumps (>1/4 ac.) should generally be 300 to 600 feet.

Use snag clumps to create gaps around dominant trees, co-dominant trees, or hardwoods.

Clump sizes should average ½ acre and not exceed ¾ acre:

Clump size	clump radius
¼ ac.	60'
½ ac.	85'
¾ ac.	100'

Creating down wood in plantations

Fall and leave about 5 trees per acre, greater than 10" DBH, for down wood. These trees should be located near snag clumps, in smaller clumps, or individually scattered.

Defer creating down wood in harvested units until three years after harvest to allow for canopy recovery, where needed, and to allow for blow-down. At that time, monitor the canopy cover before the trees are felled to ensure canopy cover remains at or above 40 percent in all units, and monitor the contributions from blow-down.

Vary the distribution of created down wood, depending upon the distribution of existing down wood. The desired distribution of all down wood, existing and created, is to have at least one clump for every five acres, with some down wood individually scattered. Distance between larger clumps should generally be 300 to 600 feet. Create down wood in areas that help development of large trees and large limbs by creating gaps around dominant trees, including some hardwoods. Refer to the silviculture prescription table for site-specific down wood requirements.

Fell trees for woody debris in areas that would enhance density variability within stands. Use *phellinus* pockets as places to concentrate down wood.

To reduce the potential for Douglas-fir bark beetle infestations, minimize felling trees for down wood during the period from May 1 through June 15 (adult beetle flight season).

Invasive plant prevention and mitigation

Follow the *Pacific Northwest Region Invasive Plant Program, Preventing and Managing Invasive Plants Final Environmental Impact Statement* (ROD, Oct. 11, 2005).

The project area has existing populations of noxious weeds, primarily along roads 3205, 3306, 3306-116, 3307, 3307-112, and 3412. Implementing this project will increase the potential for spreading existing populations and for introducing new infestations. Existing populations and any new infestations detected will be treated with mechanical, manual, and biological control methods.

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

To reduce the potential for spread of noxious and undesirable weeds, all heavy equipment (including dump trucks, excluding log trucks) 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-C/CT 6.36).

To prevent the spread of noxious and undesirable weeds from and between high weed risk stands and worksites, clean all heavy equipment (including dump trucks, excluding log trucks) used in high weed risk units and worksites prior to going to another project site or prior to leaving the work site. Use compressed air, high-pressure water, or other specified cleaning method to assure equipment is free of soil, vegetative matter, or other material that could contain or hold weed seeds. Prohibit the use of chemicals such as solvents and detergents to clean equipment on National Forest System lands. The Forest Service will specify cleaning areas, either on site or at a facility with a catch basin. Refer to the project file for a list of high-risk areas.

Develop noxious and undesirable weed treatment prescriptions for high weed risk project sites and their adjacent areas and control weeds as necessary prior to beginning project operations. False brome is present in the project area (EA, maps 2 and 3).

To reduce the risk of spreading noxious and undesirable weed infestations, begin project operations in un-infested areas before operating in weed-infested areas.

Locate and use weed-free project staging areas. Avoid or minimize all types of travel through weed-infested areas or restrict those periods when spread of seed or propagules are least likely.

Inspect and document all limited term ground-disturbing operations in noxious weed infested areas for at least three (3) growing seasons following completion of the project. Provide for follow-up treatments, based on inspection results.

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.

Fire and fuel management

Follow the Fire Management Plan for LSR RO267 for all wildfire suppression or pre-suppression prevention programs. For burning landing slash and hand piles, prepare a burn plan that meets all the parameters identified in FSM 5150. Register all material to be burnt through the Forest fuels planner and enter into the FASTRACS program. Allow 5 to 7 days to complete this process that must be done prior to burning. Conduct all burning according to the guidelines of the Oregon Smoke Management Plan and the Department of Environmental Quality's Air Quality and Visibility Protection Plan.

Design fuel treatment activities to meet Aquatic Conservation Strategy objectives and to minimize disturbance to riparian vegetation. Refer to the Northwest Forest Plan (FM-1, 3, 4, 5; pp. C-35, 36) for additional information.

Where fuel borders county roads and key forest roads maintained open for general use, provide fuel breaks to reduce the risk of human-caused fire. Measure fuel breaks from the edge of the road into the thinned units. Key roads will require a minimum 25-foot fuel break for each side of the road bordered by fuel. About 36 total acres will be treated. High cut banks (with no slash) can be considered adequate fuel breaks. See fuels prescription for a list of affected stands and roads.

If scattering of landing piles will not adequately address the fire hazard, burn landing slash within 25 feet of open-system roads. Follow-up burning with native, certified weed-free seeding if landing is larger than 1/5 acre (about 95' X 95') and has a native (non-rock) surface.

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.

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 will 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.

To reduce the potential for wildfire, do not fell trees for down wood in designated fuel breaks unless the tops are kept outside of the breaks. Designated fuel breaks need to be identified in the timber-sale contract or on implementation plan maps.

Post-Harvest Enhancement Actions

Maintain or improve grass, forb, and shrub habitat

Eliminate unwanted woody vegetation, primarily conifers and blackberry, from about 54 acres of existing meadows with manual, mechanical, and/or burning methods. Table A-4 includes acres identified for meadow maintenance by subwatershed and land allocation.

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

Improve grass, forb, and shrub habitats through burning and seeding in stands where commercial thinning reduces canopy cover below 50 to 60 percent (about 50 to 60 trees per acre). Burn about 775 acres, and seed about 1,000 acres, including portions of all units and especially gaps and under-burned areas. Protect streams with 200-foot no-burn buffers along fish-bearing streams and 50-foot no-burn buffers along all other streams.

Consider under-burning portions of stands 003, 008, 016, 036, 141, 150, 162, 170, 221, 238, 301, 337, 340, 345, 346, and 355 to encourage maintenance or restoration of grasses, forbs, or shrubs. Refer to the Wildlife Habitat Report for the estimated acres to be treated in each stand.

Apply seed in meadows, in portions of under-burned stands and gaps, on temporary roads, on burned landings, and where road maintenance or reconstruction exposes soil. Apply native seed to permanent meadows with native grasses or forbs. Apply native seed, if available, to transitory areas, such as roads. The Forest botanist and District wildlife biologist will determine appropriate species for seeding.

For burning sites designated for early seral habitat creation and for meadow maintenance, prepare a burn plan that meets all the parameters identified in FSM 5150. Register all material to be burnt through the Forest fuels planner and enter into the FASTRACS program. Allow 5 to 7 days to complete this process that must be done prior to burning. Conduct all burning according to the guidelines of the Oregon Smoke Management Plan.

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. Refer to the Northwest Forest Plan (FM-1, 3, 4, 5; pp. C-35, 36) for additional information.

Burn logging slash in the meadow below plantation 502378 after logging operations are completed. Use a brush blade when machine-piling slash to minimize the amount of dirt mixed with the slash. Seed burned areas.

Table A-4. Existing meadows in Lobster Creek on Siuslaw NF

Sub-watershed	LSR	LSR-murrelet	Matrix	Grand Total
Camp	3			**3**
Lower Lobster	2	10	21	**33**
Lower Mid Lobster	7		3	**10**
Preacher	8			**8**
Grand Total	20	10	24	**54**

Non-commercial thinning

Non-commercially thin up to 210 acres of stands. Thinning prescriptions are designed to reduce inter-tree competition, enhance species and structural diversity, create variable spacing in stands, and control Phellinus infections. Appendix B-4 identifies stands for non-commercial thinning.

Planting and tending young trees in commercially thinned stands

Create gaps (¼ to ¾ acre in size) in the canopies of commercially thinned stands and plant. The gaps increase habitat diversity and create short-term early-seral habitat.

Plant stands thinned to 60 residual trees per acre or less. Planting sites will be defined by the numerous small openings in stand canopies created by the commercial thinning operations.

To enhance tree-species diversity, plant western red cedar, western hemlock, Sitka spruce, red alder, vine maple, and big leaf maple in gaps and selected stands.

Specific criteria include:

Prepare planting sites by scalping the sites to mineral soil. Size of planting sites will be a minimum of 24" x 24"

Plant an average of 150 trees per acre in created gaps and 50 trees per acre in selected stands, as specified in the EA, appendix B-2.

Plant seedlings a minimum of 15 feet away from any residual trees.

Plant up to four seedlings in "clumps" within 4 feet of each other. If two or more species of seedlings are specified, each species should be represented in each planted clump.

Plant seedlings in protected "microsites," such as near stumps or down logs.

Vary spacing from 4 feet to 20 feet between trees to encourage both clumping opportunities and to take advantage of preferred microsite planting spots. Although spacing can be highly variable, the number of seedlings planted per acre should average150 ± 25 percent in gaps (e.g., 28 to 47 trees per ¼ acre).

Where gaps are created in *Phellinus* infection centers, plant only a combination of western red cedar, red alder, bitter cherry, vine maple, and big leaf maple seedlings to prevent the spread of the disease.

Protect seedlings with Vexar tubing—with the exception of Sitka spruce—from excessive browsing from browsing wildlife.

Reduce brush competition around planted trees to aid their survival and establishment. Release needs will be confirmed suring the first and second year seedling survival surveys. Two manual-release treatments may be needed. Use the standard Siuslaw National Forest release contract specifications.

Appendix B-4 of the EA and Table 2 in the Lobster Silvicultural Prescription Report contain planting acreages for each stand.

Riparian planting and release

About 5 acres will be planted in riparian areas adjacent to Preacher Creek (near stand 378). Actions include initial site preparation, planting and protection of seedlings, and release of seedlings. Riparian treatments have been identified and summarized in Appendix B-4.

Road Decommissioning

> *Road decommissioning definition*—Activities that result in the stabilization and restoration of unneeded roads to a more natural state (Federal Register, January 12, 2001).

Decommission roads 3305-111, 3305-900, the southernmost portion of 3310, 3412-113, 3500-112, 6300-124, and 6300-130.

Using a team of planners (at least a fish biologist and hydrologist) and engineers, review the road project sites before preparing design plans for road-decommissioning contracts. Planners and engineers will review any changes in design plans before they are incorporated into contracts.

Implement decommissioning activities during the dry season (July 1 to September 15). When needed, obtain a waiver from the State to conduct the work after September 15. Follow the directions in the Forest Road Obliteration and Upgrade Guide.

Control erosion at fill removal sites. Method of control will vary 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.

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

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 will 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 culvert functioning in place.

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

Place woody debris (locally available alder and brush from the decommissioning site 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.

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).

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.

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).

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

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).

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

Transport off-site culverts removed from stream crossings and ditches. Recycle, reuse, or dispose culverts at a landfill.

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

To meet scenic quality objectives, place disturbed material from road decommissioning in such a manner as to follow natural contour lines and vary with surrounding topography in order to appear part of the natural landscape as much as possible.

Abandoned Road Stabilization

Remove culvert fill (about 1,400 cubic yards) and unstable sidecast fill (about 1,000 cubic yards) from an abandoned road in the bottom portion of stands 005, 006, and 007 (Alternative 2 only). Use the criteria for road decommissioning when stabilizing abandoned roads.

Road 3205-111 Adjacent to Elk Creek

Remove culverts in road 3205-111 to restore watershed function. Coordinate roadwork plans with the landowner of the parcel located in T14S, R9W, section 21. Temporary culverts or armored crossings may be placed in the road by the landowner to access the parcel. Temporary culverts or armored crossings placed in the road would be removed by the landowner when access is no longer needed. All roadwork must meet Forest Service specifications.

Road Closure

Close roads needed for intermittent project access. Closure devices will be 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.

Locate and design road-closure devices to facilitate parking for forest users.

Repair, resign, and lock existing gates on roads 3306, 3417, and 3506.

To the extent possible, defer road closures until first-entry, post-harvest mitigation and enhancement actions are completed.

Planners and engineers will review the project sites before preparing design plans for road-closure contracts. Planners and engineers will review any changes in design plans before they are incorporated into contracts.

Implement road closure actions during the dry season (July 1 to October 15).

Design water bars to facilitate proper drainage of surface water and to prevent ponding. Place water bars in areas where drainage will not destabilize road fills.

To keep streams within their channels when culverts are obstructed, build water bars immediately above existing culverts to become the overflow point. Use the Waterbar Placement and Construction Guide for Siuslaw Forest Roads to determine water-bar spacing and design (SFP: FW-123).

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.

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

Roadside thinning and salvage adjacent to key forest roads

Prohibit thinning and salvaging trees within 30 feet of coho salmon streams.

Reestablish clearing limits in plantations 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.

Maintain appropriate road drainage and erosion control during thinning and salvage operations.

Leave harvest equipment on the road. 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 where uphill yarding occurs.

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

Accomplish forest road maintenance objectives where applicable during roadside thinning to limit treatment entries. Where roadside commercial thinning occurs in stands between 20 and 60 years old that were not commercially thinned under timber sale contracts, these stands may be thinned within ½ site tree (130 feet) from above or below the road. Spacing of residual trees will range from 25 to 35 feet.

Roadside danger trees

Identify dangerous trees, using the *Field Guide for Danger Tree Identification and Response* (USDA, USDI, et al. 2005).

Evaluate dangerous trees by including a road manager, a wildlife biologist, and a silviculturist (or another person trained in danger-tree identification) along key forest roads and timber-sale haul routes. These specialists will determine which trees, snags, or both need to be felled or topped to eliminate roadside hazards.

Priority for felled danger trees: 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.

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.

Implementation Monitoring

Forest Plan Standards and Guides

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

Contract and Operations

Involve appropriate specialists when developing timber sale, road decommissioning and other project contracts or conducting District operations work to ensure activities are implemented as designed. The appropriate specialists will also participate periodically during contract work, especially when unusual circumstances arise that may require a contract modification.

Key checkpoints include a plan-in-hand review, and a contract review of specifications before the next phase of work begins (to ensure key problem situations are addressed in the specifications).

During thinning operations, monitor the consistency of the silvicultural prescriptions in achieving: (1) the desired leave tree stocking, (2) variable spacing, and (3) 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.

Effectiveness Monitoring

Monitoring will be tiered to the Siuslaw Forest Plan. The appropriate specialists will be involved in the various monitoring tasks identified below.

Threatened and Endangered Species

Implementation and monitoring forms need to be completed and submitted with a cover letter from the Forest Supervisor to formally verify all adverse effects to listed species have been reported. These reports are to be submitted yearly by November 3.

Vegetation Management

Monitor thinning effectiveness in achieving: (1) the desired leave tree stocking, (2) variable spacing, (3) species and structural diversity, and (4) treatment of Phellinus infection centers. Adjust post thinning prescriptions for planting, and snag, and down wood creation where necessary to further enhance wolf tree creation, stand spacing variability and structural and species diversity.

Monitor planting effectiveness in achieving (1) survival, (2) variable spacing, and (3) species diversity within planted gaps, and upland and riparian underplant areas.

Monitor created snags and wildlife trees by observing effects of fungal injection. Observations will focus on the location and rate of decay, and use by cavity nesters.

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.

Observe all thinned stands to determine if residual trees are being damaged by Douglas-fir bark beetles.

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

For a period of three years after project activities are completed, monitor project sites with a high risk of noxious weed infestation. Conduct monitoring annually and focus on effectiveness of noxoius weed control measures as well as detection of new infestations. Refer to the Botanist Report for specific treatment areas and prescriptions.

For a period of three years after project activities are completed, monitor project sites with a high risk of weed infestation. Conduct monitoring annually and focus on detection of new weed infestations. Refer to the project file for a list of high-risk stands.

<u>Monitor</u> the effectiveness of silvicultural prescriptions in achieving variable density spacing and the retention of existing species and structural diversity prior to planting and the creation of snags and down wood. <u>Adjust</u> prescriptions for planting, and snag and CWD creation in treated stands where necessary to further enhance stand spacing variability and structural and species diversity.

Wildlife Habitat Treatments

<u>Use</u> sample plots to monitor vegetation response to areas under-burned for early seral habitat enhancement.

<u>Sample</u> post-harvest canopy closures for all harvest densities (40, 60, and 90 TPA) to attain a more accurate picture of short-term and long-term canopy closure response to thinning in the watershed. Stands should be sampled within one year after harvest, then again every two years for up to 10 years after harvest.

<u>Sample</u> all harvest densities (40, 60, and 90 TPA) to quantify cavity nester use of created snags. Stands should be sampled at approximately 1, 3, 5 and 10 years after harvest for evidence of both cavity nesting and foraging.

Road Treatments

<u>Field-review</u> excavated slopes from road stabilization activities and note areas where eroded materials enter stream channels. If the surface is eroding and could adversely affect fish habitat, take steps to eliminate or reduce erosion.

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

Mitigation and Enhancement Actions

Tables A-5 and A-6 summarize mitigation and enhancement actions associated with Alternatives 2 and 3, respectively, and include estimated costs. The tables list the actions in order of priority. Those not identified as mitigation are considered enhancement actions.

Table A-5. Alternative 2 mitigation and enhancement actions summary

Prioritized action	Mitigation	Unit of measure	Unit number	Cost per unit	Total cost
Control noxious weeds	Yes	Acres	50	200	10,000
Monitor noxious weeds	Yes	Acres	300	10	3,000
Decommission system roads	Yes	Miles	4.9	9,000	44,100
Remove culvert and sidecast fill from non-key roads	Yes	Cubic yards	5,720	10	57,200

Prioritized action	Mitigation	Unit of measure	Unit number	Cost per unit	Total cost
Remove culvert and sidecast fill from temporary roads and the abandoned road	Yes	Cubic yards	2,640	10	26,400
Close roads and repair gates[a]	Yes	Miles	2.3	2,650	6,100
Create snags in plantations[b]	Yes	Trees	17,900	15	268,500
Create down wood in plantations[c]	Yes	Trees	15,000	10	150,000
Create cavities in mature trees by topping or inoculation	Yes	Trees	300	100	30,000
Non-commercially thin plantations <20 years old	No	Acres	162	200	32,400
Non-commercially thin plantations >20 years old	No	Acres	50	560	28,000
Maintain meadow habitat	No	Acres	54	120	6,480
Create grass, forb, and shrub habitat[d]	No	Acres	775	250	193,750
Riparian planting	No	Acres	5	800	4,000
Riparian release	No	Acres	5	1,000	5,000
Plant trees in thinned plantations	No	Acres	736	800	588,800
Release trees planted in thinned plantations (2 releases)	No	Acres	736	1000	736,000
Monitor snags, down wood, and grass, forb and shrub habitat	No	Units	77	70	5,390
Monitor stream shade[e]	No	Miles	2	300	600
Monitor meadow habitat	No	Meadows	13	90	1,170
Total					**2,196,890**

[a] Includes roads not used for commercial thinning operations.
[b] Snags created would be counted as mitigation; girdling, topping or inoculation would be used.
[c] Down wood created would be counted as mitigation.
[d] Underburning would occur in about 16 plantations after commercial thinning to encourage growth of grass, forb,

and shrub habitat.
[e] Monitoring includes Phillips and Silt Creeks.
Note: Fuel treatment costs are accounted for in the timber-sale appraisal as “BD” (brush disposal) costs.

Table A-6. Alternative 3 mitigation and enhancement actions summary

Prioritized action	Mitigation	Unit of measure	Unit number	Cost per unit	Total cost
Control noxious weeds	Yes	Acres	50	200	10,000
Monitor noxious weeds	Yes	Acres	250	10	2,500
Decommission system roads	Yes	Miles	4.9	9,000	44,100
Remove culvert and sidecast fill on non-key roads	Yes	Cubic yards	5,720	10	57,200
Remove culvert and sidecast fill from the abandoned road	Yes	Cubic yards	2,400	N/A	24,000
Close roads and repair gates[a]	Yes	Miles	2.3	2,650	6,100
Create snags in plantations[b]	Yes	Trees	17,000	15	255,000
Create down wood in plantations[c]	Yes	Trees	14,200	10	142,000
Create cavities in mature trees by topping or inoculation	Yes	Trees	290	100	29,000
Non-commercially thin plantations <20 years old	No	Acres	162	200	32,400
Non-commercially thin plantations >20 years old	No	Acres	249	560	139,440
Maintain meadow habitat	No	Acres	54	120	6,480
Create grass, forb, and shrub habitat[d]	No	Acres	740	250	185,000
Riparian planting	No	Acres	5	800	4,000
Riparian release	No	Acres	5	1,000	5,000
Plant trees in thinned plantations	No	Acres	683	800	546,400
Release trees planted in thinned	No	Acres	683	1,000	683,000

Prioritized action	Mitigation	Unit of measure	Unit number	Cost per unit	Total cost
plantations (2 releases)					
Monitor snags, down wood, and grass, forb, and shrub habitat	No	Units	75	70	5,250
Monitor stream shade[e]	No	Miles	2	300	600
Monitor meadow habitat	No	Meadows	13	50	1,170
Total					**2,178,640**

[a] Includes roads not used for commercial thinning operations.
[b] Snags created would be counted as mitigation; girdling, topping or inoculation would be used.
[c] Down wood created would be counted as mitigation.
[d] Underburning would occur in about 16 plantations after commercial thinning to encourage growth of grass, forb, and shrub habitat.
[e] Monitoring includes Phillips and Silt Creeks.
Note: Fuel treatment costs are accounted for in the timber-sale appraisal as “BD” (brush disposal) costs.

Stand-Exam Summary

Stand Number	Year of Plantation Origin	Total Stand Acres	Average Trees per Acre	Mean Tree DBH (Inches)	Mean Tree Height (Feet)	Past 10 Years Mean Dia Growth (Inches)	Ave Maximum 10 Year Diameter Growth (Inches)	Average Basal Area per Acre (Sq Ft)	Relative Density	Total Board Feet/Acre (MBF)	Total Cubic Feet/Acre (CCF)
Bear Subwatershed											
502003	1979	59	383	10.2	64	3.2	5.8	215	67.3	28.8	72.3
502004	1969	88	283	12.5	94.2	1.3		233	65.9	38.6	97.9
502006	1965	140	259	13.2	81	1.9	5.8	248	68.3	43.3	100.5
502007	1975	37	285	10.8	70	3.0	5.9	180	54.8	25.0	63.4
502008	1978	30	229	12.1	73	4.5	7.3	182	52.3	25.5	63.9
502009	1961	78	204	13.5	95	1.9		204	55.5	34.6	85.5
502011	1964	51	257	13.0	84	2.3		238	66.0	34.3	92.2
502013	1963	51	158	14.8	91	2.3		190	49.4	30.5	77.8
Camp Subwatershed											
502134	1959	20	274	9.4	68	2.1		200	65.2	28.0	70.9
502162	1964	8	139	11.5	80	1.5		100	29.5	14.4	37.8
502170	1964	39	195	13.9	88	2.1		205	55.0	31.8	82
502172*	1967	32	180	11.5	75	2.1		130	38.3	25.0	64.4
502184	1974	83	251	10.7	65	3.7	5.8	157.5	48.1	20.0	50.3
502191	1970	57	240	13.4	84	2.2	6.8	236	64.5	37.4	92.1
502205	1980	24	409	8.8	56	2.3	4.9	171	57.6	22.0	53.2
502206	1961	54	158	14.5	83	1.9		182	47.8	26.2	69.3
502208	1959	56	167	13.9	97	1.3		177	47.5	30.5	75.6
502217	1965	40	259	12.3	75	2.0	5.6	212	60.4	32.1	78.8
502231*	1976	66	186	12.0	75	2.2		145	41.9	25.0	64.2
502242	1963	188	194	13.1	95	2.2		181	50.0	30.3	76.2
502251	1959	85	152	15.3	105	1.9		195	49.9	36.4	87.9
502276*	1970	49	192	12.0	80	2.0		150.0	43.3	28.0	72.0
502311	1961	42	180	16.3	97	2.5	5.8	261	64.6	49.9	113.9
502325	1966	10	152	12.4	91	1.7		156	44.3	23.9	62.1
Elk Subwatershed											
502022	1970	66	218	13.4	87	2.2	6.8	213	58.2	33.5	82.4
502026	1975	52	218	12.9	81	2.9	6.2	197	54.8	29.6	72.7
502027*	1970	48	160	11.5	80	2.0		160.0	47.2	21.0	53.9
502029*	1976	41	185	13.0	75	2.5		170	47.1	25.0	64.2

Stand-Exam Summary

Stand Number	Year of Plantation Origin	Total Stand Acres	Average Trees per Acre	Mean Tree DBH (Inches)	Mean Tree Height (Feet)	Past 10 Years Mean Dia Growth (Inches)	Ave Maximum 10 Year Diameter Growth (Inches)	Average Basal Area per Acre (Sq Ft)	Relative Density	Total Board Feet/Acre (MBF)	Total Cubic Feet/Acre (CCF)
Lower Lobster Subwatershed											
502016	1962	110	190	14.0	87	1.5		200	53.5	31.0	79
502026*	1975	52	180	13.0	80	2.0		165	45.8	27.0	69.3
502043	1963	103	155	15.0	94	2.1		191	49.3	32.0	79.5
502073	1970	46	297	10.5	69	1.3		168	51.8	22.5	58.7
502074	1974	33	248	10.1	64	1.6	5.1	109	34.3	20.0	47.3
502095	1963	48	150	13.8	96	1.7		158	42.5	26.2	67
502098	1970	32	190	11.9	75	1.9		147	42.6	19.8	52.6
502101	1969	36	250	10.0	74	1.9		138	43.6	18.8	49.3
502116	1981	119	240	12.1	75	3.7	6.7	190	54.6	27.5	68.8
502117	1975	36	353	11.2	72	2.4	5.3	243	72.6	36.1	87.9
502125	1963	38	206	14.5	91	2.0	6.1	236	62.0	41.5	97.9
502132	1963	58	190	14.3	99	1.9		210	55.5	35.3	90.9
502135	1980	154	491	8.5	55	2.7	5.5	194	66.5	24.6	60.6
502141*	1980	61	295	9.0	70	4.5		130	43.3	22.0	56.5
502150	1974	20	330	10.2	58	1.9	5.3	187	58.6	22.2	56.1
502168	1958	67	148	14.3	100	1.9		166	43.9	29.1	72.3
Lower Middle Lobster Watershed											
502036	1965	121	258	12.0	87	1.4		195	56.3	30.3	77.5
502047	1968	24	275	13.8	89	2.1	6.5	287	77.3	46.4	113.8
502059*	1968		223	12.5	85	1.8		190	53.7	28.0	72.0
502085	1973	69	214	12.2	76	2.9	6.7	172	49.2	26.4	64.4
502100	1967	24	274	11.9	73	2.4	5.8	212	61.5	33.4	81.1
502164	1961	61	201	12.9	106	2.5		186	51.8	31.0	78.8
502190*	1981	57	290	7.5	65	2.0		90.0	32.9	20.0	51.4
502193	1965	111	135	13.7	88	2.5		138	37.3	21.3	54.5
502198	1961	16	214	14.0	93	2.0		230	61.5	36.9	95.5

Stand-Exam Summary

Stand Number	Year of Plantation Origin	Total Stand Acres	Average Trees per Acre	Mean Tree DBH (Inches)	Mean Tree Height (Feet)	Past 10 Years Mean Dia Growth (Inches)	Ave Maximum 10 Year Diameter Growth (Inches)	Average Basal Area per Acre (Sq Ft)	Relative Density	Total Board Feet/Acre (MBF)	Total Cubic Feet/Acre (CCF)
Preacher Subwatershed											
502221	1961	118	252	12.1	85	2.4		202	58.1	30.9	79.3
502238	1973	66	375	11.4	70	3.1	5.3	264	78.2	39.9	96.6
502254	1967	35	195	11.0	77	1.6		130	39.2	19.9	52.1
502290	1967	35	204	12.2	97	1.8		166	47.5	30.2	71.3
502298	1985	34	465	8.1	55	3.4	5.3	165	58.0	20.7	48.9
502300	1985	4	465	8.1	55	3.4	5.3	165	58.0	20.7	48.9
502301	1958	113	192	13.8	105	2.0		200	53.8	37.1	90.2
502321	1948	17	165	18.8	110	1.4	5.3	319	73.6	75.4	157.7
502334	1979	90	494	8.5	53	3.0		194	66.5	24.9	60.5
502335	1970	23	286	11.1	69	2.7		192	57.6	25.2	65.7
502337	1961	100	274	11.7	78	2.0		204	59.6	30.8	75.8
502338	1982	35	656	7.4	45	3.1	4.6	195	71.7	22.8	54.8
502340	1975	47	218	12.7	75	3.5	6.7	192	53.9	28.9	69.9
502345	1947	49	218	15.3	118	1.5		277	70.8	59.7	135.1
502346	1956	55	192	12.1	93	1.8		152	43.7	25.3	63.7
502351	1963	148	308	13.6	84	2.0	4.0	309	83.8	53.8	127.5
502355	1974	78	300	12.5	80	2.5		230.0	65.1	25.0	59.5
502356	1961	33	288	12.1	91	1.4		228	65.5	37.3	93.3
502375	1959	43	176	12.1	92	2.9		142	40.8	21.3	54.3
502378	1980	169	180	11.0	80	2.5	6.0	130	39.2	20.0	55.0
502379	1959	52	139	14.4	105	1.8		158	41.6	28.5	71.7
502397	1975	65	319	8.9	54	3.0	5.7	136	45.6	17.1	44.7
502398	1960	88	238	11.8	85	1.9		180	52.4	26.5	68.5
502404	1963	70	240	13.5	94			240	65.3	40.0	99.7
502419a	1975	20	293	11.6	71	3.1	6.0	215	63.1	31.4	77.0
502419b	1975	63	353	10.2	64	4.0	6.4	200	62.6	27.7	66.6
502431	1970	41	263	12.6	78	2.7	5.7	227	64.0	35.7	86.9
Total		**4781**	Acres of completed stand examinations								
* Denotes that only an informal stand exam was completed and values are estimates.											

Silviculture Prescription Summary - Alternative 2

Stand Number	Total Stand Acres	Com. Thinning (HTH) Rx Acres	Canopy Gap Creation (HSG) Rx Acres *1	No Treatment Acres Within Treated Stands *2	Post Thinning Est. Relative Density	Post Thinning Average Basal Area per Acre	Post Thinning Mean Tree DBH	Post Thinning Stocking (Trees per Ac) *3	Coarse Wood Creation (Trees per Ac)	Snag Creation (Trees per Ac)	Final Post Treat Stocking (Trees per Ac)	Volume Removed /Acre (CF)	Est Resid Crown Closure (%)
Bear Subwatershed													
502003	59	41	4	14	17.1	62	13.2	70	5	6	59	3185	46
502004	88	70	7	11	18.6	74	15.8	55/70	5	6	44/59	6465	50
502006	140	23	2	114	21.8	86	15.5	55	5	6	44	2500	47
502007	37	19	2	16	16.2	60	13.8	65	5	6	54	1975	46
502008	30	23	2	5	22.7	89	15.4	75	5	6	64	2325	53
502009	78	59	6	11	22.4	92	16.8	60	5	6	49	4000	56
502011	51	42	4	5	19.8	80	16.3	55	5	6	44	4500	46
502013	51	43	4	4	25.4	108	18.1	65	5	6	54	4450	51
Camp Subwatershed													
502162	8	5	1	2	14.4	55	14.5	55	5	6	44	1500	44
502170	39	25	2	12	28.2	126	19.9	55	5	6	44	4160	48
502172	32	8	1	23	15.5	56	13.0	70	5	6	59	3500	51
502184	83	58	6	19	18.4	68	13.7	75	5	6	64	2060	55
502191	57	37	4	16	22.0	90	16.7	65	5	6	54	3275	48
502205	24	19	2	3	18.0	59	10.8	90	5	6	79	2900	65
502206	54	36	4	14	24.5	103	17.7	65	5	6	54	2600	52
502208	56	36	4	16	25.3	108	18.2	65	5	6	54	3800	55
502217	40	25	2	13	19.4	76	15.3	65	5	6	54	3100	53
502231	66	48	5	13	17.0	60	12.5	70	5	6	59	2500	49
502242	188	126	13	49	18.0	73	16.4	55/70	5	6	44/59	5000/4000	44
502251	85	59	6	20	26.0	112	18.5	65	5	6	54	4600	52
502276	49	25	2	22	21.4	87	16.5	65	5	6	54	2500	50
502311	42	21	2	19	28.5	126	19.6	65	5	6	54	4300	54
502325	10	8	1	1	20.2	80	15.7	65	5	6	54	2400	50

Silviculture Prescription Summary - Alternative 2

Stand Number	Total Stand Acres	Com. Thinning (HTH) Rx Acres	Canopy Gap Creation (HSG) Rx Acres *1	No Treatment Acres Within Treated Stands *2	Post Thinning Est. Relative Density	Post Thinning Average Basal Area per Acre	Post Thinning Mean Tree DBH	Post Thinning Stocking (Trees per Ac) *3	Coarse Wood Creation (Trees per Ac)	Snag Creation (Trees per Ac)	Final Post Treat Stocking (Trees per Ac)	Volume Removed /Acre (CF)	Est Resid Crown Closure (%)
Elk Subwatershed													
502022	66	54	5	7	18.6	76	16.7	55/70	5	6	44/59	4000/3000	44
502027	48	34	3	11	16.0	60	14.0	55	5	6	44	2100	44
502029	41	31	3	7	23.6	100	18.0	65	5	6	54	2500/6000	48
Lower Lobster Subwatershed													
502016	110	73	7	30	25.0	104	17.3	55/70	5	6	44/59	4200/3200	44
502026	52	38	4	10	24.3	98	16.2	75	5	6	64	2635	53
502043	103	75	7	21	25.2	108	18.3	65	5	6	54	3450	52
502073	46	32	3	11	17.5	65	13.8	70	5	6	59	3450	50
502074	33	25	2	6	18.4	67	13.3	70	5	6	59	1870	51
502095	48	34	3	11	26.8	111	17.1	55	5	6	44	3000	45
502098	32	23	2	7	21.0	82	15.2	70	5	6	59	2250	52
502101	36	23	2	11	15.9	58	13.3	65	5	6	54	2750	49
502116	119	70	7	42	24.3	95	15.3	80	5	6	69	3250	58
502117	36	23	2	11	19.2	73	14.5	70	5	6	59	5100	52
502125	38	27	3	8	24.2	102	17.8	65	5	6	54	2420	53
502132	58	39	4	15	23.6	99	17.6	55	5	6	44	4200	44
502135	154	74	7	73	25.4	86	11.5	120	5	6	109	2500	64
502141	61	41	4	16	21.9	83	14.4	80	5	6	69	3000	57
502150	20	14	1	5	17.0	62	13.3	70	5	6	59	2715	50
502168	67	47	5	15	23.7	99	17.5	65	5	6	54	2725	50

Silviculture Prescription Summary - Alternative 2

Stand Number	Total Stand Acres	Com. Thinning (HTH) Rx Acres	Canopy Gap Creation (HSG) Rx Acres *1	No Treatment Acres Within Treated Stands *2	Post Thinning Est. Relative Density	Post Thinning Average Basal Area per Acre	Post Thinning Mean Tree DBH	Post Thinning Stocking (Trees per Ac) *3	Coarse Wood Creation (Trees per Ac)	Snag Creation (Trees per Ac)	Final Post Treat Stocking (Trees per Ac)	Volume Removed /Acre (CF)	Est Resid Crown Closure (%)
Lower Middle Lobster Watershed													
502036	121	80	8	33	17.9	70	15.3	55/70	5	6	44/59	5000/4200	44
502047	24	12	1	11	22.7	94	17.1	55	5	6	44	6300	44
502059	8	6	1	1	21.3	85	16.0	55	5	6	44	3500	42
502085	69	48	5	16	23.1	91	15.5	80	5	6	69	2000	56
502100	24	17	2	5	19.8	77	15.2	65	5	6	54	3405	50
502164	61	40	4	17	21.6	87	16.2	55	5	6	44	4000	45
502190	57	40	4	13	12.8	41	10.2	75	5	0	64	2500	55
502193	111	68	7	36	23.3	96	17	65	5	6	54	1700	54
502198	16	14	1	1	25.0	104	17.3	75	5	6	64	4560	60

Silviculture Prescription Summary - Alternative 2

Stand Number	Total Stand Acres	Com. Thinning (HTH) Rx Acres	Canopy Gap Creation (HSG) Rx Acres *1	No Treatment Acres Within Treated Stands *2	Post Thinning Est. Relative Density	Post Thinning Average Basal Area per Acre	Post Thinning Mean Tree DBH	Post Thinning Stocking (Trees per Ac) *3	Coarse Wood Creation (Trees per Ac)	Snag Creation (Trees per Ac)	Final Post Treat Stocking (Trees per Ac)	Volume Removed /Acre (CF)	Est Resid Crown Closure (%)
Preacher Subwatershed													
502221	118	80	8	30	16.7	65	15.1	65	5	6	54	3000	49
502238	66	46	5	15	18.4	70	14.4	70	5	6	59	5200	50
502254	35	24	2	9	18.4	69	14	70	5	6	59	2425	50
502290	35	20	2	13	14.6	57	15.2	55	5	6	44	3800	43
502298	34	24	2	8	18.9	60	10.1	109	5	6	98	2850	57
502300	4	3	1	0	18.9	60	10.1	109	5	6	98	2850	57
502301	113	77	8	28	21.5	89	17.1	55/70	5	6	44/59	5000/4200	44
502334	90	24	2	64	58.2	194	11.1	109	5	0	98	2200	60
502335	23	14	1	8	13.7	52	14.4	55	5	6	44	3750	42
502337	100	75	7	19	15.5	60	14.9	55/70	5	6	44/59	5300/3725	45
502338	35	30	3	2	12.4	38	9.4	80	5	6	69	2930	45
502340	47	45	4	-2	22.8	91	16	70/80	5	6	59/69	3600/3500	50
502345	49	40	4	2	25.7	111	18.6	60	5	6	49	5000	50
502346	55	37	4	14	16.6	65	15.4	55/75	5	6	44/64	4500/3000	45
502351	148	30	3	115	22.9	94	16.9	55	5	6	44	5000	44
502355	78	50	5	28	18.0	80	14.3	80	5	6	69	3700	52
502356	33	20	2	11	13.3	52	15.4	55	5	6	44	6080	43
502375	43	28	3	12	16.6	65	15.4	55/70	5	6	44/59	3500/2100	45
502378	169	120	12	37	18.0	68	14.3	70/80	5	6	59/65	2700/2500	50
502379	52	35	3	14	21.6	91	17.7	60/75	5	6	49/69	3500/2500	48
502397	65	40	4	21	13.0	42	10.5	80	5	6	69	1850	56
502398	88	62	6	20	18.7	72	14.8	60/70	5	6	49/59	3300	45
502404	70	59	6	5	22.5	95	17.8	60/75	5	6	49/64	6000/5000	47
502419	83	34	3	46	19.5	73	14	65	5	6	54	4200	46
502431	41	28	3	10	24.3	97	15.9	70	5	6	59	3000	53

Silviculture Prescription Summary - Alternative 2

Alternative 2 Totals						
Total Stands Commercially Thinned: 77						
Total Stands Non-commercially Thinned: 6						
Total Plantation Acres in the Planning Area			**7,253**	Acres Thinned to 40-49 TPA:	**635**	**18%**
Total Acres Proposed for Thinning/Gap Treatments			**3,303**	Acres Thinned to 50-64 TPA:	**1,800**	**51%**
Total Acres Proposed for non-commercial Thinning			**212**	Acres Thinned to 65-120 TPA	**568**	**16%**
Total Plantation Acres Deferred From Treatment			**3,904**	Acres of Canopy Gaps Created	**296**	**8%**
Percentage of Total Plantation Acres Treated			**48.46%**	Acres Thinned to 60-200 TPA *4	**212**	**6%**
Estimated Total CCF Removed	**96,168**	**CCF**				**100%**
Estimated Total MBF Removed	**42,365**	**MBF**		Total Acres	**3,515**	
Average MBF Volume Removed/Acre	**12.8**					

*1 Column 4 represents the total acres of canopy groups proposed for creation in each stand. Individual canopy sizes will range from 1/4 to 3/4 acre in size.

*2 Column E represents the acres **within** each stand that are expected to be deferred from treatment activities. These areas may include, headwalls, riparian areas, areas inaccessible due to logging system constraints, understocked areas, steep drainages, and designated "no thin" areas for a variety of reasons.

Total Acres Deferred From Treatment includes the deferred portions of treated plantations as well as those entire plantations in the Planning Area that are proposed for deferral.

*3 Column L represents the final post thinning stocking of residual conifers following the creation of snags and coarse woody material (down logs).

A value of 45/55 means that two thinning prescriptions will be implemented in the stand: one leaving a residual stocking of 45 trees and the other 55 trees.

*4 Non-commercial thinning acres only.

Silviculture Prescription Summary - Alternative 3

Stand Number	Total Stand Acres	Com. Thinning (HTH) Rx Acres	Canopy Gap Creation (HSG) Rx Acres *1	No Treatment Acres Within Treated Stands *2	Post Thinning Est. Relative Density	Post Thinning Average Basal Area per Acre	Post Thinning Mean Tree DBH	Post Thinning Stocking (Trees per Ac) *3	Coarse Wood Creation (Trees per Ac)	Snag Creation (Trees per Ac)	Final Post Treat Stocking (Trees per Ac)	Volume Removed /Acre (CF)	Est Resid Crown Closure (%)
Bear Subwatershed													
502003	59	41	4	14	17.1	62	13.2	70	5	6	59	3185	46
502004	88	70	7	11	18.6	74	15.8	55/70	5	6	44/59	6465	50
502006	140	23	2	115	21.8	86	15.5	55	5	6	44	2500	47
502007	37	19	2	16	16.2	60	13.8	65	5	6	54	1975	46
502008	30	23	2	5	22.7	89	15.4	75	5	6	64	2325	53
502009	78	59	6	13	22.4	92	16.8	60	5	6	49	4000	56
502011	51	42	4	5	19.8	80	16.3	55	5	6	44	4500	46
502013	51	43	4	4	25.4	108	18.1	65	5	6	54	4450	51
Camp Subwatershed													
502162	8	5	1	2	14.4	55	14.5	55	5	6	44	1500	44
502170	39	25	2	12	28.2	126	19.9	55	5	6	44	4160	48
502172	32	8	1	23	15.5	56	13.0	70	5	6	59	3500	51
502184	83	58	6	19	18.4	68	13.7	75	5	6	64	2060	55
502191	57	37	4	16	22.0	90	16.7	65	5	6	54	3275	48
502205	24	19	2	3	18.0	59	10.8	90	5	6	79	2900	65
502206	54	36	4	14	24.5	103	17.7	65	5	6	54	2600	52
502208	56	36	4	16	25.3	108	18.2	65	5	6	54	3800	55
502217	40	25	2	13	19.4	76	15.3	65	5	6	54	3100	53
502231	66	48	5	13	17.0	60	12.5	70	5	6	59	2500	49
502242	188	126	13	49	18.0	73	16.4	55/70	5	6	44/59	5000/4000	44
502251	85	59	6	20	26.0	112	18.5	65	5	6	54	4600	52
502276	49	25	2	22	21.4	87	16.5	65	5	6	54	2500	50
502311	42	21	2	19	28.5	126	19.6	65	5	6	54	4300	54
502325	10	8	1	1	20.2	80	15.7	65	5	6	54	2400	50

Silviculture Prescription Summary - Alternative 3

Stand Number	Total Stand Acres	Com. Thinning (HTH) Rx Acres	Canopy Gap Creation (HSG) Rx Acres *1	No Treatment Acres Within Treated Stands *2	Post Thinning Est. Relative Density	Post Thinning Average Basal Area per Acre	Post Thinning Mean Tree DBH	Post Thinning Stocking (Trees per Ac) *3	Coarse Wood Creation (Trees per Ac)	Snag Creation (Trees per Ac)	Final Post Treat Stocking (Trees per Ac)	Volume Removed /Acre (CF)	Est Resid Crown Closure (%)
Elk Subwatershed													
502022	66	54	5	7	18.6	76	16.7	55/70	5	6	44/59	4000/3000	44
502027	48	34	3	11	16.0	60	14.0	55	5	6	44	2100	44
502029	41	31	3	7	23.6	100	18.0	65	5	6	54	2500/6000	48
Lower Lobster Subwatershed													
502016	110	50	5	55	25.0	104	17.3	55/70	5	6	44/59	4200/3200	44
502026	52	38	4	10	24.3	98	16.2	75	5	6	64	2635	53
502043	103	0	0	23	25.2	108	18.3	65	5	6	54	0	52
502073	46	32	3	11	17.5	65	13.8	70	5	6	59	3450	50
502074	33	25	2	6	18.4	67	13.3	70	5	6	59	1870	51
502095	48	34	3	11	26.8	111	17.1	55	5	6	44	3000	45
502098	32	23	2	7	21.0	82	15.2	70	5	6	59	2250	52
502101	36	23	2	11	15.9	58	13.3	65	5	6	54	2750	49
502116	119	70	7	42	24.3	95	15.3	80	5	6	69	3250	58
502117	36	23	2	11	19.2	73	14.5	70	5	6	59	5100	52
502125	38	27	3	8	24.2	102	17.8	65	5	6	54	2420	53
502132	58	39	4	15	23.6	99	17.6	55	5	6	44	4200	44
502135	154	74	7	73	25.4	86	11.5	120	5	6	109	2500	64
502141	61	41	4	16	21.9	83	14.4	80	5	6	69	3000	57
502150	20	14	1	5	17.0	62	13.3	70	5	6	59	2715	50
502168	67	47	5	15	23.7	99	17.5	65	5	6	54	2725	50

Silviculture Prescription Summary - Alternative 3

Stand Number	Total Stand Acres	Com. Thinning (HTH) Rx Acres	Canopy Gap Creation (HSG) Rx Acres *1	No Treatment Acres Within Treated Stands *2	Post Thinning Est. Relative Density	Post Thinning Average Basal Area per Acre	Post Thinning Mean Tree DBH	Post Thinning Stocking (Trees per Ac) *3	Coarse Wood Creation (Trees per Ac)	Snag Creation (Trees per Ac)	Final Post Treat Stocking (Trees per Ac)	Volume Removed /Acre (CF)	Est Resid Crown Closure (%)
Lower Middle Lobster Watershed													
502036	121	40	4	77	17.9	70	15.3	55/70	5	6	44/59	5000/4200	44
502047	24	12	1	11	22.7	94	17.1	55	5	6	44	6300	44
502059	8	6	1	1	21.3	85	16.0	55	5	6	44	3500	42
502085	69	0	0	29	23.1	91	15.5	80	5	6	69	0	56
502100	24	4	1	19	19.8	77	15.2	65	5	6	54	3405	50
502164	61	40	4	17	21.6	87	16.2	55	5	6	44	4000	45
502190	57	40	4	13	12.8	41	10.2	75	5	0	64	2500	55
502193	111	68	7	36	23.3	96	17	65	5	6	54	1700	54
502198	16	14	1	1	25.0	104	17.3	75	5	6	64	4560	60

Silviculture Prescription Summary - Alternative 3

Stand Number	Total Stand Acres	Com. Thinning (HTH) Rx Acres	Canopy Gap Creation (HSG) Rx Acres *1	No Treatment Acres Within Treated Stands *2	Post Thinning Est. Relative Density	Post Thinning Average Basal Area per Acre	Post Thinning Mean Tree DBH	Post Thinning Stocking (Trees per Ac) *3	Coarse Wood Creation (Trees per Ac)	Snag Creation (Trees per Ac)	Final Post Treat Stocking (Trees per Ac)	Volume Removed /Acre (CF)	Est Resid Crown Closure (%)
Preacher Subwatershed													
502221	118	80	8	30	16.7	65	15.1	65	5	6	54	3000	49
502238	66	46	5	15	18.4	70	14.4	70	5	6	59	5200	50
502254	35	24	2	9	18.4	69	14	70	5	6	59	2425	50
502290	35	20	2	13	14.6	57	15.2	55	5	6	44	3800	43
502298	34	24	2	8	18.9	60	10.1	109	5	6	98	2850	57
502300	4	3	1	0	18.9	60	10.1	109	5	6	98	2850	57
502301	113	77	8	28	21.5	89	17.1	55/70	5	6	44/59	5000/4200	44
502334	90	24	2	64	58.2	194	11.1	109	5	0	98	2200	60
502335	23	14	1	8	13.7	52	14.4	55	5	6	44	3750	42
502337	100	75	7	18	15.5	60	14.9	55/70	5	6	44/59	5300/3725	45
502338	35	30	3	2	12.4	38	9.4	80	5	6	69	2930	45
502340	47	45	4	-2	22.8	91	16	70/80	5	6	59/69	3600/3500	50
502345	49	40	4	2	25.7	111	18.6	60	5	6	49	5000	50
502346	55	37	4	14	16.6	65	15.4	55/75	5	6	44/64	4500/3000	45
502351	148	30	3	115	22.9	94	16.9	55	5	6	44	5000	44
502355	78	50	5	28	18.0	80	14.3	80	5	6	69	3700	52
502356	33	20	2	11	13.3	52	15.4	55	5	6	44	6080	43
502375	43	28	3	12	16.6	65	15.4	55/70	5	6	44/59	3500/2100	45
502378	169	120	12	37	18.0	68	14.3	70/80	5	6	59/65	2700/2500	50
502379	52	35	3	14	21.6	91	17.7	60/75	5	6	49/69	3500/2500	48
502397	65	40	4	21	13.0	42	10.5	80	5	6	69	1850	56
502398	88	62	6	20	18.7	72	14.8	60/70	5	6	49/59	3300	45
502404	70	59	6	5	22.5	95	17.8	60/75	5	6	49/64	6000/5000	47
502419	83	34	3	46	19.5	73	14	65	5	6	54	4200	46
502431	41	28	3	10	24.3	97	15.9	70	5	6	59	3000	53

Silviculture Prescription Summary - Alternative 3

Alternative 3 Totals					
Total Stands Commercially Thinned: 75					
Total Stands Non-commercially Thinned: 8					
Total Plantation Acres in the Planning Area	**7,253**		Acres Thinned to 40-49 TPA:	**625**	**19%**
Total Acres Proposed for Thinning/Gap Treatments	**3,004**		Acres Thinned to 50-64 TPA:	**1,659**	**49%**
Total Acres Proposed for Non-commercial Thinning	**361**		Acres Thinned to 65-120 TPA	**520**	**15%**
Total Plantation Acres Deferred From Treatment	**4,118**		Acres of Canopy Gaps Created	**200**	**6%**
Percentage of Total Plantation Acres Treated	**46.39%**		Acres Thinned to 60-200 TPA *4	**361**	**11%**
Estimated Total CCF Removed	**90,459**	**CCF**			**100%**
Estimated Total MBF Removed	**39,850**	**MBF**	Total Acres	**3,165**	
Average MBF Volume Removed/Acre	**12.7**				

*1 Column 4 represents the total acres of canopy groups proposed for creation in each stand. Individual canopy sizes will range from 1/4 to 3/4 acre in size.

*2 Column E represents the acres **within** each stand that are expected to be deferred from treatment activities. These areas may include, headwalls, riparian areas, areas inaccessible due to logging system constraints, understocked areas, steep drainages, and designated "no thin" areas for a variety of reasons.

Total Acres Deferred From Treatment includes the deferred portions of treated plantations as well as those entire plantations in the Planning Area that are proposed for deferral.

*3 Column L represents the final post thinning stocking of residual conifers following the creation of snags and coarse woody material (down logs).

A value of 45/55 means that two thinning prescriptions will be implemented in the stand: one leaving a residual stocking of 45 trees and the other 55 trees.

*4 Non-commercial thinning acres only

Harvest Plan Summary - Alternative 2

Bear

Stand Number	Year of Origin	Harvest Acres	Total Harvest Volume (CCF)	Total Harvest Volume (MBF)	Reopen System Road Miles/Acres Accessed	Reopen Non-system Road Miles/Acres Accessed	New Temporary Road Miles/Acres Accessed	Skyline Acres	Existing Skyline Landing #	New Skyline Landing #	Helicopter Acres
003	1979	41	1,306	518	0	0	0	38	5	0	3
004	1969	70	4,525	1,794	0	0	0	70	9	0	0
006	1965	23	575	228	0	0.19/20	0	23	6	0	0
007	1975	19	375	149	0	0	0	19	2	0	0
008	1978	23	535	212	0	0	0	23	3	0	0
009*	1961	59	2,360	934	0	0.06/15	0	57	5	0	2
011*	1964	42	1,890	749	0	0.4/27	0	37	8	0	5
013	1963	43	1,913	758	0	0	0	34	10	0	9
Subtotal		320	13,479	5342	0	0.65/62	0	301	48	0	19
Project Total*		3,003	96,168	42,365	1.03/112	6.74/865	1.45/247	2,459	298	32	544

*Includes volume from gaps

Harvest Plan Summary - Alternative 2

Camp

Stand Number	Year of Origin	Harvest Acres	Total Harvest Volume (CCF)	Total Harvest Volume (MBF)	Reopen System Road Miles/Acres Accessed	Reopen Non-system Road Miles/Acres Accessed	New Temporary Road Miles/Acres Accessed	Skyline Acres	Existing Skyline Landing #	New Skyline Landing #	Helicopter Acres
162	1964	5	170	68	0	0.06/5	0	5	1	0	0
170*	1964	25	1,040	412	0	0	0	10	1	0	15
172*	1967	8	280	110	0	0	0.02/5	8	2	1	0
184	1974	58	1,195	473	0	0	0	47	2	0	11
191	1970	37	1,212	480	0.44/37	0	0	37	6	0	0
205*	1980	19	551	218	0	0	0	19	1	0	0
206	1961	36	936	371	0	0.11/13	0.02/9	22	3	1	14
208	1959	36	1,368	542	0	0.02/12	0.01/12	36	3	1	0
217	1965	25	775	310	0	0	0	25	3	0	0
231	1976	48	1,200	475	0	0	0	24	1	0	24
242*	1963	126	5,670	2,240	0	0.5/61	0	100	14	0	26
251	1959	59	2,714	1,075	0	0	0	55	4	0	4
276*	1970	25	625	248	0	0	0	18	7	0	7
311	1961	21	903	357	0	0	0	16	3	0	5
325*	1966	8	192	76	0	0	0	8	2	0	0
Subtotal		536	18831	7455	0.44/37	0.69/91	0.05/29	430	53	3	106

Elk

Stand Number	Year of Origin	Harvest Acres	Total Harvest Volume (CCF)	Total Harvest Volume (MBF)	Reopen System Road Miles/Acres Accessed	Reopen Non-system Road Miles/Acres Accessed	New Temporary Road Miles/Acres Accessed	Skyline Acres	Existing Skyline Landing #	New Skyline Landing #	Helicopter Acres
022	1970	54	1,890	749	0	0.09/14	0	44	7	0	10
027	1970	34	1,650	643	0	0.16/20	0.03/7	34	4	1	0
029	1976	31	1,240	491	0	0	0	31	3	0	0
Subtotal		119	4,780	1883	0	0.25/34	0.03/7	109	14	1	10

Harvest Plan Summary - Alternative 2

Lower Lobster

Stand Number	Year of Origin	Harvest Acres	Total Harvest Volume (CCF)	Total harvest volume (MBF)	Reopen System Road Miles/Acres Accessed	Reopen Non-system Road Miles/Acres Accessed	New Temporary Road Miles/Acres Accessed	Skyline Acres	Existing Skyline Landing #	New Skyline Landing #	Helicopter Acres
016	1962	73	2,701	1,069	0	0.07/29	0	73	10	0	0
026	1975	38	1,001	397	0	0	0	38	3	0	0
043*	1963	75	2,588	1,025	0	0.27/75	0	47	4	0	28
073	1970	32	1,104	437	0	0	0	28	2	0	4
074	1974	25	468	185	0	0.02/3	0	25	3	0	0
095	1963	34	910	360	0	0	0.04/6	34	3	1	0
098*	1970	23	518	205	0	0	0	23	2	0	0
101	1969	23	633	250	0	0.05/4	0.02/5	23	4	1	0
116	1981	70	2,275	901	0	0.11/29	0	52	4	0	18
117	1975	23	713	282	0	0	0	23	3	0	0
125	1963	27	653	258	0	0.19/18	0	27	3	0	0
132	1963	39	1,638	648	0	0	0.09/19	32	4	2	7
135	1980	74	1,850	733	0	0.39/74	0.19/30	74	9	0	0
141	1980	41	1,230	487	0	0	0	41	7	0	0
150	1974	14	380	150	0	0	0	6	1	0	8
168	1958	47	1,281	508	0	0	0	39	3	0	8
Subtotal		658	19,943	7,895	0	1.10/232	0.34/60	585	65	4	73

Harvest Plan Summary - Alternative 2

Lower Middle Lobster

Stand Number	Year of Origin	Harvest Acres	Total Harvest Volume (CCF)	Total harvest volume (MBF)	Reopen System Road Miles/Acres Accessed	Reopen Non-system Road Miles/Acres Accessed	New Temporary Road Miles/Acres Accessed	Skyline Acres	Existing Skyline Landing #	New Skyline Landing #	Helicopter Acres
036	1965	80	3,760	1,489	0	0.15/32	0.01/6	60	5	1	20
047	1968	12	756	300	0	0	0	12	3	0	0
059	1968	6	210	83	0	0	0	6	2	0	0
085	1973	48	960	380	0.33/48	0.2/48	0	48	4	0	0
100*	1967	17	579	230	0	0	0	4	1	0	13
164	1961	40	1,600	634	0	0.38/40	0	40	2	2	0
190	1981	40	1,000	396	0	0.02/16	0	16	1	0	24
193	1965	68	1,156	458	0	0	0	51	8	0	17
198	1961	14	638	253	0	0.17/14	0.07/14	14	0	2	0
Subtotal		325	10,659	4,223	0.33/48	0.92/150	0.08/20	251	26	5	74

Harvest Plan Summary - Alternative 2

Preacher

Stand Number	Year of Origin	Harvest Acres	Total Harvest Volume (CCF)	Total harvest volume (MBF)	Reopen System Road Miles/Acres Accessed	Reopen Non-system Road Miles/Acres Accessed	New Temporary Road Miles/Acres Accessed	Skyline Acres	Existing Skyline Landing #	New Skyline Landing #	Helicopter Acres
221	1961	80	2,400	950	0	0.3/19	0.07/13	80	9	1	0
238*	1973	46	2,392	947	0	0.08/13	0.05/7	34	3	2	12
254	1967	24	582	230	0	0.19/18	0	18	1	0	6
290	1967	20	760	301	0	0	0	7	1	0	13
298/300	1985	27	770	305	0.26/27	0	0	27	3	0	0
301*	1958	77	3,542	1,402	0	0.3/39	0.12/27	77	5	0	0
334	1979	24	528	209	0	0.6/13	0.07/11	24	3	3	0
335	1970	14	525	208	0	0	0	0	0	0	14
337	1961	75	3,375	1,337	0	0.05/14	0.21/26	65	11	4	10
338	1982	30	879	348	0	0	0	25	3	0	5
340*	1975	45	1,598	633	0	0	0	28	1	0	17
345	1947	40	2,000	792	0	0.38/15	0.26/25	40	2	5	0
346	1956	37	1,406	557	0	0.4/24	0	37	9	0	0
351	1963	30	1,500	594	0	0	0	22	3	0	8
355	1974	50	1,850	699	0	0.04/27	0	47	5	0	3
356	1961	20	1,216	482	0	0	0	0	0	0	20
375	1959	28	784	311	0	0.19/28	0	28	4	0	0
378*	1980	120	4,500	1,511	0	0	0	0	0	0	120
379	1959	35	1,050	416	0	0.2/31	0	31	4	0	4
397	1975	40	740	293	0	0.04/13	0.04/5	40	3	1	0
398	1960	62	2,046	859	0	0.05/11	0	54	9	0	8
404*	1963	59	3,245	1,285	0	0.09/12	0.09/4	37	3	1	22
419	1975	34	1,428	565	0	0.12/13	0	34	8	0	0
431	1970	28	840	333	0	0.1/6	0.04/13	28	2	2	0
Subtotal		1045	39,956	15,567	0.26/27	3.13/296	0.95/131	783	92	19	262

*Helicopter service landing (HSL) inside or nearby stand

Harvest Plan Summary - Alternative 3

Bear

Stand Number	Year of Origin	Harvest Acres	Total Harvest Volume (CCF)	Total Harvest Volume (MBF)	Reopen Road Miles/Acres Accessed	New Temporary Road Miles/Acres Accessed	Skyline Acres	Existing Skyline Landing #	New Skyline Landing #	Helicopter Acres
003	1979	41	1,306	518	0	0	38	5	0	3
004	1969	70	4,525	1,794	0	0	70	9	0	0
006	1965	23	575	228	0	0	11	4	0	12
007	1975	19	375	149	0	0	19	2	0	0
008	1978	23	535	212	0	0	23	3	0	0
009*	1961	59	2,360	934	0	0	51	4	0	8
011*	1964	42	1,890	749	0	0	10	3	0	32
013	1963	43	1,913	758	0	0	34	10	0	9
Subtotal		320	13,479	5342	0	0	256	40	0	64
Project total*		2,804	90,459	39,850	0/0	0/0	1,575	212	0	1,229

*Includes volume from gaps

Harvest Plan Summary - Alternative 3

Camp

Stand Number	Year of Origin	Harvest Acres	Total Harvest Volume (CCF)	Total Harvest Volume (MBF)	Reopen Road Miles/Acres Accessed	New Temporary Road Miles/Acres Accessed	Skyline Acres	Existing Skyline Landing #	New Skyline Landing #	Helicopter Acres
162	1964	5	170	68	0	0	2	1	0	3
170*	1964	25	1,040	412	0	0	10	1	0	15
172*	1967	8	280	110	0	0	0	0	0	8
184	1974	58	1,195	473	0	0	47	2	0	11
191	1970	37	1,212	480	0	0	0	0	0	37
205*	1980	19	551	218	0	0	19	1	0	0
206	1961	36	936	371	0	0	10	2	0	26
208	1959	36	1,368	542	0	0	36	3	0	0
217	1965	25	775	310	0	0	25	3	0	0
231	1976	48	1,200	475	0	0	24	3	0	24
242*	1963	126	5,670	2,240	0	0	41	7	0	85
251	1959	59	2,714	1,075	0	0	55	4	0	4
276*	1970	25	625	248	0	0	18	7	0	7
311	1961	21	903	357	0	0	16	3	0	5
325*	1966	8	192	76	0	0	8	2	0	0
Subtotal		536	18831	7455	0	0	311	39	0	225

Elk

Stand Number	Year of Origin	Harvest Acres	Total Harvest Volume (CCF)	Total Harvest Volume (MBF)	Reopen Road Miles/Acres Accessed	New Temporary Road Miles/Acres Accessed	Skyline Acres	Existing Skyline Landing #	New Skyline Landing #	Helicopter Acres
022	1970	54	1,890	749	0	0	32	6	0	22
027	1970	34	1,650	643	0	0	7	1	0	27
029	1976	31	1,240	491	0	0	31	3	0	0
Subtotal		119	4,780	1883	0	0	70	10	0	49

Harvest Plan Summary - Alternative 3

Lower Lobster

Stand Number	Year of Origin	Harvest Acres	Total Harvest Volume (CCF)	Total harvest volume (MBF)	Reopen Road Miles/Acres Accessed	New Temporary Road Miles/Acres Accessed	Skyline Acres	Existing Skyline Landing #	New Skyline Landing #	Helicopter Acres
016	1962	50	2,220	879	0	0	50	5	0	0
026	1975	38	1,001	397	0	0	38	3	0	0
043	1963	0	0	0	0	0	0	0	0	0
073	1970	32	1,104	437	0	0	28	2	0	4
074	1974	25	468	185	0	0	22	2	0	3
095	1963	34	910	360	0	0	30	3	0	4
098*	1970	23	518	205	0	0	23	2	0	0
101	1969	23	633	250	0	0	14	3	0	9
116	1981	70	2,275	901	0	0	16	2	0	54
117	1975	23	713	282	0	0	23	3	0	0
125	1963	27	653	258	0	0	19	2	0	8
132	1963	39	1,638	648	0	0	25	4	0	14
135	1980	74	1,850	733	0	0	0	0	0	74
141	1980	41	1,230	487	0	0	41	7	0	0
150	1974	14	380	150	0	0	6	1	0	8
168	1958	47	1,281	508	0	0	39	3	0	8
Subtotal		560	16,874	6,680	0	0	374	42	0	186

Harvest Plan Summary - Alternative 3

Lower Middle Lobster

Stand Number	Year of Origin	Harvest Acres	Total Harvest Volume (CCF)	Total harvest volume (MBF)	Reopen Road Miles/Acres Accessed	New Temporary Road Miles/Acres Accessed	Skyline Acres	Existing Skyline Landing #	New Skyline Landing #	Helicopter Acres
036	1965	40	1,880	745	0	0	40	4	0	0
047	1968	12	756	300	0	0	12	3	0	0
059	1968	6	210	83	0	0	6	2	0	0
085	1973	0	0	0	0	0	0	0	0	0
100	1967	4	136	54	0	0	4	1	0	0
164	1961	40	1,600	634	0	0	0	0	0	40
190	1981	40	1,000	396	0	0	0	0	0	40
193	1965	68	1,156	458	0	0	51	8	0	17
198	1961	14	638	253	0	0	6	2	0	8
Subtotal		224	7,376	2,923	0	0	119	20	0	105

Harvest Plan Summary - Alternative 3

Preacher

Stand Number	Year of Origin	Harvest Acres	Total Harvest Volume (CCF)	Total harvest volume (MBF)	Reopen unclassified road miles	New Temporary Road Miles/Acres Accessed	Skyline Acres	Existing Skyline Landing #	New Skyline Landing #	Helicopter Acres
221	1961	80	2,400	950	0	0	53	6	0	27
238	1973	46	2,392	947	0	0	28	2	0	18
254	1967	24	582	230	0	0	0	0	0	24
290	1967	20	760	301	0	0	7	1	0	13
298/300	1985	27	770	305	0	0	0	0	0	27
301*	1958	77	3,542	1,402	0	0	42	5	0	35
334	1979	24	528	209	0	0	0	0	0	24
335	1970	14	525	208	0	0	0	0	0	14
337	1961	75	3,375	1,337	0	0	49	11	0	26
338	1982	30	879	348	0	0	25	3	0	5
340*	1975	45	1,598	633	0	0	28	1	0	17
345	1947	40	2,000	792	0	0	0	0	0	40
346	1956	37	1,406	557	0	0	26	5	0	11
351	1963	30	1,500	594	0	0	22	3	0	8
355	1974	50	1,850	699	0	0	0	0	0	50
356	1961	20	1,216	482	0	0	0	0	0	20
375	1959	28	784	311	0	0	8	1	0	20
378*	1980	120	4,500	1,511	0	0	0	0	0	120
379	1959	35	1,050	416	0	0	0	0	0	35
397	1975	40	740	293	0	0	40	3	0	0
398	1960	62	2,046	859	0	0	54	9	0	8
404*	1963	59	3,245	1,285	0	0	27	4	0	32
419	1975	34	1,428	565	0	0	24	5	0	10
431	1970	28	840	333	0	0	12	2	0	16
Subtotal		1045	39,956	15,567	0	0	445	61	0	600

*Helicopter service landing (HSL) inside or nearby stand

Appendix C

Wildlife Species and Their Habitat Associations

Habitats needed by wildlife species analyzed were identified using information from a variety of sources, including Wildlife Habitat Relationships in Oregon and Washington (Johnson, D.H. and T.A. O'Neil. 2001), Management of Fish and Wildlife Habitats of Western Oregon and Washington (Brown et. al., 1985), recovery plans for the northern spotted owl and marbled murrelet conservation plans for certain species, and the Siuslaw Land and Resource Management Plan, as amended by the Northwest Forest Plan. Wildlife species are associated with the following habitat elements: grass/forb, shrub, seedling/sapling/pole, young forest, mature forest, old growth forest, caves & burrows, cliffs & rims, large down wood, snags, talus, and riparian/aquatic.

The following table identifies why the species listed here are species analyzed, and it distinguishes the habitats needed by these species. Primary habitat, denoted with "1" in this table, is important habitat for species survival, while secondary habitat, denoted with "2", is habitat often used.

Table C-1: Species analyzed and their habitat associations

COMMON SPECIES NAME	Species status*	Grass/Forb	Shrub	Sapling/ Pole	Small Forest	Mature Forest	Old Growth Forest	Caves Burrow	Cliffs Rims	Down Wood	Snag	Talus	Riparian (including bays)
Oregon Silverspot Butterfly	T, MIS	1											
Bald eagle	T, MIS	1				2	2				1		1
California Brown Pelican**	E												1
Marbled murrelet	T					2	1						1
Northern spotted owl	T, MIS					2	1				2		
Western Snowy Plover**	T, MIS												1
Great gray owl**	S&M	1				2	2						
Foothill yellow-legged frog	S	2	2										1
Northwestern pond turtle	S	1	1							1			1
Southern torrent salamander	S			2	1	1	1					1	1
Aleutian Canada goose**	S, MIS	1											1

COMMON SPECIES NAME	Species status*	Grass/Forb	Shrub	Sapling/ Pole	Small Forest	Mature Forest	Old Growth Forest	Caves Burrow	Cliffs Rims	Down Wood	Snag	Talus	Riparian (including bays)
American peregrine falcon	S, MIS	2	2			2	2		1		2	2	1
Bufflehead**	S												1
Harlequin Duck**	S												1
Streaked Horned Lark**	S	1	2										
California Wolverine	S							1		1		1	1
Pacific Fisher	S				2	1	1		2	1	1	1	2
Pacific fringe-tailed myotis	S, PB	1	1			2	2	1	1		2		1
Pacific Pallid bat	PB	1		1	2	2	2	1	1		2		1
Red tree vole	S				2	2	1						
Pacific shrew	S	2	2	2	2	2	2			1			
Long-eared myotis	PB			2	2	1	1	2		1	1		1
Long-legged myotis	PB	2	1	1	2	1	1	1	1		1		1
Silver-haired bat	PB	2		1	2	2	1	2	2		1		2
Townsend's big-eared bat	PB		2	1	2			1					2
Downy woodpecker	MIS			2	2	2	2				1		1
Hairy woodpecker	MIS			2	2	2	1			1	1		2
Pileated woodpecker	MIS, NTMB				2	2	1			1	1		2
Red-breasted sapsucker	MIS			2	2	2	2				1		1
Northern flicker	MIS	1	2	2		1	1			1	1		2
Red-breasted nuthatch	MIS			2	2	1	1			2	1		1
Ruffed grouse	MIS	1	1	1	1	2	2			1			1
American Marten	MIS			2	2	1	1	2	2	1	1	2	2
Roosevelt elk	MIS	1	1	1	1	1	1						1
Band-tailed pigeon	NTMB	2	2	1	1	1	1						
Black-throated gray warbler	NTMB	1	1	1	1	1	1						
California quail	NTMB	1	1	2									
Hammond's flycatcher	NTMB				2	1	1						

COMMON SPECIES NAME	Species status*	Grass/Forb	Shrub	Sapling/ Pole	Small Forest	Mature Forest	Old Growth Forest	Caves Burrow	Cliffs Rims	Down Wood	Snag	Talus	Riparian (including bays)
Hermit warbler	NTMB		2	1	1	1	1						
Hutton's vireo	NTMB		1	1	1	1	1						
Pacific-slope flycatcher	NTMB			2	2	1	1				1		
Rufus hummingbird	NTMB	2	1	1	2	2	2						
Vaux's swift	NTMB	2	2	2	2	1	1				1		
Wrentit	NTMB		1	1	2	2	2						
Number of **T & E** species that use PRIMARY habitat.		2	0	0	0	0	2	0	0	0	1	0	4
Number of **T & E** species that use SECONDARY habitat		0	0	0	0	3	1	0	0	0	1	0	0
Number of **Sensitive** species that use PRIMARY habitat		5	2	1	1	2	3	3	3	4	1	3	10
TOTAL number of all Species analyzed that use PRIMARY habitat		**13**	**10**	**12**	**7**	**15**	**21**	**5**	**4**	**10**	**14**	**3**	**21**
TOTAL number of all species analyzed that use SECONDARY habitat		8	9	12	19	17	11	3	3	1	4	2	7

*E=endangered, T=threatened, S=Region 6 sensitive, S&M=survey and manage, PB=protection-buffer, MIS=management-indicator species, NTMB=neo-tropical migratory bird.
**Present on the South Zone of the Siuslaw, but not expected in the project planning area.

Appendix D

Contributions from Others

1. Proposed Project (scoping) Comment Summary and Forest Service Responses

Reference to the Lobster Landscape Management Project preliminary analysis (PA) is included in the response column, where applicable.

Table D-1. Access and Travel Management

Person or Organization-Letter Number	Comment Summary	Response
Ken Myer-1	Needs access to his 60-acre parcel in NW ¼ of T14S, R9W, section 21. Plans to harvest alder during the dry season in the near future.	Access to this parcel would be maintained.
Darrell Jones-2	Supportive. Easement of road 3305-112 reverted back to him.	Refer to the PA, maps 2 and 3, for the location of roads proposed for decommissioning.
Anne Hendrix-3	Concerned about decommissioning or closing roads 3500 and 6300 because of the need for emergency (fire) access.	Road 6300 (63) was decommissioned under another project. Road 35 would be maintained, providing access from Lobster Valley to Deadwood (PA, chapter 3, Public and Management Access).
Armando and Christina Alvarez-6	Maintain access between Lobster Valley Road and Highway 36. Maintain escape routes in case of wildfires.	See above response. Road 35 would maintain access to Highway 36.

Person or Organization-Letter Number	Comment Summary	Response
Albert Keltner-7	Supportive, especially proposed road closures.	Refer to the PA, maps 2 and 3, for location of road closures.
Fred Hendrix-9	Have turn-arounds built at road closure sites. Use gates and keep roads in useable condition for fire protection and forest management. Make sure culvert is a fish passage barrier before replacing it—confirm that fish are there. No road decommissioning—roads still have value for fire protection and forest management. Use funds to repair, not to decommission. Specific roads of concern include: paved road from Preacher Cr. to Deadwood, Preacher Cr. Road closure (other owners, powerline; gate with keys would be better option), Wilkinson Ridge Road (powerline from Missouri Bend substation to Lobster Valley.	Refer to the PA, appendix A (road closure); and the PA, chapter 3, Aquatic Species and Public and Management Access sections.
Gene Gangle-10	Concerned about closing road 3417 (T14S, R9W, section 8). Needs access to harvest trees in a few years. If road 3417 can't be used, he will have to cat-log to ridge-top.	Road 3417 can be used under a special-use permit.

Table D-2. Silviculture Treatments

Person or Organization	Comment Summary	Response
Michael Newton-5	No provision for any patch size dedicated to early successional species. Difficult to maintain understory due to overstory competition; therefore, risky. More entries are needed to thin plantations to maintain understories. Use basal area instead of trees per acre as a criterion for residual stand density.	Early seral habitat would be maintained or created (PA maps 2 and 3; chapter 3, Forest Stand Conditions and Wildlife sections). Refer to chapter 3, Forest Stand Conditions, about stand treatment discussions.

Person or Organization	Comment Summary	Response
Armando and Christina Alvarez-6	Leaving cut trees on site will increase the risk of wildfires. Reduce this risk by selling the wood to local logging companies; and/or making it available for firewood gathering, with donations to the local gleaner organization.	Appendix A (Post Harvest Mitigation and Enhancement Actions sections) and the PA (chapter 3, Fire section) include fuel treatments to reduce fuel loading. After harvest operations are completed, firewood is made available to the public under a permit system.
Chandra LeGue, ONRC-8	More variable density thinning (gaps, dense patches, and different thinning densities) is needed. No road construction or road reopening should be done.	Refer to the PA, chapter 3, Forest Stand Conditions and Wildlife sections. Refer to chapters 2 and 3 for discussions on temporary roads.

Table D-3. Fuel loading and invasive weeds

Person or Organization	Comment Summary	Response
Chandra LeGue, ONRC-8	Control spread of invasive weeds and reduce their populations.	Refer to appendix A, Post Harvest Mitigation Actions section, and the PA, chapter 3, Noxious and Undesirable Weeds section.

Table D-4. Water quality and fish habitat

Person or Organization	Comment Summary	Response
Kelly Hockema-4	What is normal stream temperature? Has large wood in streams lowered temperature and increased trout populations, smolts, and eels? What is the effect of the massive salmon trapping and eradication program on Lobster and Five Rivers? PHD's are now saying that overplanting riparian areas can be extremely harmful to indicator species (crustaceans) by over-shading. Sunlight is needed for successful hatch of insects that provide food for sea-run and native red-gilled trout. Huge overweight	No large wood additions to streams are proposed under this project. Refer to the PA, chapter 3, Soils and Water Quality, and Aquatic Species sections.

Person or Organization	Comment Summary	Response
	and overheight trees are greater landslide risks than roads. “Chronic sedimentation” of aquatic conditions—where is this problem area? What is the rationale for spending money on fish, while over-fishing is allowed?	
Chandra LeGue, ONRC-8	Analysis should discuss each of the ACS objectives. Identify roads proposed for construction/reconstruction that will cross streams.	Refer to the PA, Aquatic Conservation Strategy section. Additional ACS information is included in the project file. None of the temporary roads (new or reopened) would cross streams.
David Wagner-11	Don’t close waterways to eliminate multiple use. Trees and logs would prohibit uses, such as canoeing kayaking, tubing, or rafting.	No large wood additions to streams are proposed.

Table D-5. Wildlife and Plants

Person or Organization	Comment Summary	Response
Chandra LeGue, ONRC-8	Special status species surveys must be done prior to developing alternatives.	Refer to the PA, chapter 3, Wildlife section, and Proposed Endangered, Threatened, and Sensitive Plants section.

Table D-6. NEPA

Person or Organization	Comment Summary	Response
Chandra LeGue, ONRC-8	Full range of alternatives should be considered—wildlife enhancement, restoration, old-growth protection (minimize fragmentation), and non-motorized use.	Refer to the PA, chapter 2.

2. Preliminary Analysis comment summary and Forest Service Responses

Table D7 summarizes the comments received on the preliminary analysis during the 30-day comment period, which began on May 10, 2006 and ended close-of-business on June 12, 2006. Each comment was read and considered, as the environmental assessment for this project was prepared. Comments, not covered by existing regulations or not outside the scope of the project, were separated into topics. Where applicable, pages of the environmental assessment (EA) or project design criteria (appendix A) are referenced where the comment topics are discussed.

Table D7. Preliminary analysis comment and response summary

Person or Organization	Discussion Topic	Comment Summary	Response
Kenneth Meyer Local landowner T14S, R9W, section 21	Access	Maintain access to his property by preparing the existing road for log hauling in the dry season.	Refer to appendix A, page 21.
Michael Newton Professor Emeritus OSU Department. of Forest Sciences	Index of residual stand density	Thinning treatments would substantially increase windthrow. Use basal area rather than stems per acre as an index of residual stand density.	Refer to the EA, chapter 3; Insects, disease and wind, pages 32 and 33. On the Siuslaw, the average residual tree equates to about one square foot. Appendix B-2 shows both basal area and trees per acre for residual stands.
Doug Heiken Oregon Natural Resources Council	Stand density treatments	Apply variability in thinning densities and variability in stands and between stands.	Refer to the EA, pages 28 to 35; appendix A, pages 5 to 7 and 18; and appendix B-2.
	Snags and down wood	Retain lots of dead wood in stands and variably distribute snags in stands.	Refer to the EA, chapter 3, wildlife effects, large dead wood habitat section; and appendix A, pages 14 to 16.
		Use only inoculum to create snags.	Diverse methods would be used to create snags, including inoculum. Based on observations,

			inoculum has had mixed results—no dead wood in the short term, and cavities and dead wood in live trees in the long term.
	Early seral habitat	Gap planting should be patchy and at very low density, especially outside riparian reserves to allow early seral habitat to persist for awhile.	Refer to the EA, chapter 3, wildlife effects section; and appendix A, pages 17 and 18.
	Spotted owl prey species	Provide diverse habitat for these species.	Refer to the EA, chapters 1, 2, and 3; and appendices A and B-2.
	Wildlife habitat	Retain trees with forks and broken tops, hardwoods, and under-represented conifers. Retain trees with visible nests of birds or mammals.	Refer to appendix A, pages 3, and 5 to 7.
	Season of operation	Don't allow ground-based logging or log hauling on unpaved roads during wet weather.	Refer to appendix A, pages 7, 8, and 9 to 12.
	Soils	Avoid soil disturbance in landslide initiation areas.	Refer to appendix A, pages 7, 8, and 9.
	Riparian areas	Don't cut trees that could span streams.	Refer to appendix A, pages 7 and 8.
	Roads	Minimize road construction and close temporary roads before the rainy season.	Refer to appendix A, pages 9 to 12.

National Marine Fisheries Service (NMFS; Reference number 2005/06511)	Water and substrate quality	Recommends design criteria for replacing nine culverts within 400 feet of essential fish habitat, for replacing a culvert in the Preacher Creek Road (Road 3500), and for seven stands beside or immediately upstream of 303(d)-listed stream reaches.	Refer to the EA, chapter 3, pages 58 to 74; and EA, appendix A, pages 19 to 21.
	In-stream wood	Recommends buffer widths and minimum thinning prescriptions next to streams of all sizes.	Refer to the EA, chapter 2, page 10; EA, chapter 3, pages 58 to 74; and EA, appendix A, pages 5 to 9.

Appendix E

Lobster Landscape Management Project

List of Preparers

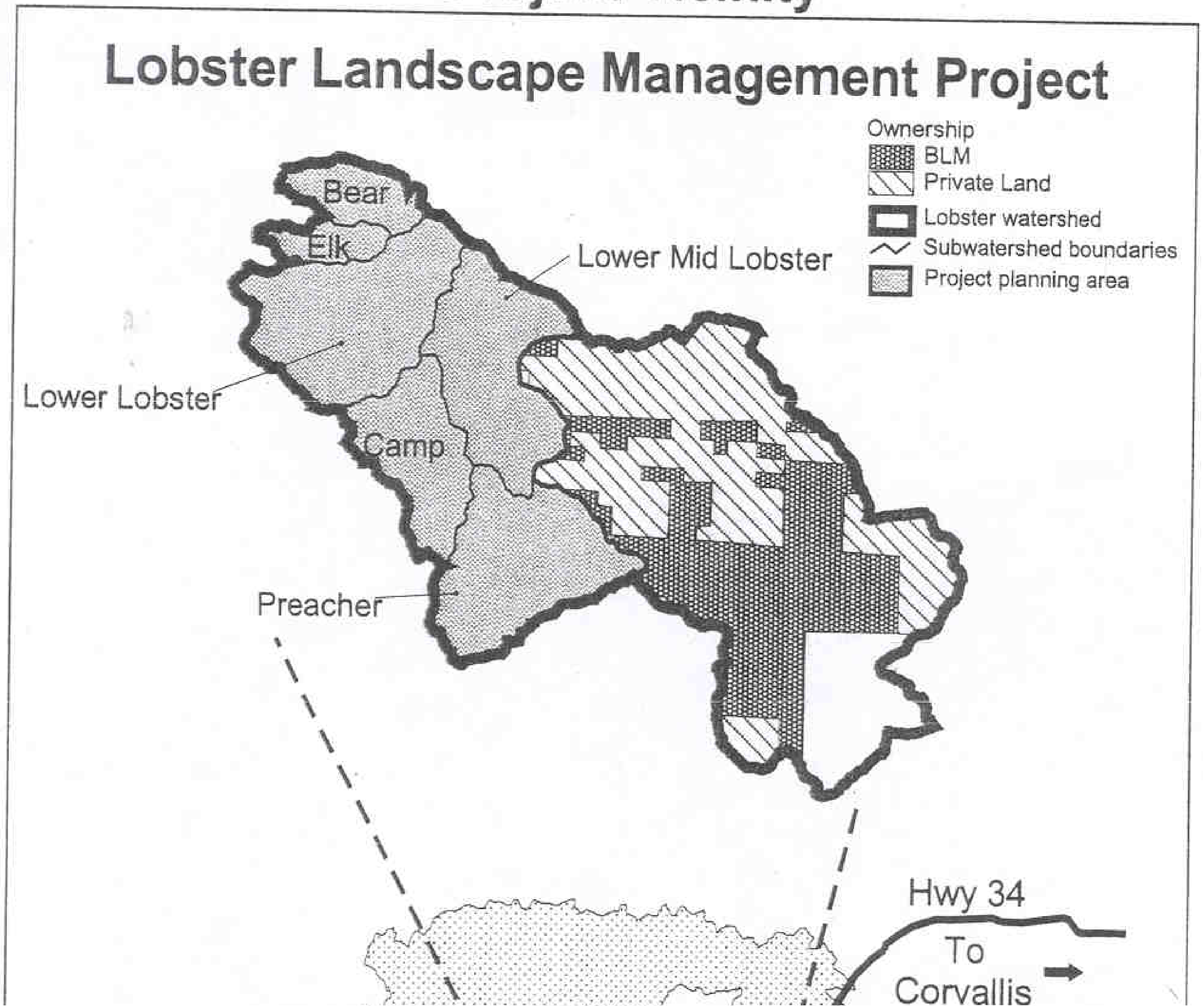
The Team

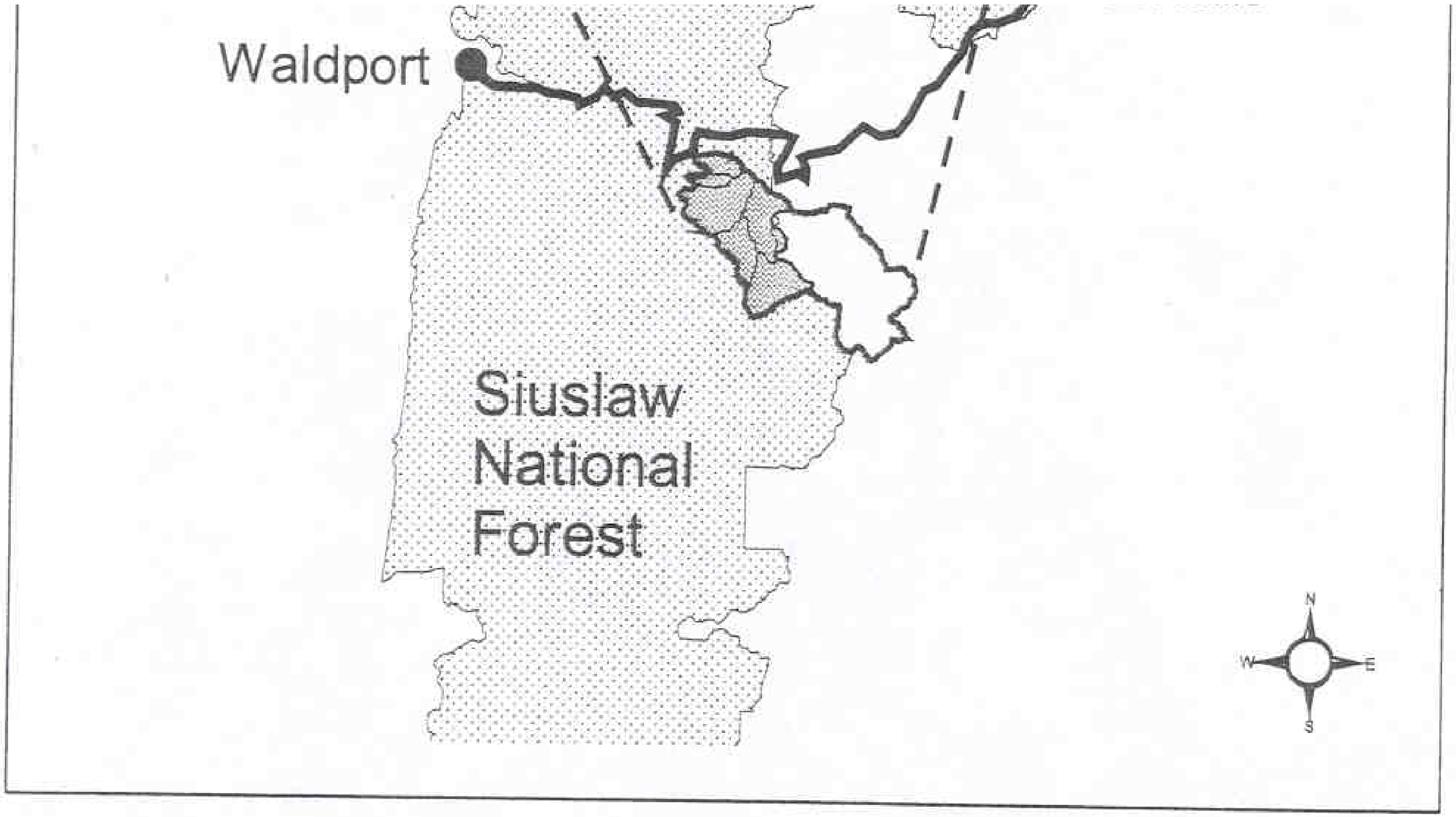
Name	Position Title	Primary Responsibilities
Bruce Buckley	Resource Planner	Project coordinator, NEPA documentation and process
Dean Devlin	GIS Technician	GIS mapping
Jessica Dole	Forest Landscape Architect	Scenery effects
Edward Garza and Terri Brown	Forest Fuels/Fire Planners	Fire hazard effects
Ken McCall	Forest Transportation Planner	Forest transportation system effects, roads analysis
Randy Miller	District Wildlife Biologist	Wildlife effects; wildlife specialist report, including the biological evaluation
Jan Robbins and Lance Gatchell	District Hydrologists	Hydrologic and soils effects, roads stability assessment, water quality restoration plan
Marty Stein	Forest Botanist	Listed, sensitive, and survey-and-manage plant effects, effects on noxious and undesirable weeds
Jack Sleeper	District Fish Biologist	Fisheries biological assessment and effects
Phyllis Steeves	Forest Archaeologist	Heritage resource effects
Paul Thomas	Planning Manager	Team leader
Russ Volke	District Silviculturist	Stand exams and silviculture prescriptions;stand treatment effects

Contributors

Name	Position Title	Primary Responsibilities
Karen Bennett	Forest Soils Scientist	Soils effects support
Frank Davis	Forest Environmental Coordinator	NEPA guide
Carl Frounfelker	Forest Wildlife Biologist	Wildlife effects support
Bill Helphinstine	District Ranger	Process guide
John Sanchez	Forest Fish Biologist	Fish biological assessment support
John Zapell	District Public Affairs Specialist	Public notification

Map 1
Project Vicinity




Waldport
Siuslaw
National
Forest
N
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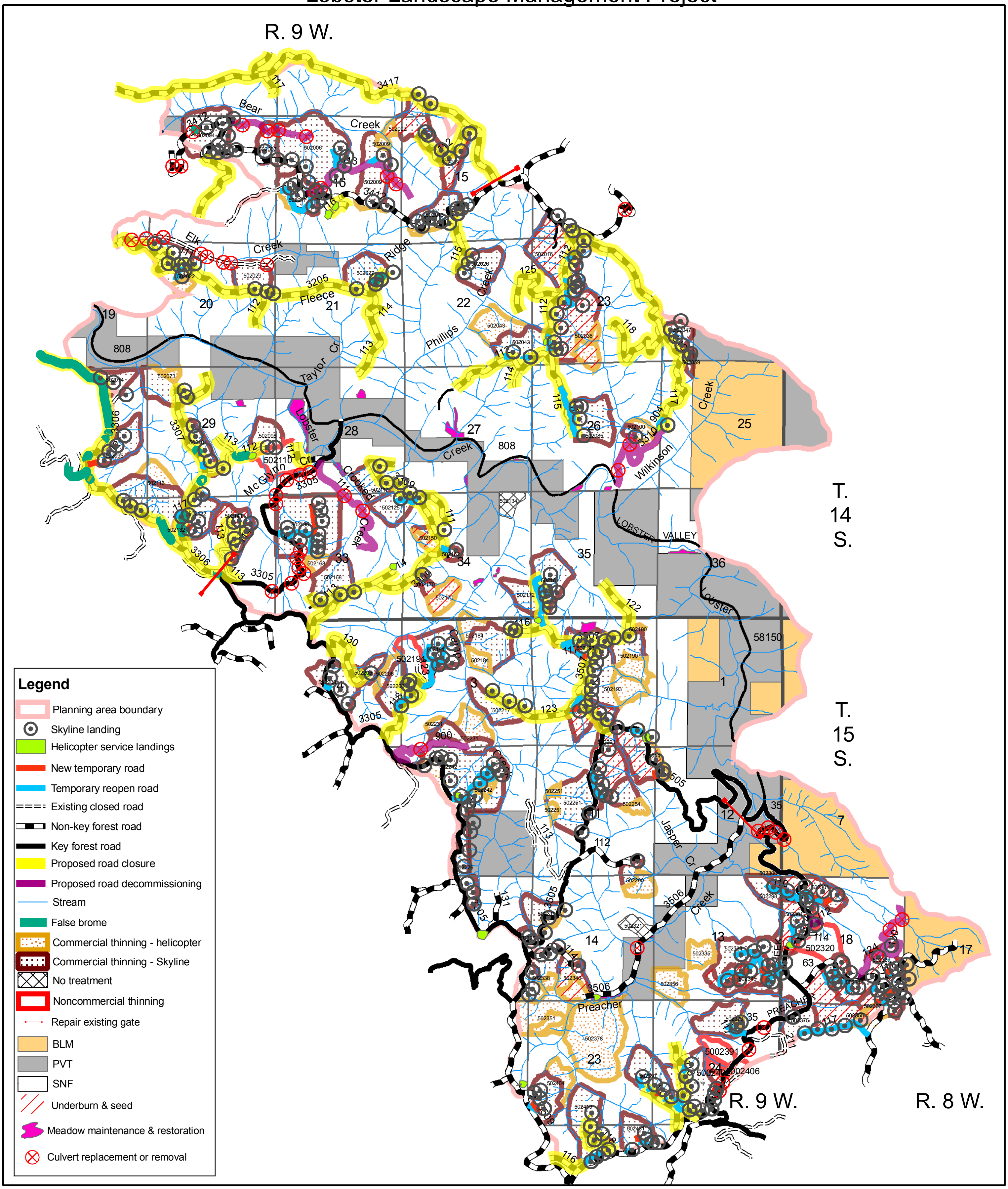
Map 2
Alternative 2

Lobster Landscape Management Project

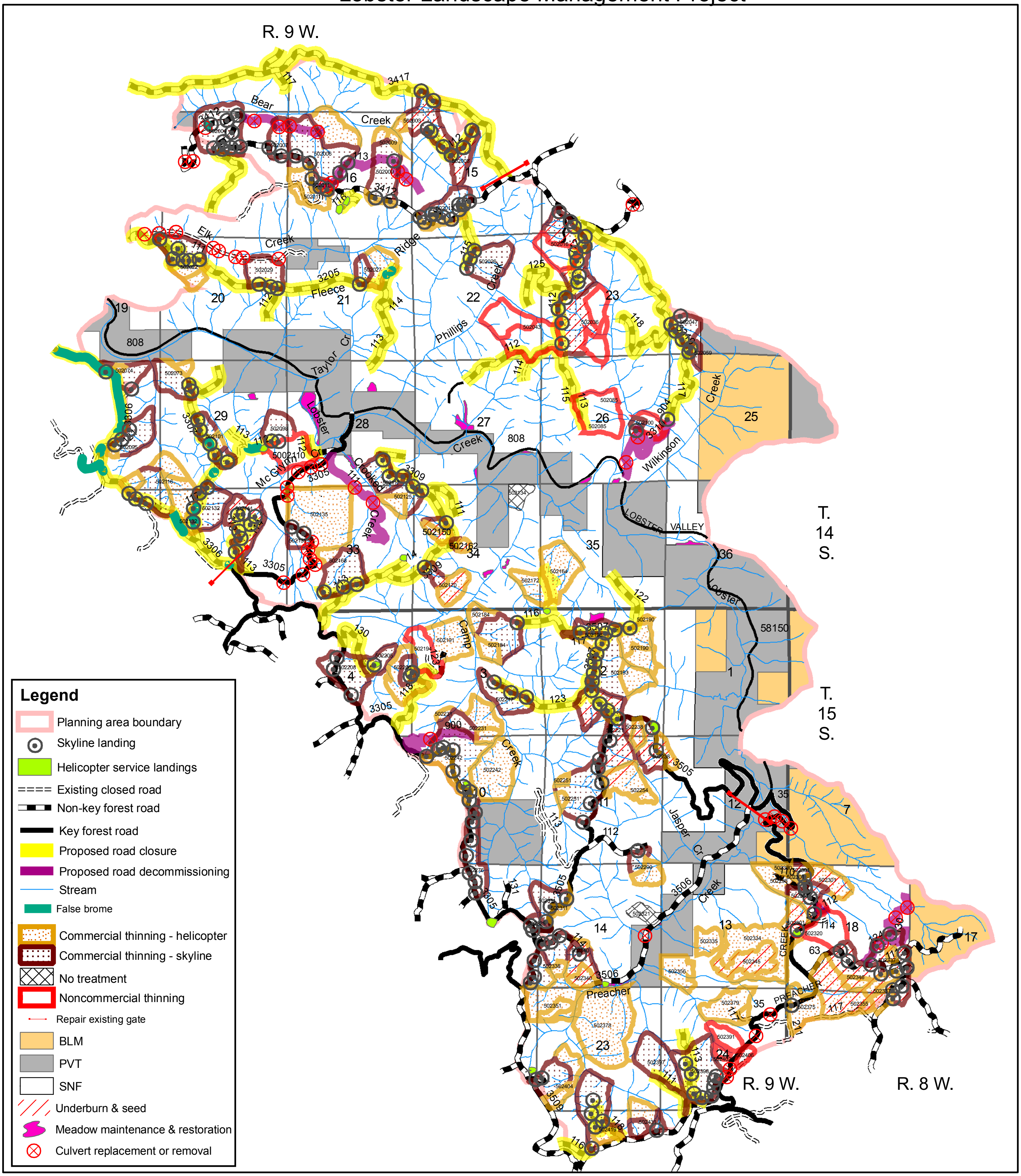


Scale: 1 inch = 1 mile

3/28/2006
dwd

Map 3
Alternative 3

Lobster Landscape Management Project



Scale: 1 inch = 1 mile

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Map 4
Land Allocations
Lobster Landscape Management Project