ENVIRONMENTAL ASSESSMENT

Little Nestucca Thin

USDA FOREST SERVICE
SIUSLAW NATIONAL FOREST
HEBO RANGER DISTRICT

Tillamook County, Oregon
January 2007

RESPONSIBLE OFFICIAL:
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Comments received in response to this solicitation, including names and addresses of those who comment would be considered part of the public record on this proposed action and would be available for public inspection. Comments submitted anonymously would be accepted and considered; however, those who only submit anonymous comments would not have standing to appeal the subsequent decision under 36 CFR part 215. Additionally, pursuant to 7 CFR 1.2 (d) any person may request the agency to withhold a submission from the public record by showing how the Freedom of Information Act (FOIA) permits such confidentiality. Persons requesting such confidentiality should be aware that, under FOIA, confidentiality may be granted in only limited circumstances, such as to protect trade secrets.

Table of contents

Chapter 1 Purpose of and Need for Action

The intent of the National Environmental Policy Act (NEPA), its implementing regulations, and Forest Service policy is to evaluate and disclose the effects of proposed actions on the quality of the human environment. These procedures are meant to improve the quality of decision-making, as well as make the decision-making process more accessible and transparent to the affected public.

Chapter 1 includes information on the history of the project proposal, the purpose of and need for the project, and the agency's proposal for achieving that purpose and need. This section also details how the Forest Service informed the public of the proposal and how the public responded.

Introduction

In March 2004, the Hebo Ranger District initiated the Little Nestucca Restoration Project Environmental Assessment, which analyzed the young managed conifer stands in the vicinity of the Little Nestucca river to determine if actions are needed to improve watershed conditions and habitat for aquatic and terrestrial species. The project area, shown on the Little Nestucca Project Map, includes 12,693 acres of National Forest System (NFS) lands.

The project area is contained within the Little Nestucca Watershed. The legal description for the Little Nestucca Project Area is T5S, R9W, Sections 14-16, 20-23, 26-36 and T5S, R10W, Sections 4- 9, 15-18, 20- 23, 25-29, 33-36 and T6S, R8W, Sections 6-7; T6S, R9W, Sections 1-13 and T6S, R10W Sections 1- 3, 11-12. Willamette Meridian, Tillamook County, Oregon. The area is located within the Little Nestucca 5th field Non-Key watershed.

Proposed Action

The Hebo District Ranger proposes the following actions:

- Commercially thin approximately 2,638 acres of 30 to 63 year old young managed conifer stands[1]. Cable yarding, ground based, and helicopter systems may be used.
- Commercially thin approximately 210 acres of 90 to 95 year old off-site Douglas- fir stands. Cable yarding, ground based, and helicopter systems may be used.
- Decommission approximately 7 miles of Forest system roads.
- Close some non-key roads in Forest system, which may include stabilizing, water barring and barricading roads.
- Construct approximately 2 miles of new temporary roads and reopen about 10 miles of existing temporary roads. The constructed temporary roads and other roads, including existing temporary closed roads would be stabilized and closed upon completion of harvest or end of current operating season, whichever comes first.
- Construct about 600 feet of new system road off of Forest Road 2234 to access stands 85-89.
- Road maintenance and reconstruction on the log haul routes that may include resurfacing, cleaning ditches, grading, brushing, adding ditch relief culverts and replacing 18 stream crossing culverts.

Complete descriptions of these proposed actions are found in Chapter 2 Alternatives.

[1] Stand: The original clearcut area expressed in acres.

The following activities designed to increase late-successional forest structure, tree species diversity and to provide meadow habitat are proposed in the project area:

- Under-plant about 350 acres of commercially thinned 30 to 63 year old units[2] with shade-tolerant conifers.
- Under-plant about 200 acres of commercially thinned 90 to 95 year old units with a mix of shade-tolerant and shade-intolerant conifers from local seed sources.
- Dependant upon existing levels of snags and down logs (coarse woody debris, CWD) within units following harvest, between 2 to 20 snags and/or CWD per acre would be created. Snag and CWD creation is also proposed in the "no harvest" buffers along streams where young conifers are crowded and need to be thinned, but commercial harvest might adversely impact the riparian-dependant species' habitat or water quality.
- Precommercially thin approximately 1000 acres.
- Maintain one 5 acre meadow.
- Enhance approximately 7 acres of meadow within stand 85.

Relationship to Forest Plan

This Environmental Assessment is tiered to the Siuslaw National Forest Land and Resource Management Plan (Siuslaw Forest Plan) and Final Environmental Impact Statement (USDA Forest Service, 1990). The Siuslaw Forest Plan was amended by the Record of Decision (ROD) for Amendments to Forest Service and Bureau of Land Management Planning Documents Within the Range of the Northern Spotted Owl and ROD Attachment A (Standards and Guidelines for Management of Habitat for Late-Successional and Old-Growth Related Species Within the Range of the Northern spotted Owl) (USDA, USDI, 1994), commonly known as the Northwest Forest Plan. Hereafter, the above mentioned plans will corporately be referred to as the Forest Plan.

The proposed actions are designed to meet the Forest Plan Standards and Guidelines. The lands within this project area are allocated to one of six designated areas (ROD page A-4). The land allocations within the project area are briefly described below. In general, where land allocations overlap, the more restrictive standards and guidelines apply. For more detailed description of each management area or land allocation and standards and guidelines associated with them, refer to the Forest Plan

Northern Coast Range Adaptive Management Area (AMA)

All National Forest system lands located within the project area are designated as AMA. The emphasis for this area is restoration and maintenance of late-successional forest habitat, consistent with marbled murrelet guidelines (ROD, D-15). The overall objective is to learn how to manage on an ecosystem basis in terms of both technical and social challenges, and in a manner consistent with applicable laws (ROD, D-1). The primary technical objectives are development, demonstration, implementation, and evaluation of monitoring programs and innovative management practices that integrate ecological and economic values (ROD, D-3).

[2] Unit: Units refer to those areas where commercial harvest would occur.

Late-Successional Reserve (LSR)
LSR's cover 7,991 acres in the Little Nestucca Project Area of which 1,597 acres are within stands. A Late-Successional Reserve is "designed to serve a number of purposes. First, it will provide distribution, quantity and quality old-growth forest habitat sufficient to avoid foreclosure of future management options. Second, it will provide habitat for populations of species associated with late-successional forests. Third, it will help ensure late-successional species diversity will be conserved." (ROD page B-4). LSR Standards and Guidelines are listed in the ROD pages C9-C21. The standards and guidelines that apply to this project include:

- Management Assessment (page C-11) –A management assessment should be prepared for each large Late-Successional Reserve (or groups of smaller late-successional reserves) before habitat manipulation activities are designed and implemented.
- Silviculture (page C-12) **West of the Cascades-**There is no harvest allowed in stands over 80 years old (110 years in Northern Coast Adaptive Management Area). Thinning (precommerical and commercial may occur in stands up to 80 years old regardless of the origin of the stands (e.g., plantations planted after logging or stands naturally regenerated after fire or blowdown).
- Road Construction and Maintenance (page C-16)—Road construction in Late-Successional Reserves for silvicultural, salvage and other activities generally is not recommended unless the potential benefits exceed the costs of habitat impairment. If new roads are necessary to implement a practice that is other wise in accordance with these guidelines, they would be kept to a minimum, be routed through non-late-successional habitat where possible, and be designed to minimize adverse impacts. Alternative access methods, such as aerial logging should be considered to provide access in reserves.

Riparian Reserves
Riparian Reserves cover portions of both the AMA and LSRs. Riparian Reserves include lands along streams and unstable areas where riparian-dependent resources receive primary emphasis and where special standards and guidelines apply (ROD, B-12). Riparian Reserves cover at least 18,629 acres (65.6 percent) in the Little Nestucca Project Area of which 2,579 acres are within the stands. The standards and guidelines that apply to this Project are:

Timber Management

- TM-1 Prohibit timber harvest, including fire wood cutting, in Riparian Reserves, except as described below (page C-31).

  c. Apply silvicultural practices for Riparian Reserves to control stocking, reestablish and manage stands, and acquire desired vegetation characteristics needed to attain Aquatic Conservation Strategy objectives (page C-32).

Roads Management (page C-32)

- RF-2. For each existing or planned road, meet the Aquatic Conservation Strategy objectives by:

  a. Minimizing roads and landing in Riparian Reserves.

  b. Completing watershed analyses (including appropriate geotechnical analyses) prior to construction of new roads or landing in Riparian Reserves.

  e. Minimizing disruption of natural hydrologic flow paths, including diversion of streamflow and interception of surface and subsurface flow.

  g. Avoiding wetlands entirely when constructing new roads.

Northern Spotted Owl Reserve Pair Area
There is approximately 1,101 acres (4.2 percent) of the Little Nestucca project area within the multi-site Cascade Head Reserve Pair Area of which none of the acres are within the stands. The size of a Reserve Pair Area is at least equal to the median home range for owl pairs in the province. In these Reserve Areas, all suitable habitat in each area is reserved from timber harvest. Suitable habitat is defined as conifer dominated 80 years old or older and/or have trees greater than or equal to 18 inches average dbh, multi-storied in structure, and have sufficient snags and downed wood to provide opportunities for own nesting, roosting and foraging. The canopy closure generally exceeds 60 percent. In these Areas the following may occur:

- Late-Successional Reserve management standards and guidelines for salvage and other multiple-use activities would generally apply in the suitable habitat portion of the Reserve Pair Area.
- Allow for management of currently unsuitable areas consistent with Late-Successional Reserve management standards and guidelines for silviculture and salvage. Management of other multiple-use activities in the unsuitable habitat should follow standards and guidelines from current plans and draft plan preferred alternatives, which may allow some activities that would not be consistent with Late-Successional Reserve management standards and guidelines.

Supporting Documents

The Forest Plan requires that several analysis documents be prepared to guide the implementation of the Forest Plan. These include Watershed Analyses, Late-Successional Reserve Assessments and Adaptive Management Guides. These documents provide existing condition information and contain recommendations for attainment of the Forest Plan desired conditions.

Watershed Analysis (WA)
These documents identify important resource and information needs (data gaps), and describe ecological processes and interactions. The Little Nestucca Project Area is included in the Little Nestucca Watershed Analysis (Siuslaw, 1998). The WA achieves the Aquatic conservation Strategy objectives and provides the basis for restoration and monitoring programs. The WA identified about 9,132 acres of plantations less than 50 years old on National Forest System lands, within the Little Nestucca watershed. The WA identifies that management would focus on maintaining and improving late-successional ecosystem function and habitat characteristics while restoring connectivity with late-successional habitat outside the watershed (page9).

Late Successional Reserve Assessment (LSRA)
The Forest Plan requires that a Late-Successional Reserve Assessment (LSRA) be completed for each LSR or group of LSRs before habitat manipulation activities are designed or implemented. "*The Late-Successional Reserve Assessment for the Northern Coast Range Adaptive Management Area"* was completed January 1998. This Assessment provides a broad scale description of the resources and issues which affect late-successional habitat, describes management objectives and desired future conditions, and provides a context for future decision making. The Assessment includes recommendations for a variety of management activities considered appropriate for achieving the goals of the Forest Plan.

Siuslaw National Forest Roads Analysis, 2003 (RA)

On January 12, 2001, the Forest Service issued the final National Forest System Road Management Rule. This rule revised regulations concerning the management, use and maintenance of the National Forest Transportation System, and requires each Forest to complete a Roads Analysis. The Siuslaw Forest Roads Analysis is designed to provide decision makers with information to develop road systems that are safe and responsive to public needs and desires, are affordable and efficient, and are in balance with available funding for needed management actions. The Forest RA, completed 2003, guides project level road analysis and decisions.

Purpose and Need for Action

Action is needed in the Little Nestucca Project Area to maintain or improve habitat for aquatic and terrestrial species in the area by accelerating the development of late-successional forest habitat, maintaining unique habitat such as meadows, and improving watershed condition. Watershed conditions would be improved through road stabilization and decommissioning

What to do and how it is to be done is framed by two major underlying needs of the Forest Plan. They are:

> "The need for forest habitat is the need for a healthy forest ecosystem with habitat that would support populations of native species (particularity those associated with late-successional and old growth forests) and includes protection for riparian areas and waters" (ROD, page 26)
>
> "The need for forest products from forest ecosystems is the need for a sustainable supply of timber and other forest products that would help maintain the stability of local and regional economics on a predictable and long term basis." (ROD, page 26)

To refine this dual need, an interdisciplinary team analyzed the Little Nestucca Project Area and identified the existing and desired conditions of the managed stands in the Area. The team identified actions needed to meet or implement changes that would, in the future, meet this dual need and the desired condition. The focus of this analysis was the conifer stands that are the basis of the late-successional forest including the coarse woody debris and snag habitat and the transportation system.

Existing and Desired Conditions

Existing Condition – Young managed conifer stands

The Little Nestucca Project Area is approximately evenly divided between natural stands and young managed stands (see the table below).

Table 1-1: Acres of Managed and Natural Stands on National Forest System Lands in the Little Nestucca Project Area

Type of Stand	Acres
Managed Stands: 29 Years Old & Younger	2,910
Managed Stands 30 to 63 Years Old	3,368
Managed Off-Site Stands 90 to 95 Years Old	234
Subtotal – Managed Stands	**6,512**

Non-Forest (lakes, rivers, roads, meadows, etc.)	165
Natural Stands	6,016
Total	**12,693**

Large fires burned most of the Little Nestucca watershed in 1845 and again in 1890. In 1910 the northeast portion of the project area burned as part of the Mount Hebo Fire. Most of the current natural stands developed after the 1890 and 1910 fires. The managed stands identified in Table 1-1 were created by planting following the Mount Hebo Fire in 1910 and after clearcutting at various times throughout the past 63 years. The three "settlement fires" between 1845 and 1910 left almost no surviving trees that could serve as seed sources and very little natural regeneration on the broad, flat, upper elevation ridges, so the Forest Service conducted the first large-scale planting in the United States - the Mount Hebo Plantation. It covers 234 acres in the northeast corner of the project area. The rest of the project area resembles a jigsaw puzzle with small (1 to 142-acre stands, averaging just less than 40 acres), young managed stands scattered on a background matrix of natural stands.

Stand 87 was established in 1912. Stands 85, 86, 88, and 89 were established in 1915. All five were part of the Mount Hebo plantation. Seedlings were planted at a spacing of approximately 8 feet by 8 feet with no subsequent precommercial thinning, so these stands are densely stocked and almost 100 percent Douglas-fir. The trees are relatively short and small in diameter, and have small, sparse crowns. Additionally, the seedlings planted on this site were predominately interior Douglas-fir from Washington. This "off-site stock" is not genetically adapted to local conditions. A high percentage of them have forks or crooks indicating past stem breakage, probably due to heavy snow or ice storms. There is also an unusually high incidence of butt rot that apparently resulted from cambium damage during a hard freeze in November 1955 – noted in the Douglas-fir heredity study established near the project area in 1915 (based on a 2001 conversation with Roy Silen, retired U.S. Forest Service employee - Corvallis Lab, Pacific Northwest Research Station). If these stands are not treated, development of late-successional forest conditions will be slow, at best. Clear-cutting and starting stand development over again would also delay late-successional forest development. There are a lot of large trees with acceptable crown ratios scattered throughout these stands.

Stands 1 through 84 are younger, with years of origin ranging from 1944 through 1977. These plantations were generally planted with 300 to 700 Douglas-fir per acre. The planted seedling often competed with naturally regenerated seedlings and shrubs, depending on availability of seed, weather conditions, abundance of seed-eating insects and rodents, etc. Survival of the planted and natural seedlings varied greatly depending on many site and weather factors, animal damage, and insects and disease. Stocking often varied from 100 to 3,000 trees per acre. Some of the most heavily stocked stands were precommercially thinned to 150 to 300 trees per acre between stand ages 12 and 15 years old. These stands currently have between 170 and 400 trees per acre.

Stands in the Austin Creek drainage and to the west of it generally have naturally regenerated Sitka spruce, western hemlock, red alder, and a few western red cedar in the overstory; as well as Douglas-fir that was planted after clearcutting. Stands to the east have a few spruce in the overstory and hemlock becomes less common in stands farthest to the west and higher in elevation. Crown ratios of the trees in the stands proposed for commercial thinning are rapidly decreasing, so

deferring treatment now would leave fewer management options in the future because of decreased wind firmness and less potential to build crown mass needed to accelerate diameter growth.

The managed stands proposed for thinning are even-aged and have a single canopy (the tree crowns are all about the same height). The trees in these stands have very little stem taper (the diameter of the trunk doesn't vary much from top to bottom), few branches over one inch diameter, and small, narrow crowns. Due to the crowded stand conditions, trees are generally growing slowly, making them more susceptible to damage and mortality from insects, disease, and weather events, than stands with fewer stems per acre.

Wind is a significant disturbance in the project area. Overly dense stands are structurally weak and subject to windthrow that can flatten the entire stand. Since fragmentation of the remaining late-successional stands in the project area is a significant concern, there is a need to increase the wind firmness of these managed stands to minimize stand replacement events.

Swiss needle cast and root rots are currently the most significant diseases in stands within the project area. *Phellinus weirii* (laminated root rot) and *Armillaria* root disease are common in the project area. Some stands proposed for treatment have small pockets of these root diseases, characterized by clumps of dead, dying or fading trees. Douglas-fir in the project area are infected with low to moderate levels of Swiss needle cast. A few stands in the northern portion of the project area have been identified in recent years as having moderate to high levels.

Desired Condition – Young Managed Conifer Stands

The desired future condition can be best described as stand characteristics that will provide suitable habitat for species associated with late seral forests. See Franklin and Spies (1991), pages 61 through 80 and the Late-Successional Reserve Assessment for Oregon's Northern Coast Range Adaptive Management Area (Siuslaw, 1998), pages 70 through 80 for detailed discussions and data sets describing late-successional structural and compositional characteristics.

Specific long-term, late-successional forest characteristics that are targeted by the proposed treatments include:

- growing some large trees (over 40 inches diameter at breast height (dbh)) with large limbs and broken tops or large cavities,
- developing multiple canopy layers within treated stands,
- establishing a variety of shade tolerant species in the understory,
- establishing pockets of shrubs and forbs scattered throughout the stands,
- creating numerous large snags (over 20 inches dbh and over 15 feet tall), and
- creating down logs in all decay classes.

The short-term desired characteristics include:

- A more heterogeneous stand with varying tree densities, gaps, and understory conditions
- Some large, dominant, open-growing trees with the potential to develop large limbs and deep crowns
- Fewer trees per acre with improved growth rates on the dominant trees
- At least 10 percent of each stand area untreated, providing diverse stocking densities across the stand
- Retention of some trees with wildlife habitat features such as forks, crooks, butt and stem decay, bark and stem fissures, etc.

- An overall increase in understory vegetation, including shade tolerant tree species
- Improvement in the mix of native species vegetation in both the riparian and upland areas
- Fewer trees per acre with increased wind firmness of the overall stand (5 years after treatment)

Existing Condition –Riparian Reserves
Human caused disturbance has impacted riparian ecosystems in the area. Plantations and other environments manipulated by man do not provide the range of habitat components (vertical and horizontal structure, large woody debris) needed to support the full complement of riparian-dependent wildlife.

Desired Condition –Riparian Reserves
As identified in the Record of Decision for the Northwest Forest Plan (ROD, p. 7), these large Riparian Reserves were established not only to "protect the health of the aquatic system and its dependant species," but to "improve travel and dispersal corridors for terrestrial animals and plants, and provide for greater connectivity of late-successional forest habitat." As a result, Objectives 8 and 9 of the Aquatic Conservation Strategy (ROD, B-11) define a desired future condition for vegetation broad enough to fit both upland and riparian areas in these reserves. The more specific desired future condition described in the above section entitled *Desired Condition – Young Managed Conifer Stands* fits both the wetter, riparian-influenced areas and the uplands outside of them. The Late-Successional Reserve Assessment for Oregon's Northern Coast Range Adaptive Management Area (Siuslaw, 1998; pages 70 – 80) includes detailed discussions and data sets describing late-successional structural and compositional characteristics appropriate to riparian and upland habitat.

Existing Condition — Coarse Woody Debris (CWD) and Snags
CWD is down wood on the forest floor such as logs and stumps. Levels of down wood, in these young managed stands, are highly variable, estimated to be between 500 and 7,000 cubic feet per acre. Stands north of Highway 22 have the lowest levels of down wood due to multiple wildfires between 1845 and 1910. The rest of the Project Area generally has high levels of down wood. However, most of the down wood throughout the project area is in the form of very large logs legacies from the previous stand. These are in the soft log class, decay classes III through V.

Excerpts from the Late-Successional Reserve Assessment for Oregon's Northern Coast Range Adaptive Management Area (LSRA, page 75) below, describe the current condition of CWD.

Large accumulation of CWD, including both snags and down logs, take a long time to develop naturally after a stand replacing disturbance. Due to rapid decomposition rates in the Coast Range most of the CWD from the previous stand is not detectable 100 to 150 years after it reaches the forest floor (Wright 1997). Additionally, at 100 to 150 years CWD accumulations are just beginning to increase as large trees begin to die (Spies and Cline 1998). This results in CWD levels operating on a different cycle than live trees biomass. CWD levels are actually highest early in succession and lowest in mid-seral stands,

Many of the natural 80 to 120 year old stands which would have started to contribute large CWD were harvested in the past 50 years. In commercially thinned stands, most of the suppressed trees

(which would have provided CWD as they died) have been removed, snags have been felled for safety concerns, and some of the down wood has been harvested. In clearcuts, most of the live trees have been salvaged or removed as firewood. Some of the CWD was removed from the site during harvest and post harvest treatments (slash burning). Spies and Cline (1988) observed that at least six times more CWD carries over after wildfire in old-growth systems than after logging in old-growth; in addition, the CWD left after logging is smaller and decays faster. Young managed stands will not provide high levels of CWD for at least 150 years after harvest (Wright 1997).

The trees in these stands are too small to provide medium to large snags (21 to 48 inches dbh). Snags most commonly encountered in these stands are small trees that have been shaded-out by faster growing trees. Individual stands varied from zero to 40 snags per acre. Most snags ranged from 7 to 11 inches in diameter. The higher snag densities are associated with root rot, bear damage and suppression.

Desired Condition — Coarse Woody Debris (CWD) and Snags

Strategies for Achieving desired CWD levels are described in the LSRA, pages 95 through 97. At the landscape scale, recommended CWD levels are not likely to be achieved during a single entry in early or mid-seral stands. Long-term, site specific strategies are necessary to guide current and future entries toward the goal of achieving the desired levels of snags and down wood. This project proposes to utilize a combination of Strategies 1, 2 and 3. In those stands having larger trees (the off-site stands in the northeast corner of the project area) create large amounts of CWD immediately – Strategy 1. It is the last opportunity to finance CWD input through timber harvest. Strategy 2 would be utilized to enhance CWD by creating some snags and coarse wood at this time, with the intention of speeding up the growth of larger trees that can provide large coarse wood in the future. Strategy 3 would be utilized in some of the mixed seral stands that are not thinned – snag and CWD creation would be utilized to open holes in the canopy and improve growth on selected larger trees.

Creation of snags and down wood would accelerate development of late successional forest habitat by providing an immediate infusion of fresh dead wood on site, enhancing habitat for a variety of wildlife species and fungi. Fresh snags and down wood would simply maintain these species on site until larger snags and down wood become available through natural processes. Snags and down wood created in the residual stand would be much larger than those currently being created through the natural process of suppression and mortality.

A single entry can improve the current situation. However, trees in the younger managed stands are so small at this time that snag and CWD creation does little to improve habitat (e.g. – snags are so small that they are not suitable for cavity nester, CDW is so small that it does little to retain moisture on site during drier times of the year, etc.) and they rapidly decay. Multiple entries and activities would help to achieve the desired future conditions sooner, especially once the trees are larger.

Decision Framework

The Responsible Official for this project is the Hebo District Ranger, Siuslaw National Forest. The environmental assessment for this project provides the alternatives, the environmental effects of implementation and public comments upon which a decision will be made by the District Ranger. the District Ranger will determine through a Decision Notice::

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

The primary factors that will influence the District Ranger's decision are based on how well the issues are addressed. The Decision Notice will document this decision and describe what activities will be implemented to address the alternatives. The decision will be consistent with the Forest Plan and will incorporate the associated the design criteria, including the management requirements and mitigation measures.

Summary of Scoping

Information used to identify the issues and develop the alternatives was gathered by a Forest Service Interdisciplinary Team (IDT), from field reconnaissance, District resource maps, local experience and review of comments from the public, Native American tribes, special interest groups, and state and federal organizations. Two methods were used to provide the public the opportunity to comment about the proposed actions:

- Starting in the spring of 2004, the Project was listed in the Project Update, the Siuslaw National Forest's Schedule of Proposed Actions (SOPA), which is published and mailed quarterly to a Forest mailing list of interested groups and individuals. No comments were received by this scoping method.
- On July 12, 2004, soon after the project was initiated, the District mailed a project scoping letter to 24 interested individuals, organizations and Native American tribes. In addition, a public notice soliciting comments about the project was published in the *Tillamook Headlight Herald* newspaper. From this scoping method, the Forest Service received two letters. These comments are located in the project analysis file.

Issues

The IDT and the Hebo District Ranger, responsible official for this project, reviewed all of the comments to determine the significant and non-significant issues for this project. Significant issues are used to formulate alternatives, prescribe mitigation measures or analyze environmental effects. Issues are significant because of the extent of their geographic distribution, the duration of their effects, or the intensity of interest or resource conflict.

Non-significant issues generally are those that are outside the scope of the proposed action(s), decided by existing law, regulation, Forest Plan or higher level decision, irrelevant to the decision to be made and conjectural and not supported by scientific evidence. Council on Environmental Quality regulations (40 CFR 1500.2(b) and 1500.4(g) require that issues that are deemed not significant include a brief statement of why they would not considered significant. For this project, these issues are in the Appendix B, Other Issues section.

Significant Issue Associated with the Proposed Action

After review of the both internal (Forest Service) and public comments, one issue, the anticipated impacts of the proposed actions to water quality and aquatic habitat is considered significant. The following discussion of this issue contains an issue statement, which generally describes the cause and effect relationship of implementing the proposed actions, and one or more concerns that detail these cause and effect relationships. Also, for each concern there are one or more elements that are

used to quantify or qualify the effects between the fully evaluated alternatives. These estimates of effects are discussed in Chapter 3.

Issue - Impacts to Water Quality/Fish Habitat

The proposed activities have the potential to adversely impact water quality and fish habitat by increasing sediment in the streams that may be affected by the proposed actions.

Background

Downstream aquatic habitat could be damaged if sufficient sediment reaches streams.
The amount of sediment that may reach streams could be influenced by: 1) Temporary road construction. 2) Re-opening closed existing temporary and NFS roads that are revegetated. 3) Use of roads that have a gravel or dirt travelway during wet periods may be a source of sediment. 4) Timber harvest disturbance could result in sedimentation. 5) Land management; including harvest systems, drainage structures, and road maintenance may result in slope instability.

Indicator:

- Miles of new temporary roads.
- Miles of reopened existing closed temporary roads and miles reopened NFS roads.
- Miles of roads with gravel or dirt surfaces used to support commercial harvest operations.
- Acres of timber harvest by harvest system.
- Numbers of drainage structures removed or replaced.

Chapter 2 Alternatives

This chapter includes a description of the reasonable range of alternatives developed to respond to the significant issue and need for actions described in Chapter 1. It also includes a list of the design criteria (mitigation measures) that would be implemented to minimize or prevent adverse effects on environmental, economic, and social resources in the Little Nestucca Project Area, and be consistent with Forest Plan Standards and Guidelines.

The section, *Alternatives Studied in Detail*, describes those alternatives that meet the need for actions described above and respond to the significant issues. The section, *Alternatives Considered but Eliminated from Further Analysis* describes the alternatives considered but dropped from further analysis, and an explanation of why they were dropped.

Alternatives Studied in Detail

Alternative 1 No Action

In this alternative, none of the managed stands in the Little Nestucca Project Area would be treated to control density and create coarse woody debris or snags. Also under this alternative, no commercial thinning or road decommissioning would be accomplished, as well as other proposed actions under the other action alternative.

This alternative does not meet the purpose and need to maintain or improve habitat for aquatic and terrestrial species in the area by accelerating the development of late-successional forest habitat and by improving watershed conditions. This alternative also does not work toward meeting the desired conditions described in the Chapter 1 of this Environmental Assessment nor meet the two major underlying needs of the Forest Plan. However, this is a fully evaluated alternative because it provides the baseline for analysis for the action alternatives. It is required by NEPA (40CFR 1502.14(d)).

Design Criteria Common to All Action Alternatives

To meet the Forest Plan Standards and Guidelines and reduce or prevent the adverse impacts of the proposed actions, the following project design items (mitigation measures) would be implemented. This list applies to all of the action alternatives. Where design criterion is specific to an alternative, it is found in the description of that alternative.

Commercial Thinning

Commercial Sale Design

1. Silvicultural prescriptions will focus on leaving the largest, fastest growing trees.

2. Protective vegetation leave areas or buffers would be implemented around all streams near potentially unstable areas and wet sites. These areas would be designed to protect riparian vegetation, to maintain stream temperature, and to maintain stream-adjacent slope stability (including headwalls). These areas would not be thinned and harvested but may contain yarding corridors. Trees that need to be felled in these areas will be left on site. The minimum stream buffer would be 15 feet on each side of intermittent streams and 30 feet on each side of perennial streams.

3. Stands 85, 86, 87, 88, and 89 would be treated by removing an additional twenty trees per acre 4 to 5 years after the initial thinning. This would allow time for development of increased wind firmness and crown development. Snag and CWD creation would occur after this second entry, followed by underplanting.

Logging Operations

1. To reduce soil disturbance, ground-based equipment would not be used on slopes greater than 30 percent unless otherwise authorized.

2. Ground-based operations would be limited to July 8 through October 31 unless otherwise authorized.

3. Ground-based skidding equipment would stay on designated skid trails. Ground-based skid trails would be predesignated and pre-approved before use. They would not exceed 15 feet in width and would generally be a minimum of 100 feet apart at the terminal point of the skid trail.

4. Partial or one end suspension would be required during inhaul on skyline units, except at tail trees and landings. Given the uneven terrain in some units, small areas of ground lead may occur along ridge lines or benches.

5. Generally all snags and existing down wood would be retained. Snags or other danger trees that pose a safety hazard may be felled, but would be retained on site for coarse woody debris.

6. Trees would be directionally felled away from buffers to protect riparian vegetation from damage. Trees accidentally felled into buffers would be retained to minimize stream sedimentation or damage to riparian vegetation. Some trees could be removed as determined by the Forest Service.

7. Skyline corridors would be limited to 12 feet wide or less unless otherwise authorized.

8. Where cable yarding is planned, logging systems would be designed to yard away from stream channels to minimize soil disturbance on stream-adjacent slopes. Where skyline corridors pass through riparian buffers, no more than 20 percent of the canopy would be removed in any given, 1,000-foot reach of stream. All logs yarded over streams would be fully suspended. Skyline cable landings would be built in stable areas with stable cut bank slopes. Existing landings would be used where feasible.

9. Damaged “rub trees” would remain on site.

10. To lessen damage to residual trees, trees would be directionally felled to the lead of cable corridors and ground based skidding trails.

11. “Off road” equipment cleaning will be required prior to arrival on Forest. Cleaning specifications will be included in the timber sale contract (includes yarders, shovels etc., log trucks not included).

12. Disturbed sites lacking canopy cover (cut/fill slopes, waste areas, landings, temp roads, tractor skid roads etc.) would be seeded and fertilized using native grass and forb seed (FS supplies seed). Rates would be 30 pounds per acre of seed and 200 pounds per acre of 16-16-16 slow release fertilizer. Seeding would be accomplished when there is sufficient ground moisture generally in the spring or fall.

13. To minimize weed colonization, vegetation cover would be maintained to the extent possible when reopening and building roads or stabilizing and closing them.

14. To maintain long-term productivity, the total acreage of all detrimental soil conditions would not exceed 15 percent of the total National Forest land within each harvest unit, excluding roads and landings. Detrimental conditions are those that would reduce the potential of the site to grow trees or vegetation.

15. Trees in riparian buffers that need to be cut to facilitate harvest operations would be dropped into the stream if possible to aid in woody debris recruitment.

16. Disturbance to the existing down woody debris concentrations would be avoided as much as practical.

17. Commercial Sale Operating Season—Felling, Yarding, and Hauling (dates inclusive) —To reduce disturbance of northern spotted owls and marbled murrelets, adverse effects on avian species.

Table 2-1: Operating Season by Units

Stand/Unit Number	Stand Acres*	Unit Acres*	Operating season for felling and yarding	Log Haul	Restriction reason(s)
5	**27**	20	**July 8-Feb 28 Aug 6- Feb 28 (portion of)**	**Any time**	**Portion of unit contains 100 yard buffer, see #18 below**
6	**74**	60	**Oct 1-Feb 28 (Helo)**	**Any time**	**Helicopter unit**
7	**17**	15	**July 8-Feb 28**	**Any time**	
8	**66**	54	**July 8- Oct 31 Aug 6- Oct 31 (portion of)**	**Anytime**	**Portion of unit contains 100 yard buffer, see #18 below**
11	**64**	57	**July 8- Oct 31**	**June 1- Oct 31**	
12	**59**	48	**July 8-Oct 31**	**June 1- Oct 31**	**Portion that's reached by 2280-117 can be hauled anytime**
14	**86**	66	**July 8- Oct 31 Aug 6- Oct 31 (portion of)**	**June 1 – Oct 31**	**Portion of unit contains 100 yard buffer, see #18 below**
15	**19**	12	**July 8-Feb 28 Aug 6- Feb 28 (portion of)**	**Any time**	**Portion of unit contains 100 yard buffer, see #18 below**
16	**75**	67	**July 8- Oct 31 Aug 6- Oct 31 (portion of)**	**Anytime**	**Portion of unit contains 100 yard buffer, see #18 below**
17	**49**	44	**July 8- Oct 31 Aug 6- Oct 31 (portion of)**	**Anytime**	**Portion of unit contains 100 yard buffer, see #18 below**
18	**33**	29	**July 8-Oct 31**	**June 1- Oct 31**	
19	**58**	52	**July 8- Oct 31 Aug 6- Oct 31 (portion of)**	**Anytime**	**Portion of unit contains 100 yard buffer, see #18 below**
20	**32**	28	**July 8- Oct 31 Aug 6- Oct 31 (portion of)**	**Anytime**	**Portion of unit contains 100 yard buffer, see #18**

					below
21	**52**	46	**July 8- Oct 31 Aug 6- Oct 31 (portion of)**	**June 1- Oct 31**	**Portion of unit contains 100 yard buffer, see #18 below**
22 west ½	**25**	22	**July 8-Feb 28 Aug 6- Feb 28 (portion of)**	**Any time**	**Portion of unit contains 100 yard buffer, see #18 below**
22 east ½			**July 8- Oct 31 Aug 6- Oct 31 (portion of)**	**June 1- Oct 31**	**Portion of unit contains 100 yard buffer, see #18 58below**
23	**65**	52	**July 8- Oct 31 Aug 6- Oct 31 (portion of)**	**June 1- Oct 31**	**Portion of unit contains 100 yard buffer, see #18 below**
24	**58**	52	**July 8-Feb28 Aug 6- Feb 28 (portion of)**	**Any time**	**Portion of unit contains 100 yard buffer, see #18 below**
29	**21**	18	**July 8-Feb 28 Aug 6- Feb 28 (portion of)**	**Any time**	**Portion of unit contains 100 yard buffer, see #18 below**
30	**14**	12	**July 8-Feb 28 Aug 6- Feb 28 (portion of)**	**Any time**	**Portion of unit contains 100 yard buffer, see #18 below**
31	**22**	19	**July 8-Feb 28 Aug 6- Feb 28 (portion of)**	**Any time**	**Portion of unit contains 100 yard buffer, see #18 below**
32	**50**	45	**July 8- Oct 31 Aug 6- Oct 31 (portion of)**	**June 1- Oct 31**	**Portion of unit contains 100 yard buffer, see #18 below**
33	**22**	16	**July 8- Oct 31 Aug 6- Oct 31 (portion of)**	**Anytime**	**Portion of unit contains 100 yard buffer, see #18 below**
34	**18**	16	**Aug 6- Oct 31 (all/most)**	**June 1- Oct 31**	**All/most of unit is within 100 yard buffer, see 18 below**
35	**70**	61	**July 8- Oct 31 Aug 6- Oct 31 (all/most)**	**Anytime**	**All/most of unit is within 100 yard buffer, see 18 below**
36	**26**	7	**July 8- Oct 31 Aug 6- Oct 31 (portion of)**	**June 1- Oct 31**	**Portion of unit contains 100 yard buffer, see #18 below**
37	**18**	16	**July 8-Feb 28 Aug 6- Feb 28 (portion of)**	**Any time**	**Portion of unit contains 100 yard buffer, see #18 below**
38	**13**	10	**July 8-Feb 28 Aug 6- Feb 28 (portion of)**	**Any time**	**Portion of unit contains 100 yard buffer, see #18 below**
39	**37**	33	**July 8- Oct 31 Aug 6- Feb 28 (portion of)**	**Anytime**	**Portion of unit contains 100 yard buffer, see #18 below**
40	**69**	57	**Oct 1-Feb 28 (Helo)**	**Any time**	**Helicopter unit**
41	**45**	40	**July 8- Oct 31 Aug 6- Oct 31 (portion of)**	**Anytime**	**Portion of unit contains 100 yard buffer, see #18 below**
42	**83**	67	**July 8- Oct 31 Aug 6- Oct 31 (portion of)**	**June 1- Oct 31**	**Portion of unit contains 100 yard buffer, see #18 below**
43	**8**	7	**July 8- Oct 31 Aug 6- Oct 31 (portion of)**	**Anytime**	**Portion of unit contains 100 yard buffer, see #18 below**
44	**28**	14	**July 8- Oct 31 Aug 6- Oct 31 (all/most)**	**Anytime**	**All/most of unit is within 100 yard buffer, see 18 below**
45	**26**	20	**July 8-Feb 28 Aug 6- Feb 28 (all/most)**	**Any time**	**All/most of unit is within 100 yard buffer, see 18 below**
46	**22**	19	**July 8- Oct 31 Aug 6- Oct 31 (all/most)**	**Anytime**	**All/most of unit is within 100 yard buffer,**

					see 18 below
47	**17**	15	**July 8-Feb 28 Aug 6- Feb 28 (all/most)**	**Any time**	**All/most of unit is within 100 yard buffer, see 18 below**
48	**9**	8	**July 8- Oct 31 Aug 6- Oct 31 (all/most)**	**June 1- Oct 31**	**All/most of unit is within 100 yard buffer, see 18 below**
50	**9**	8	**July 8- Oct 31 Aug 6- Oct 31 (all/most)**	**June 1- Oct 31**	**All/most of unit is within 100 yard buffer, see 18 below**
51	**20**	18	**July 8-Feb 28 Aug 6- Feb 28 (portion of)**	**Any time**	**Portion of unit contains 100 yard buffer, see #18 below**
52	**38**	34	**July 8- Oct 31 Aug 6- Oct 31 (portion of)**	**June 1- Oct 31**	**Portion of unit contains 100 yard buffer, see #18 below**
53	**46**	41	**July 8- Oct 31 Aug 6- Oct 31 (portion of)**	**June 1- Oct 31**	**Portion of unit contains 100 yard buffer, see #18 below**
54	**32**	28	**July 8- Oct 31 Aug 6- Oct 31 (all/most)**	**June 1- Oct 31**	**All/most of unit is within 100 yard buffer, see 18 below**
55	**26**	23	**Oct 1-Feb 28 (Helo)**	**Any time**	**Helicopter unit**
56	**22**	19	**July 8- Oct 31 Aug 6- Oct 31 (portion of)**	**June 1- Oct 31**	**Portion of unit contains 100 yard buffer, see #18 below**
57	**26**	20	**July 8- Oct 31 Aug 6- Oct 31 (portion of)**	**Anytime**	**Portion of unit contains 100 yard buffer, see #18 below**
58	**91**	81	**July 8-Feb 28 Aug 6- Feb 28 (portion of)**	**Any time**	**Portion of unit contains 100 yard buffer, see #18 below**
59	**34**	14	**July 8-Feb 28 Aug 6- Feb 28 (all/most)**	**Any time**	**All/most of unit is within 100 yard buffer, see 18 below**
60	**52**	46	**July 8- Oct 31 Aug 6- Oct 31 (portion of)**	**June 1- Oct 31**	**Portion of unit contains 100 yard buffer, see #18 below**
61	**96**	66	**July 8- Oct 31 Aug 6- Oct 31 (portion of)**	**June 1- Oct 31**	**Portion of unit contains 100 yard buffer, see #18 below**
62	**57**	49	**July 8- Oct 31 Aug 6- Oct 31 (portion of)**	**June 1- Oct 31**	**Portion of unit contains 100 yard buffer, see #18 below**
63	**142**	127	**July 8- Oct 31 Aug 6- Oct 31 (portion of)**	**June 1- Oct 31**	**Portion of unit contains 100 yard buffer, see #18 below**
64	**61**	32	**Oct 1-Feb 28 (Helo)**	**Any time**	**Helicopter unit**
66	**84**	75	**Oct 1-Feb 28 (Helo)**	**Any time**	**Helicopter unit**
67	**47**	35	**July 8- Oct 31**	**Anytime**	
68	**46**	41	**July 8-Feb 28 Aug 6- Feb 28 (portion of)**	**Any time**	**Portion of unit contains 100 yard buffer, see #18 below**
70	**92**	50	**July 8- Oct 31 Aug 6- Oct 31 (portion of)**	**June 1- Oct 31**	**Portion of unit contains 100 yard buffer, see #18 below**
71	**176**	158	**July 8- Oct 31**	**June 1- Oct 31**	
72	**56**	50	**July 8-Feb 28**	**Any time**	
73	**56**	27	**July 8- Oct 31**	**June 1- Oct 31**	
74	**115**	82	**July 8- Oct 31 Aug 6- Oct 31 (portion of)**	**June 1- Oct 31**	**Portion of unit contains 100 yard buffer, see #18 below**
75	**36**	32	**July 8- Oct 31**	**June 1- Oct 31**	
76	**42**	37	**July 8- Oct 31 Aug 6- Oct 31(portion of)**	**June 1- Oct 31**	**Portion of unit contains 100 yard buffer, see #18**

					below
77	**28**	20	**July 8- Oct 31 Aug 6- Oct 31 (portion of)**	**June 1- Oct 31**	**Portion of unit contains 100 yard buffer, see #18 below**
78	**19**	17	**July 8- Oct 31 Aug 6- Oct 31 (portion of)**	**June 1- Oct 31**	**Portion of unit contains 100 yard buffer, see #18 below**
79	**6**	5	**July 8- Oct 31 Aug 6- Oct 31 (all/most)**	**June 1- Oct 31**	**All/most of unit is within 100 yard buffer, see 18 below**
80	**57**	50	**July 8- Oct 31**	**June 1- Oct 31**	
81	**31**	28	**July 8- Oct 31 Aug 6- Oct 31 (portion of)**	**June 1- Oct 31**	**Portion of unit contains 100 yard buffer, see #18 below**
82	**17**	15	**July 8-Feb 28 Aug 6- Feb 28 (all/most)**	**Any time**	**All/most of unit is within 100 yard buffer, see 18 below**
83	**21**	18	**Oct 1-Feb 28 (Helo)**	**Any time**	**Helicopter unit**
84	**76**	68	**July 8- Oct 31 Aug 6- Oct 31 (portion of)**	**June 1- Oct 31**	**Portion of unit contains 100 yard buffer, see #18 below**
85	**212**	190	**July 8- Oct 31**	**June 1- Oct 31**	
86	**2**	2	**July 8- Oct 31**	**June 1- Oct 31**	
87	**8**	7	**July 8- Oct 31**	**June 1- Oct 31**	
88	**1**	1	**July 8- Oct 31**	**June 1- Oct 31**	
89	**11**	10	**July 8- Oct 31**	**June 1- Oct 31**	

*acres are approximate

18. Felling and yarding within 100 yards of suitable owl or murrelet habitat in occupied or un-surveyed stands (mature forest) would occur between August 6 and February 28. Within 100 yards of suitable habitat in occupied or un-surveyed stands, daily-timing restrictions would limit operations to within 2 hours after sunrise to 2 hours prior to sunset August 6 through September 15 unless otherwise authorized.

19. Key Roads would be kept open during logging operations with no more than minor traffic delays.

20. When the Industrial Fire Precaution Level is 2 or above, the time of day restriction may be waived during the late breeding period of August 6 through September 15.

Road Management

1. Road maintenance of the NFS roads used for log haul may include adding surface rock, blading, brushing, ditch or culvert cleaning and the addition of several ditch relief culverts would occur prior to project implementation.

2. The road construction and re-opening operating season would be June through October. Open spur roads would be storm proofed and blocked to traffic if they have to sit through extended periods of wet weather.

3. Log haul routes will be monitored during periods of heavy rain, such as precipitation exceeding one inch in a 24-hour period. Straw bales or other sediment control measures would be utilized to trap sediment and reduce off-site erosion, as needed. Active erosion controls would be implemented if sediment is found entering stream channels. When determined to be necessary, haul would be stopped during heavy rainfall to prevent adverse soil impacts and potential mobilization of sediment.

4. Rock surfacing would be placed on roads with gravel or native surface in sufficient amounts to minimize or stop rutting or soil displacement.

5. To reduce sedimentation and road wear, "constant reduced tire pressure" provision would be included in timber sale contract.

Fire and Fuels Management/Air Quality

All requirements of the Oregon Smoke Management Plan would be followed for all prescribed burning associated with this project. Impacts to downwind residents and communities would be evaluated and minimized on burn days. Pile burning would take place when atmospheric conditions are optimal for smoke dispersion, usually in the late fall or winter.

Alternative 2 Proposed Action

The proposed and connected actions included in this alternative are:

- Commercially thin approximately 2,638 acres of 30 to 63 year old young managed conifer stands. Cable yarding, ground based, and helicopter systems may be used.
- Commercially thin approximately 210 acres of 90 to 95 year old off-site Douglas- fir stands. Cable yarding, ground based, and helicopter systems may be used.
- Decommission approximately 7 miles of Forest system roads.
- Close some non-key roads in Forest system, which may include stabilizing, water barring and barricading roads.
- Construct approximately 2 miles of new temporary roads and reopen about 10 miles of existing temporary roads. The constructed temporary roads and other roads, including existing temporary closed roads would be stabilized and closed upon completion of harvest or end of current operating season, whichever comes first.
- Construct about 600 feet of new system road off of Forest Road 2234 to access stands 85-89.
- Road maintenance and reconstruction on the log haul routes that may include resurfacing, cleaning ditches, grading, brushing, adding ditch relief culverts and replacing 18 stream crossing culverts.

The following activities are proposed in the project area – they are designed to increase late-successional forest structure, tree species diversity and to provide meadow habitat:

- Under-plant about 350 acres of commercially thinned 30 to 63 year old units with shade-tolerant conifers.
- Under-plant about 200 acres of commercially thinned 90 to 95 year old units with a mix of shade-tolerant and shade-intolerant conifers from local seed sources.
- Dependant upon existing levels of snags and down logs (coarse woody debris, CWD) within units following harvest, between 2 to 20 snags and/or CWD per acre would be created. Snag and CWD creation is also proposed in the "no harvest" buffers along streams where young conifers are crowded and need to be thinned, but commercial harvest might adversely impact the riparian-dependant species' habitat or water quality.
- Precommercially thin approximately 1000 acres.
- Maintain one 5 acre meadow.
- Enhance approximately 7 acres of meadow within stand 85.

Commercial Thinning

Alternative 2 would treat approximately 2,848 acres within 75 stands. Variable density thinning would be prescribed and this variability would be accomplished by the following methods:

- Thinning would generally be from below to remove the suppressed, intermediate, and some co-dominant trees. Those trees removed are the ones most susceptible to wind throw and competition mortality, and the least likely to develop into the giant over-story trees of the future.
- At least ten percent of each stand (the original clearcut area) would be left in unthinned patches 0.5-acre or larger. These patches will provide dense pockets of trees with intermingled crowns.
- In each stand, ten percent of the area or less will be very heavily thinned to less than 20 trees per acre to create 0.5 to 2-acre "openings." This would promote open grown characteristics and provide more light to reach the forest floor promoting understory tree development. Patches created by marking the specific trees to be removed would occur at least 90 feet away from perennial streams and would not reduce the total stand average canopy to less than 40 percent.
- When economically feasible and environmentally acceptable (limited wind throw or insect and disease concerns), the thinning spacing will be varied to provide various levels of thinning within the timber harvest unit (the area within the stand that will be treated by thinning). This may be accomplished by individual tree marking (usually very expensive) or by a variety of other means, including thinning to diameter limits (cutting all trees below a certain diameter and above 7 inches in diameter) if presale layout examination indicates that the results would satisfactorily move the stand toward the desired future condition. Many stands will be thinned to more uniform spacing to increase wind firmness, with more variable spacing planned for the next entry.

The proposed thinning prescriptions were designed to maximize individual tree growth while limiting the likelihood that the stand would blow down. Units, or portions of units, that are most susceptible to wind throw, would be thinned to about 80 to 100 trees per acre. This level of thinning makes it likely that these stands would benefit from future thinning in 10 to 15 years to further assist their development towards late-successional habitat. The remaining portions of units, not as susceptible to wind throw, would be thinned to about 55 to 75 trees per acre.

Commercial Thinning Operations

A combination of ground based equipment; helicopter and cable yarding would be used to harvest about 36 million board feet of timber. Table 2-3 shows which system would be used for each treatment unit.

TABLE 2-3: Proposed Commercial Thinning Yarding Methods

Skyline	Ground Based	Helicopter
Units: 8, 11, 15, 16, 17, 18, 19, 20, 21, 22, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 41, 42, 43, 44, 45, 46, 47, 48, 51, 52, 54, 56, 57, 58, 59, 60, 61, 62, 63, 67, 68, 70, 71, 72, 73, 74, 75, 77, 78, 79, 80, 81, 82, 84, 86, 87, 88, 89 Portions of Units: 5, 7, 12, 14, 23, 24, 53, 58, 76, 85 **Total Acres: 2,476**	Units: 50 Portions of Units: 5, 7, 12, 14, 23, 24, 53, 58, 76, 85 **Total Acres: 107**	Units 6, 40, 55, 64, 66 and 83 **Total Acres: 265**

Road Management

To support the commercial thinning, a combination of existing NFS roads, temporary roads, and new temporary roads would be needed. About 2 miles of temporary roads would be constructed, about 10 miles of existing closed temporary road and about 25 miles of NFS roads would be used. Decommission approximately 7 miles of NFS roads.

The proposed new temporary roads are extensions of existing roads in the Project Area. These proposed new temporary roads do not cross any streams. They are constructed in such a way as to minimize exposed cut and fill slopes, minimize the total amount of excavation, and avoid streams and small unstable areas within the stands. These temporary roads are located on relatively flat ground and no new ditches will be constructed. This design feature is intended to preserve hydrologic function.

The following table identifies the proposed units that would require new temporary roads, estimated length of temporary roads located in the Riparian Reserve, and the proposed thinning acres accessed by each road segment.

Table 2-4

Unit and Temporary Road Number	Temp Road Distance in feet	Length (in feet) of Temporary Roads In/Out of Riparian Reserve		Acres Accessed
		Out	In	
11-1	1,053	264	789	16
19-1	160	160	0	6
19-2	715	422	293	13
30-1	170	0	170	5
32-4	340	340	0	6
42-2	175	175	0	4
42-4	470	0	470	3
42-5	330	0	330	23
54-3	470	0	470	3
54-4	420	264	206	7
57-1	470	53	417	7
62-2	360	360	0	26
63-3a	160	0	160	23
63-5	200	0	200	11
70-2	570	570	0	31
74-1	300	300	0	9
76-4	250	0	250	3
78-2	830	41	789	19
85-2	470	470	0	20
85-3	660	660	0	9
85-4	450	450	0	67
85-5	270	270	0	6
86-1	132	132	0	2
87-1	300	300	0	8
Totals	**9,855**	**4,752**	**5,103**	**330**

Opening the existing temporary and NFS roads that are closed would include cutting and removing shrubs, small conifers and hardwoods. Rock would be added to the travelways as necessary to support haul and to reduce or stop production of sediment from these roads. All of the temporary roads would be stabilized with waterbars, scarified seeded and closed to public travel when use is completed. The NFS roads that are presently closed would be stabilized and closed to traffic when use is completed.

The proposed primary log haul routes would be on NFS roads 1200, 1633, 2234, 2280 and 2281. Local roads will be used to access individual units. Improvements to NFS roads to support log haul may include: repairing worn asphalt surfacing, cleaning ditches, replacing surface rock and adding or replacing ditch relief culverts. The locations of existing NFS roads and the proposed new road are shown on the Little Nestucca Project Map.

Coarse Woody Debris (CWD) and Snag Creation
Snag and CWD prescriptions vary based on the existing levels in the stand and surrounding area, and the strategy selected to achieve long term desired levels. South and west of Highway 22, where levels are higher, two snags per acre would be created and two trees would be felled for CWD, if funding becomes available. In stands north and east of Highway 22, where snag and CWD levels are lower, snags and CWD would be created to mitigate removal of potential snags and CWD in the harvest units. In stands 85, 86, 87, 88, and 89 ten snags and ten down logs per acre would be created. In stands 32, 33, 34, 35, 45, 46, 47, and 48 five snags per acre would be created and five trees per acre would be felled for down wood. Five snags per acre and five down logs per acre would also be created in older stands adjacent to harvest units if funding becomes available.

Underplanting
Underplanting is prescribed on approximately 550 acres of the commercially thinned units. It is planned for units that are thinned heavily enough or in 0.5 to 1.5 acre created openings to allow under planted trees to survive and grow. The primary purpose of underplanting is to speed up the development of a multi-layered canopy. 200 acres of stands 85, 86, 87, 88, and 89 would be underplanted with approximately 100 seedlings per acre. A mix of western hemlock, western red cedar and Douglas fir from locally-adapted seed sources would be planted. Douglas fir would be included in the mix to insure that some genetically local seed source seedlings are established on site to replace the off-site overstory Douglas fir as it dies. The remaining 350 acres would be underplanted with western hemlock, western red cedar, and Sitka spruce, as appropriate to the site. Some Swiss needle cast resistant Douglas fir may be planted if the seedlings are available. In many areas underplanting with hemlock and spruce will not be necessary as these species will naturally regenerate. Red alder, cascara, vine maple and other hardwoods would also naturally regenerate on these sites, especially in the larger openings, creating additional species and structural diversity in the stands.

The seedlings would have protective mesh tubes placed over them during planting to discourage animal damage. The protective tubes would have to be lifted annually or semi-annually on the western red cedar to prevent browsing by deer and elk. Competing shrubs growing within 3 to 5 feet of the underplanted seedlings would be cut until the seedlings are established and can compete with the surrounding vegetation. This type of "release" treatment is likely to occur for 5 to 8 years after planting.

Alternative 3 No New Temporary Roads

This alternative differs from the Proposed Action alternative in that no new temporary roads would be constructed. This would affect portions of units 11, 19, 30, 32, 42, 54, 57, 62, 63, 70, 74, 76, 78, 85, 86, 87, 88, and 89 for a total of 330 acres (see Table 2-4) that would not be commercially thinned. The only treatment of these areas would be to create about 10 snags and 10 down wood per acre, if funding is available. The other commercial units that have existing access, including closed NFS and temporary

roads, would be treated as described in the Proposed Action alternative. The other actions in the Proposed Action alternative would be done as described.

Table 2-5—Comparison of Fully Evaluated Alternatives
This table displays a comparison of the results of the various proposed actions of the fully evaluated alternatives.

	Alternative 1 No Action	Alternative 2 Proposed Action	Alternative 3 No New Temporary Roads
Vegetation Management			
Commercial Thinning—Estimated Acres	0	2,848	2,518
Underplanting –Estimated Acres	0	550	220
Coarse Wood Debris Creation—Estimated Acres	0	3,350	2,900
Logging/Road Use			
Ground skidding (acres)	0	107	107
Skyline yarding (acres)	0	2,476	2,178
Helicopter (acres)	0	265	265
Temporary road construction (mile)	0	1.9	0
National Forest System Roads used (miles)	0	25	25
Open existing temporary roads (miles)	0	10	10

Monitoring

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

1. Implementation Monitoring

Forest Plan Standards and Guides

Before the contract is advertised, review project contracts for consistency with the standards and guides of the Forest Plan 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 would 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).

The overall soil productivity objective is to maintain soil disturbance below the 15 percent (FW-107 as amended in 1992, Chapter IV, page51) mandated by the Forest Plan and to prevent and mitigate potential adverse erosion. The sale would be monitored to see if these objectives are achieved.

2. Effectiveness Monitoring
Monitoring will be tiered to the Forest Plan.

Vegetation Management

a. Monitor planted trees for survival and growth.

b. Monitor number of snags created and trees felled for coarse woody debris (CWD).

c. Monitor stands for existing snags and coarse woody debris within 4 years after treatment. These numbers would count towards meeting the snag and coarse wood objectives for individual stands.

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

e. 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.

f. Monitor 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 CWD. Adjust prescriptions for planting, and snag and CWD creation in treated stands where necessary to further enhance stand spacing variability and structural and species diversity.

Water Quality

Stream temperature monitoring is done on an annual basis.

3. Project Tracking
Forest Service direction, regulations, and standards and guides for resource protection may change over time. Should changes occur prior to completion of any actions under this project, an addendum will be done for the EA and contract specifications will be modified, if necessary.

Alternatives Considered but Eliminated

Stands 3, 4, 25, 26, 27, and 28 were outside of the final Project Area, so they were not analyzed at this time.

1) Commercially thin all available young managed stands
Stands 1, 9, 10, 13, and 69 are so young that harvest volumes are too low to support the cost of commercial thinning. Stands 2, 49, 65, and untreated portions of many of the stands proposed for treatment in alternative 2 were eliminated from further consideration when it was determined that the cost of purchasing, constructing, or reconstructing access roads exceeded the value of the restoration work that commercial thinning would achieve. In a few of these areas it would have been necessary to construct temporary roads in very steep terrain or on unstable soil. Temporary roads through these types of areas could cause slumps or slides, delivering sediment into adjacent fish bearing streams. At this

time, these unthinned stands or portions of stands will be left to provide structural diversity within the project area.

2) Helicopter inaccessible portions without new temporary roads
Helicopter logging of those portions of stands that were left out of alternative 3 would allow the treatment of 330 acres that were not accessible by new temporary road construction. However, this option was not considered further because it is not economically feasible – the areas are too small, when considering the cost of helicopter logging. Additionally, as helicopter landings need to be relatively large, the amount of area disturbed out-weighed the value of the restoration work achieved by thinning these small areas. At this time, these unthinned portions of stands will be left to provide structural diversity within the project area.

Chapter 3 Affected Environment and Environmental Consequences

INTRODUCTION

This Chapter describes the physical, biological, social and economic conditions that may be affected by the fully evaluated alternatives described in Chapter 2. In some Environmental Assessments (EAs) and most Environmental Impact Statements (EISs), the existing conditions and environmental consequences have been presented in separate chapters. They are combined into one chapter for this EA to lessen repetition, reduce the length of the document, and provide a format in which existing conditions can be easily compared with predicted effects.

As directed by the Council for Environmental Quality (CEQ) implementing regulations for National Environmental Policy Act (NEPA), the discussion focuses on resource conditions in the Little Nestucca Project Environmental Assessment, associated with the significant issues and concerns presented in Chapter 1. The description of the affected environment succinctly describes the environment of the areas to be affected by the three fully evaluated alternatives. Only those descriptions necessary to understand the effects of these alternatives are provided.

Environmental consequences are discussed in terms of direct, indirect and cumulative effects. Direct effects are caused by implementing proposed activities and occur at the same time and place. Indirect effects are caused by implementing proposed activities and occur later in time or further removed in distance, but are still reasonably foreseeable. Cumulative effects result from incremental impacts of proposed activities when added to other past, present and reasonably foreseeable future actions regardless of what Agency or person undertakes such other actions. Some resource conditions consider a larger area if predicted effects extend beyond the Little Nestucca Project Area.

Public and Management Access/Transportation

Introduction

This information is summarized from the *Little Nestucca Project Transportation Plan and Roads Analysis*. This report is in the Little Nestucca Project analysis file. The roads in the Little Nestucca Project Area directly or indirectly affect almost all activities and resources that occur in the Area. The two major factors that affect the roads and their management are the need to maintain them on a regular basis because of the wet climate and steep slopes, common in the planning area, and the limited amount of maintenance funding that is available to do the necessary work.

A roads analysis was conducted for this project as a guide for managing the National Forest System (NFS) roads in the Project's planning area. The roads analysis considered such road-related items as safety, risk to resources, future expected use, public and private access, emergency access, and maintenance costs. Following direction in Forest Service Manual 7700 adopted under the January 2001 Roads Rule; the Siuslaw National Forest completed a Forest level roads analysis in January 2003. The Siuslaw National Forest Roads Analysis (Forest Roads Analysis) met the requirements to conduct roads analysis at the Forest level. Since this project includes alternatives that would change access in the

analysis area, the District Ranger directed the interdisciplinary (IDT) team to conduct a roads analysis at the project scale. The project IDT considered all NFS roads in the planning area as well as the impacts of building or reopening temporary roads and constructing a short segment of new NFS road for project access. The recommendations of the Forest Roads Analysis and the project-level roads analysis were included in this project.

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

The desired condition of the Forest transportation system is a safe and efficient network that serves public needs and management objectives within available funding. There are about 770 miles of key forest roads in the Siuslaw National Forest (USDA 2003). This is about 35 percent of the total miles of roads managed by the Forest. The miles of road not managed as part of the key road network are considered project or administrative roads that are maintained through individual project funding and may be closed between periods of project use. The Forest is funded at less than 20 percent of the need to accomplish annual routine maintenance on the key forest road system. The Forest Roads Analysis recommends prioritizing the 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.

In addition to reduced forest road maintenance budgets, changes in forest management direction have reduced the availability of cooperative deposits associated with timber sales and reduced available timber harvest generated funds for reconstruction and repair of the road system. This reduction in routine maintenance funding and a lack of appropriated funds to address the increasing maintenance backlog is resulting in continued deterioration of the key and non key forest road network. This continued deterioration of roads is increasing driving hazards, risk to resources, road repair costs and is decreasing the asset value of roads. Therefore, the Forest Roads Analysis recommends seeking additional funding to address the maintenance backlog, where available. The Forest Roads Analysis also recommends periodic closure of non key roads not needed for constant access and decommissioning non needed roads to reduce maintenance costs and resource risks.

The maintenance backlog has resulted from road repair items not being performed when scheduled, with the expectation that the repair would be performed at some future period. Maintenance needs may be categorized as critical or non-critical. Critical needs are requirements that address a serious threat to public health or safety, a natural resource, or the ability to carry out the mission of the organization. Non-critical needs are requirements that address potential risk to public or employee safety or health; compliance with codes, standards, regulations, etc.; or needs that address potential adverse consequences to natural resources or mission accomplishment.

The current system does not meet the desired condition in part due to deferral of needed road maintenance over the past decade. In the planning area, there are about 27 miles of key forest roads with a backlog of maintenance needs. Key forest roads needed for transporting logs are in a structural condition that currently will not support commercial traffic. Although the roads are being used by noncommercial traffic, adding commercial traffic to the existing recreational and administrative traffic would increase safety risks. The current traffic consists of light pickup trucks and limited passenger car use. Sight distances, uneven road surfaces, and road surfacing are inadequate to allow safely mixing the traffic with commercial-sized vehicles such as log trucks. Some portions of the key roads that would be used to haul timber make connections with state and county highways. Maintaining these connections on the key road system is consistent with overall road management objectives and recommendations in the Forest Roads Analysis.

Most Forest roads not selected as part of the key forest road network (non key roads) were stabilized with water bars and either closed with physical barriers, or left to be closed naturally by vegetation encroachment. This treatment was generally completed about ten to twelve years ago as part f a forest strategy to reduce watershed impacts of non maintained roads and reduce the overall cost of road maintenance. The non-key roads are now typically maintained only when access is needed for specific project activities such as vegetation management or habitat restoration. The lack of maintenance on the non-key roads has resulted in many roads being accessible only with a high-clearance vehicle, sometimes requiring four-wheel drive.

Alternative 1 (no action) would maintain the current road management strategy to keep the existing key forest roads open. 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 NFS roads would be either actively opened or closed to public use. The result would be a continued reduction in miles of roads accessible by vehicle as they deteriorate or become blocked or overgrown with vegetation, decreasing vehicle access for all uses. 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 decommission about 7 miles of existing non-key forest roads. The roads would be taken off the road inventory, closed to all vehicle traffic and returned to a more natural state.

Decommissioning treatments range from closing entrances with barricades such as earthen berms, large rocks, or guardrails to removing stream crossings, water barring road surfaces, and pulling back any side cast material placed over the road shoulder during construction. Decommission miles include 1.4 miles of NFS road 1287 that was stabilized, had stream crossings removed and was closed to all traffic in 2006. That project was designed to improve fish habitat. It has been determined this road segment would not be needed for future management or public access.

Alternatives 2 and 3 would result in closure to about 35 miles of non-key roads. Individual closure would occur over several years with a variety of closure methods including earthen berms, guardrail barricades, large boulders or allowing the roads to become overgrown with vegetation. Road closures in alternatives 2 and 3 include retaining the closures on about 7 miles of roads that are currently closed to all traffic with gates which allow limited access to permit users and administrative traffic. These gated roads would continue to be maintained as project roads.

Under Alternative 2, old overgrown temporary roads reopened or new temporary roads built for commercial thinning operations would be designed as low-standard access for logging vehicles. All temporary roads would be water barred and closed when not being used and physically closed following commercial thinning operations. Existing impassable old non system roads that are temporarily reopened would be stabilized by removing unstable side cast material and temporary culverts. In some cases these road beds will be outsloped to improve drainage. Temporary road traffic would generally be limited to commercial thinning or other project use. These roads may provide some opportunities for limited, short-term public use during the dry season. About 600 feet of new low standard NFS road will be built to access project sites off NFS road 2234 near the north east boundary of the planning area. This road would be gated following commercial thinning use and used for intermittent project access to a meadow area adjacent to the newly constructed road.

Alternative 3 would have essentially the same effects on public and private access as alternative 2, including decommissioning about 7 miles of existing non-key forest roads. However, alternative 3 would not include constructing new temporary roads or the segment of new NFS system road off existing key road 2234. During logging operations, Alternatives 2 and 3 will have some short-term road closures on non-key roads and some delays on key roads.

Table 3-1: displays the status of NFS roads by alternative. Alternatives 2 and 3 include the one-tenth mile of new system road. Decommissioned road miles are included in total miles column. These roads will be taken off the road inventory and closed to all motorized use

Table 3-1: NFS road status by alternative. Alternative one displays the current NFS road status including one mile of previously decommissioned roads. Alternative 2 and 3 display the result of fully implementing proposed road treatments.

Alternative	Key Roads Open	Non Key Open	Non Key Closed	Decommission	NFS roads on Inventory	Total Miles
1	27	59	8	1	94	95
2	27	25	35	8	87	95
3	27	25	35	8	87	95

Alternatives 2 and 3 would address some of the backlog of needed maintenance and repair on six key forest roads (1200, 1280, 1633, 2280, 2281 and 2234), including roads or road segments used for log hauling. Maintaining and repairing these roads would improve structural strength, add road surfacing to reduce sediment, accommodate commercial timber haul and safely accommodate mixed commercial and passenger traffic. Some live stream culverts will be replaced, failing ditch relief culverts will be replaced and additional culverts will be installed where needed. Placement of additional ditch relief culverts will be designed to disconnect ditch line water from live stream channels by diverting runoff onto vegetated natural ground. Run off will also be diverted away from fill slopes to improve fill stability and reduce risks of fill failure. By implementing roadside clearing to maintain sight distances on key roads associated with commercial haul and repairing road surfaces associated with poor drainage and surface wear, safer driving conditions would be achieved. If the existing driving conditions were 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. These maintenance activities and road repairs will improve the road conditions and better meet road-management objectives for a safe and efficient key road system managed for mixed traffic types.

Road maintenance and repair would also reduce the risk of resource damage and potential for loss of road investments. By increasing structural strength, replacing culverts, and adding surfacing to roads, the risk of 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 resources would occur.

Generally, public traffic is allowed on key roads used for log hauling. Timber sale contracts require posting of warning signs and may require use of traffic flaggers in the vicinity of logging operations. The contracts also allow limited short-term road closure during logging operations. 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, closing key roads to all public traffic, or setting

scheduled times the public could use the roads. Non-key roads are typically closed to public access during logging operations.

Table 3-2 shows the miles of the six key forest roads in watershed that are planned as primary commercial log haul routes associated with this project and the estimated costs of performing maintenance and repair work under Alternatives 2 and 3. Routine maintenance on non key roads used for project access and commercial haul are not included as these roads will generally receive only limited maintenance to facilitate short term project use. Maintenance on key roads beyond that needed to facilitate project access and transportation of timber would be accomplished with funding not associated with this project. An example would be routine maintenance during periods of time there are no project activities associated with this proposed project. Continued deferral of non-critical maintenance would normally result in an increase of maintenance costs. Costs associated with maintaining non-key roads, such as reopening overgrown roads to access project sites, are expected to be included in individual project costs.

Table 3-2: Estimated miles of reconstruction and maintenance costs associated with the six key forest roads. Miles on road 1200 include a segment of the log haul route that is non key and currently closed to public traffic.

Key road maintenance and repair	1200	1280	1633	2234	2280	2281
Miles in project area to be treated	9.3	1.9	6.3	4.2	1.2	5.7
Maintenance and repair costs	$254,750	$20,800	$95,850	$55,000	$15,700	$76,700

A summary of the effects of the alternatives is shown below.

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 project related changes in open-road mileage 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 2:

- Decommissions about 7 miles of National Forest System roads.
- Reduces open-road mileage of National Forest System roads in the planning area from about 86 miles to 52 miles.
- Repairs and maintains 27 miles of key forest roads and 25 miles of non-key forest roads as open for travel.
- Adds 600 feet of new system road designed for intermittent project access of Forest Road 2234
- Allows some limited public access on reopened and newly built temporary roads
- Allows some public access on non key roads prior to and during project entry

Alternative 3:

- Decommissions about 7 miles of National Forest System roads.
- Reduces open-road mileage of National Forest System roads in the watershed from about 86 miles to 52 miles.
- Repairs and maintains 27 miles of key forest roads and 25 miles of non-key forest roads as open for travel.
- Allows some limited public access on reopened temporary roads
- Allows some public access on non key roads prior to and during project entry

Soils

Introduction

The following information is summarized from the *Little Nestucca Project Soil and Watershed Report December 11, 2006*. This report is located in the Little Nestucca Project analysis file. A study of the land and soils in the Little Nestucca Project Area provides a basis for understanding the existing condition of the area. Soil is a basic resource of the forest, and is the key to the productivity of an area. Maintenance of soil productivity is dependent on protecting the soil from displacement, compaction, nutrient loss and instability. Management actions do not affect factors such as climate and soil parent material. However, management activities can affect soil structure, density, nutrients and stability.

Existing Condition and Trends

Stability

The Little Nestucca project area is located in the Coast Range physiographic province. The majority of the area is covered by fine-grained sedimentary rock, mostly silts and sandstones of the Yamhill, Nestucca, and Tyee Formations. Intrusions of basaltic rock punctuate the landscape. The fine-grained formations are easily eroded, and produce silt, sand and gravel. Most of the watershed is underlain by easily erodable bedrock. This area has a naturally high sediment production rate.

Productivity

The soils in the analysis area are deep to very deep gravelly clays and clay loams. They have high water holding capacities and are very productive. The high level of biological activity produces a high amount of organic matter in the soil.

Side slopes and soil depths are highly variable, but soil moisture and temperature regimes are very favorable for soil biological activity and plant growth on most sites. An important ingredient to soil productivity is the presence of down wood. These stands were harvested 30 to 60 years ago when utilization was less intense than in more recent decades. Extensive concentrations of down logs are present in some areas. Many of the stands were also burned when duff retention standards were not in place. Consequently, in some areas, little or no decomposing organic matter remains.

Another aspect of long term nutrient availability and ectomycorrhizal formation is the amount of larger woody material retained on site. The amount of large, down wood in the proposed commercial thinning units is highly variable, ranging from low to high levels, as defined in LSRA. Each unit's management activities would be planned to maintain enough large wood (dead and down) to provide for a healthy forest ecosystem and ensure adequate nutrient cycling.

Increasing human activities in the Little Nestucca Project Area have led to increased levels of soil disturbance and reduced soil productivity. The one management activity that has the most direct impact on soils on the NFS land portion of the Little Nestucca Project Area is roads. Impacts from roads persist until the road is totally reclaimed, subsurface drainage patterns restored and organic matter again accumulates on the surface. Site productivity would remain somewhat less on reclaimed roads than on similar undisturbed sites for a period of time.

Road building affects soils by removing and displacing the topsoil layers from the road prism and compacting the road surface and shoulders. The surface of the road would not support trees and other forest vegetation as long as the road is used and maintained. Trees and shrubs would grow along the road bed, but site productivity is less here than in unaffected soils. Native surface roads would grow trees and other forest vegetation again when uses and maintenance ceases. However, site productivity would be less than similar undisturbed soils.

Direct and Indirect Effects

The major short-term impacts to soil productivity from harvest activity includes four factors used to evaluate the effects of the planned actions. They are displacement, compaction, nutrient loss, and instability. The primary analysis area for soils effects is the proposed ground within a specific unit boundary. Soils effects are generally evaluated by unit. To maintain long-term soil productivity the total acreage of all detrimental soil conditions would not exceed 15 percent of the total land within each harvest unit, excluding roads and landings. The following sections discuss in more detail 1) how the proposed action may affect the soil resource or 2) mitigations that can be utilized to avoid potentially undesirable effects.

Alternative 1 No Action

Stands would continue to develop. Most stands currently have little understory vegetation and bare soil is common in many units because of the lack of sunlight to the forest floor. Intermediate and suppressed trees would slowly be removed from the stand through mortality and decay. In areas of heavy stocking, stands would stagnate. In general, plant diversity would diminish as well as soil biota because of the

lack of sunlight. In areas already compacted or disturbed by the initial entries, the soil building process would continue to return the soil to near pre-harvest conditions. Short-term impacts from harvest, such as soil disturbance and slash accumulation, would not occur.

Alternative 2 Proposed Action

Displacement

Partial or one-end suspension of logs during yarding requirement would protect the soil from excessive disturbance or displacement. Unless otherwise stated or mitigated, all designated streams require full suspension or yarding away from the stream course during the yarding process. To adequately protect the soil resource, the primary yarding objective for all units would be skyline with partial suspension.

Ground based yarding systems, primarily tractor, could be utilized in the following units: 7, 8, 12, 14, 15, 16, 17, 18, 23, 24, 31, 32, 33, 34, 35, 36, 37, 39, 42, 43, 45, 46, 47, 48, 50, 51, 52, 53, 54, 55, 56, 61, 62, 63, 64, 66, 67, 68, 75 and 80. In several of these units ground based yarding systems may be employed on a few to several acres in each unit, where slopes are 30 percent or less. All areas where ground based yarding might occur, are away from active drainages.

Compaction

The major source of compaction (and also much disturbance) is ground based skidding equipment. Unrestricted tractor yarding and tractor piling are not considered an option on those landtypes where sideslopes are more than 30 percent to support tractor usage (BMP T-9 and VM-1, and FW-107). The silty nature of the fine grained soils, and evidence that significant soil moisture is available most of the year indicate that any type of unrestricted tractor yarding and piling (even low ground pressure) would lead to unacceptable soil compaction and/or disturbance. With tractor yarding, skid roads are predesignated and generally a minimum of 100 feet apart. With a processor/forwarder system the skid roads are usually 50 feet or more apart, but the number of trips on each individual road are substantially less than with skidding. Monitoring has shown that when designated skid roads are properly utilized in conjunction with line pulling and directional falling, compaction from ground based tractor operations generally remains at about 9 to 13 percent. Skyline operations in thinning units with small wood and intermediate supports usually impacts less than 1 percent of the unit area.

Residual compaction from the original harvest of these plantations needs to be considered. In most cases, the original units were cable yarded, though suspension may have been limited. However, little evidence now remains. Transects in several units indicated primary skid roads occupy 8 to 10 percent of the flatter terrain. The few evident skid roads would be reutilized in those units that have some ground based logging. Almost no new spur roads would be required. Since ground based yarding is not a primary component in most units, compaction is not considered a cumulative concern. In addition, some scarifying is proposed in order to reduce compaction at heavily used haul roads, spur truck roads, and landings. Skyline landings are primarily planned at old existing landings, road turnouts, and road junctions.

Nutrient Loss

An important ingredient to soil productivity is the presence of down wood. These stands were harvested 30 to 60 years ago when utilization was less intense than in more recent decades. Extensive concentrations of down logs are present in some areas. Many of the stands were also burned when duff retention standards were not in place. Consequently, in some areas, little or no down decomposing

organic matter remains. The proposed action would provide 7 to 10 snags or down wood per acre in those units deficient of large wood.

In areas where slash has to be piled and burned due to fire management concerns, sufficient heat may develop to affect the underlying soil. However, pile burning is usually done in the fall or winter months when duff and soil moistures are higher, and this helps reduce the heat effects on the soil. Consequently, burning in this manner is considered a minor effect and not cumulative because of the limited overall acreage involved.

Another aspect of long term nutrient availability and ectomycorrhizal formation is the amount of larger woody material retained on site. Management activities would be planned to maintain enough large wood (dead and down) to provide for a healthy forest ecosystem and ensure adequate nutrient cycling (FW-110). At this time, site specific needs would be considered commensurate with wildlife objectives.

Instability

Slope instability has been an active agent in the down slope movement of soil in most of the analysis area in the last hundred to 150 years. Within the project area, both rotational (slump type) and translational (debris chute) failures are evident. The larger scale (hundreds of acres) rotational soil failures or slump type/earth flow terrain can be found in several units, though for the most part, old and long stabilized. Here failure depths are such that tree root strength does not play a major role in slope stability. No active slump type failures were noted in any unit, except Unit 85, where about 2 acres of unstable ground would be deleted from the unit. In addition, the road access for Unit 20 crosses an active slump/earth flow of a couple acres. Drainage measures would be implanted to avoid aggravating the stability situation.

Both natural and management related translational failures are present in this landscape. Management induced debris chute type slope instability from road sidecast failures and/or root strength loss from headwall harvest are evident in many Units such as 5, 8, 11, 16, 19, 20, 21, 22, 30, 59 and 60. These are older failure scars that have mostly revegetated, primarily with alder. The recent intense rainstorms from 1996 and 1998 produced some additional debris chute type soil failures within Units 21, 22, 42 and 44. In Units 21 and 44, the failures were related to road sidecast or road drainage.

Thinning promotes tree growth. Crowns increase in size and root systems expand. Evapotranspiration rates increase. These factors all promote greater slope stability. Field review of previously thinned units has shown no increase in slope instability in either the uplands or riparian reserves. Thinning within and through riparian reserves improves long-term slope stability as stand conditions change with release and increased tree growth. Thinning should emphasize the retention of a well-distributed stand of larger trees, both conifer and hard wood. These larger trees also provide the opportunity to better withstand the assaults of windstorms and floods over time.

Transportation System

Existing and closed roads provide some access to some units. These old roads for the most part are native surface, overgrown with vegetation, and show little or no active erosion. They usually have no ditches or culverts, are often outsloped, and have few if any water bars. Most of these roads have solid subgrades, which are suitable for dry season haul with perhaps a little spot rocking in a few critical areas. Extended season or wet weather haul would require rocking of entire length of most spurs with at

least four to six inches of a higher quality aggregate. No major problems were noted on any proposed spur access, except perhaps for Unit 11. Several spur roads will require temporary culverts and drainage stabilization. At the completion of logging activities, these spur roads would be water barred as appropriate to control seepage or storm run off and closed. Experience has shown that these decommissioned roads revegetate quickly, typically within 1-2 years after they are closed.

With Unit 11, the existing old spur road runs approximately between the boundary for Unit 11 and Unit 12, and accesses the western portion of both Unit 11 and 12. The existing spur has some drainage concerns, primarily water running in the road way, which will need to be corrected prior to use. However, the primary problem is an unstable fill approximately 900 feet east of the property line at the west boundary. This fill crosses a small perennial / intermittent stream with a gradient of 10 to 12%. The fill height is about 7 to 10 feet, and the top of the fill is now only about 5 feet wide. There is no pipe or culvert in this old fill, and water runs through logs and organic debris. Prior to use, the old fill needs to be removed and a temporary culvert installed. This pipe can be removed at the completion of harvest activities to reestablish the original channel.

In addition, a few new temporary spurs roads would be required to access some critical portions of some units. In all cases these roads are well located on ridges or benches with stable, gentle side slopes. These roads would be decommissioned after use, seeded, and natural drainage patterns would be reestablished. In summary, development of the transportation system for this sale would maintain slope stability, would produce little or no off site erosion, and would provide opportunity to rehabilitate old road courses.

Alternative 3 No New Temporary Roads
Under this alternative no new temporary roads would be built. There is no increase in permanent roads proposed for the Little Nestucca Project. Without building the temporary roads for this project, 330 acres of thinning to improve forest health would be excluded from the project. Although this alternative would disturb less ground with road construction, it could require more tractor roads, or additional skyline landings, or larger helicopter landing to harvest the same ground. Consequently, the amount of disturbed ground remains about the same for both options.

Cumulative Effects
Alternative1 No Action
Cumulative effects for soils would be the same as the indirect and direct effects discussed for soils under the no action alternative.

Alternative 2 Proposed Action
The effects of the Proposed Action on the soils resource are very limited in scope. No individual unit would have individual or cumulative adverse impacts greater than the15 percent threshold. Given the limited amount of ground-based operation and with the implementation of LTSR (Locate Tractor Skid Road) in the timber sale contract, this figure would be well below the 15 percent figure for the total impacted area of any given unit. With the deletion of numerous stability sensitive areas from the proposed units, slope stability will be maintained. Given the proposed road decommissioning and storm proofing of older system and spur roads, the potential for future slope instability would be reduced in the long term. This is the only project planned in this analysis area for the foreseeable future on National Forest land.

At this time, no single unit of measure of long-term soil productivity is widely used. Information on the survival and growth of planted seedlings may indicate short-term changes in site productivity. However, the relationship between short-term changes and long-term productivity is not fully understood at present. Experience indicates that the potential impacts on soils are best evaluated on a site specific, project-by-project basis. The major soils concerns –compaction, nutrient loss, displacement, and instability – are most effectively evaluated, for both short and long term effects, at the project level. With proper project implementation, unacceptable cumulative effects on the soils resource are not anticipated from any action alternatives. Consequently, the utilization of soil protection measures and best management practices precludes the need for additional cumulative effects analysis.

Alternative 3 No New Temporary Roads
Cumulative effects would be similar to the cumulative effects of the proposed action except in relation to the building of new temporary roads. No new temporary roads would be built with the implementation of this alternative.

The proposed action, which includes snag creation and underplanting, and other foreseeable routine actions: noxious weed control, road maintenance, administrative road use, public recreational use, and small forest products gathering for personal use, do not involve the use of heavy equipment other than on existing road surfaces. Based on the types and extent of these uses in the Little Nestucca Project Area, no detrimental soil disturbance is anticipated.

Water Quality

Introduction

This information is summarized from the *Little Nestucca Thinning Project Watershed Report, December 2006*. This report is located in the Little Nestucca Project analysis file. The project area is located in the Little Nestucca Watershed. This watershed includes a mixed ownership of county, small private, rural residential, private timber, industrial timber and Forest Service. Past activities associated with timber harvest, stream treatments, and road construction/failures have had the greatest effects on aquatic resources in the Little Nestucca Project Area. These effects include but are not limited to sediment delivery to streams from culvert failures during the 1996 and 1998 rain events. Current practices are directed to improve dense overstocked stands planted following clear cut harvest and promote tree health by encouraging the larger trees to grow.

Existing Condition and Trends

No streams in the Little Nestucca watershed are currently listed as water-quality impaired on the State of Oregon Department of Environmental Quality's 303d. Several sites in the watershed have been monitored for stream temperature since 1996. Only one site in the mainstem of the Little Nestucca River (site #129) has not met the state water quality standards of maintaining a 7-day average maximum temperature under 64F.

Roads within in the Project Area include paved, graveled and dirt surfaces. The conditions of the roads range from those that pose a potential negative resource risk to others that pose minimal risk. Road maintenance in the Project Area would continue at a reduced level. Key roads identified in the Road Management Plan would continue to receive ditch/culvert cleaning, brushing and blading on a rotational basis. Road maintenance funding has decreased however, and those roads currently open that are not

part of the National Forest Key Road System would eventually become overgrown and undriveable. Culverts that have been left on closed roads that are no longer being maintained are vulnerable to plugging and failure. The potential for road failures and debris torrents would continue to pose a risk to downstream aquatic resources as long as these culverts and fills are in place.

Analysis of Direct and Indirect Effects

Alternative 1 No Action

This alternative would have no effect on the existing sediment or stream temperature regime, soil resources or deep-seated earthflows in this watershed. However, if the culverts and fills remain in place on closed roads that are not receiving regular maintenance, the risk remains that these culverts and fills could fail and cause road-related debris torrents.

Alternative 2 Proposed Action

Soils

The majority of the units would be harvested using a skyline cable system or helicopter, which would have a minimal effect on soils. The acreage that would be harvested using a ground-based system would use existing skid roads; therefore, no additional ground would be compacted by heavy equipment. Approximately 6 acres would be impacted by building 1.9 miles of new temporary roads.

Slope stability

Replacing culvert and improving road drainage in preparation for the timber sale would reduce the risk of road-related slope failures. Also, implementing the restoration plan recommendations, which consist of removing culvert and fills on temporary roads, and decommissioning or closing roads would also reduce slope-failure risks. In addition, potentially highly unstable or actively unstable areas would be deleted from within stands to avoid impacts to these areas.

Water quality (sedimentation)

Actions that could affect sedimentation into streams would be timber haul during the wet season, and replacing or removing culverts. During winter haul, there is a potential for muddy water to run down the road ditchlines and into streams if adequate precautions are not taken.

Eighteen stream crossing culverts would need to be replaced prior to log haul. In addition, several additional ditch-relief culverts would be installed on Roads 1633 and 1200.

Up to 40 culverts and fills are proposed for removal following completion of the timber harvest. All road construction and culvert removals would take place during the dry season (July-early October) to minimize erosion. Effects from these actions can be minimized by:

- dewatering streams during culvert removal or replacement
- using appropriate erosion control measures.

Water quality (temperature)

The *Northwest Forest Plan Temperature TMDL Implementation Strategies* document (2005) was developed by the US Forest Service and the Bureau of Land Management to address the issue of stream temperature and shade. The authors recognize the need for thinning to produce long-term benefits, in spite of a short term reduction in shade. "For example, in riparian areas that have been harvested and have succeeded to dense early-seral vegetation, site potential shade may be diminished until stands are

thinned and individual trees are released for recruitment into the forest canopy. In such cases, thinning that reduces stream shade and may affect stream temperature in the short term may ultimately result in a long-term benefit to shade production." (p. 10). On page 25, they allow for thinning in Riparian Reserves, as long as the following conditions are met:

1. Vegetation density is high and would benefit from thinning.
2. Vegetation thinning would not occur in the primary shade zone (no-cut buffer).
3. NWFP Standards and Guildelines and BMP's still apply.
4. Table 3 of the document would be used to determine the width of the primary shade zone, unless a shade model is used for site-specific analysis.

For the Little Nesucca Thinning project, a shade model is used to develop recommended buffer widths to address the shade issue.

In the Little Nestucca Watershed, a stream shade model was used to compare the existing shade on third-order and larger streams to post-thinning stream shade. The model was run for a variety of scenarios based on buffer width and canopy closure, and compared to the existing shade.

Both the direct effects within the unit and the cumulative effects by watershed show that canopy closure is a more significant variable than buffer width in determining the amount of shade over a stream. In individual units, there is very little difference between a 15 foot buffer and a 30 foot buffer in the two thinning scenarios (canopy closure at 40 percent or 60 percent). Also, few of the units have 80 percent or greater shade as an existing condition prior to harvest.

On average, there is an 8 percent difference in shade between a 30 foot and a 60 foot no-cut buffer on 3rd order streams in the proposed harvest units. There is an average 9 percent difference in shade between a 30 foot and 100 foot buffer, so the wider buffer is no necessarily more effective in providing shade. There is a 13 percent average difference in shade between a 30 foot no-cut buffer and a 30 foot buffer that is thinned to 60 percent canopy closure. Again, the canopy closure appears to be a more significant factor than the width of the buffer.

Cumulative effects on Stream Temperature:
For 3rd order and greater streams in the 6th field Lower Little Nestucca River watershed, 2.2 percent of the stream length would be affected by riparian buffers. In the Middle Little Nestucca watershed, the figure is 2.9 percent, and for the Upper Little Nestucca watershed, it is only 1.2 percent. Therefore, the effects on stream shading over the entire watershed would be negligible. The total length of streams, including all first and second order streams, within the Little Nestucca 5th field watershed is 11.3 percent.

Alternative 3 No New Temporary Roads
This alternative is very similar to Alternative 2 (Proposed Action); however, 330 out of 2,848 acres would not be harvested. No new temporary spurs would be built. Existing temporary spurs would be re-opened.

Soils
The effects would be similar to Alternative 2, with the exception that 6 acres would not be impacted by new roads.

Slope stability
The effects would be the same as Alternative 2.

Water Quality (sedimentation)
The effects would be similar to Alternative 2; the same number of culverts would be replaced and removed. Winter haul would still occur.

Water quality (temperature)
The effects would be the same as Alternative 2.

Comparing alternatives

	Alt 2	Alt 3
Acres harvested	2,848	2,562
New temp. spurs built	1.9 miles	0 miles
Existing system and non-system roads re-opened	35 miles	35 miles

Cumulative Effects
Road surfacing and maintenance along the haul route would be completed prior to thinning and haul. No negative impact on water quality is anticipated as a result of this project. The effect on water yield is unknown at this time; however, no significant changes are expected. Road use necessary to perform thinning operations and haul is not anticipated to result in increased road related negative impacts on water quality.

Thinning stands of this nature is expected to result in no negative impacts to water quality. Thinning smaller suppressed timber from overstocked stands would encourage healthy growth in the remaining large trees. The actions required to perform the thinning would cause minimal impact to soil and have no affect on water quality.

All new temporary roads would be located ridge tops and not require ditches or culverts. They are a considerable distance from streams. All new temporary roads would be constructed during the summer months used to access timber and waterbarred where necessary, seeded with native grass seed and closed to vehicle travel. The use of ground based equipment is restricted to the dry season, and it is expected that these travelways would revegetate quickly, so no sediment is expected.

Other foreseeable routine actions may include noxious weed control, road maintenance, administrative road use, public recreational use, and small forest products gathering for personal use. These activities do not involve the use of heavy equipment other than on existing road surfaces. Based on the types and extent of these uses in the Little Nestucca Project Area, no detrimental soil disturbance is anticipated.

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 Fisheries Biological Evaluation for the Little Nestucca Project 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.

Young Managed Stands

Introduction

The forests in the Little Nestucca Project Area are composed of a variety of vegetation. This vegetation occurs in diverse combinations and patterns of species, ages, sizes, shapes, and structure. These diverse forests provide a multitude of social, biological and ecological benefits, such as wildlife habitat, timber products, firewood, mushrooms, berries, clean air and water, and a pleasing setting for human enjoyment. Disturbance processes and logging have played major roles in shaping the current forest conditions. A thorough description of the vegetation is included in the Little Nestucca Watershed Analysis, and the LSRA. For a description of current conditions see Chapter 1, Purpose and Need, pages 2 and 3.

Direct and Indirect Effects

Alternative 1 No Action

No stand treatments would be done at this time. There is no immediate direct effect on the stands. In their current condition, the young managed stands would not develop late-successional habitat characteristics in the near future. This is due to:

- Declining diameter growth rates associated with these stands, thus increasing the time needed to develop large trees, snags and logs,
- The lack of species diversity both in the overstory and understory,
- The lack of spatial variability that contributes to the development of differing stand structures such as “wolf trees”.
- Stands that are primarily Douglas-fir would continue to have little species diversity and would be less resilient to diseases such as Swiss needle cast or Phellinus.
- An increased risk of the stand blowing down.

Another indirect effect of “no action” is that it limits options for future treatment. The tree crowns would continue to become smaller and over time thinning becomes less and less an option due to increased windthrow risk and the stand’s inability to respond to thinning.

The unthinned stands would contribute a steady input of small snags over a long period of time. Pockets of *Phellinus* and *Armillaria* root rot would also provide an on-going input of snags, contribute to stand diversity and provide some of the disturbance needed to further stand development towards a more "natural" condition. If windthrow occurred in relatively small patches, rather than blowing down the entire stand, it would also provide for some diversity and "push" stand development forward.

Action Alternatives (Alternatives 2 & 3)
The difference between the action alternatives is the construction of the proposed temporary roads. If the roads are not constructed about 330 acres would not be commercially thinned. This acreage includes parts of some of the proposed units. Snags and CWD treatments could be done on these acres. However, funding for these types of projects is extremely limited.

Recent research (Carey, 2002; Franklin, 2001; Garman, 2003; Hunter, 2001; Muir, 2002; Tappeiner, 1997; and Thysell, 2001) shows that thinning can improve the probability that these stands would develop late-successional forest characteristics within the next 100 years. Thinning would result in increased diameter growth, crown development, and understory diversity.

Following treatment (thinning, underplanting, and snag and CWD creation) direct affects would include:

- Fewer trees per acre
- A higher average stand diameter (because smaller trees have been removed)
- More light to the forest floor
- Different relative proportions of tree species (for instance, if only Douglas-fir is cut, there would be more western hemlock relative to the Douglas-fir than prior to thinning)
- More down wood and snags (in units where snag creation is planned) in larger size classes.
- Greater variability in tree spacing
- An immediate increase in understory trees (in under planted units)

Thinning is not known to spread Swiss needle cast or increase the rate of infection in the tree. However, there is a concern that thinning infected stands may exacerbate the disease's effects on the remaining Douglas-fir, particularly by increasing the stress on needles exposed to the drying action of wind. Conversely, it is possible that because thinning increases the amount of resources available to the remaining trees, they would be more vigorous, develop larger crowns and be in a better position to maintain growth in spite of the disease. Most of the stands under consideration are not considered to have a high Swiss needle cast severity rating. The objective of thinning these stands is to maintain or increase the growth rates of the remaining trees. It is certain that without thinning growth rates would decline. Thinning of Douglas-fir on the Hebo Ranger District has been demonstrated to improve growth rates and canopy development even with the presence of Swiss needle cast. Another objective, the development of an understory, particularly the initiation of a second canopy layer of shade-tolerant trees, can only be achieved by opening up the Douglas-fir canopy by thinning.

The harvest of trees would result in the loss of potential CWD and snags, in the short term. It is anticipated that some of this loss would be made up by mortality that may occur due to natural processes such as *Phellinus*, windthrow, logging damage, etc. Also, limbs, tops and portions of the bole that break off during harvest operations would remain in the units, providing an immediate short-term source of additional CWD. Untreated portions of stands and stands left unthinned would provide a gradual input

of small trees dying from competition. Part of the purpose of the project is to increase tree growth so that larger trees would be available as large snags and down wood sooner than if left unthinned.

Thinning would preserve options for future treatment. The thinned stands would remain in a much healthier, stable condition allowing for future treatments as more is learned about managing towards the desired conditions.

Cumulative Effects
The existing condition discussion in Chapter One, Purpose and Need, describes the cumulative effects of the past management based on clearcutting and planting back at high seedling densities. To summarize, currently in the Project Area, approximately 52 percent of the Forest Service land is in plantations that originated between 1912 and 1993. Although 47 percent of the Forest Service land is in mature, natural stands, much of it occurs in relatively narrow bands located between relatively large blocks of plantations. It is assumed that much of the private land within the Project Area is being managed for timber production on short rotations and would not reach late-seral conditions.

The Forest Plan has changed the goals for the Little Nestucca Project Area from an emphasis on timber production to development of late-successional habitat. Over the past 5 years, 636 acres within the Project Area have been precommercially thinned. These stands originated between 1980 and 1993. Thinning emphasized variability with an average of about 150 to 200 trees per acre left after thinning. However, most of the stands planted in the past 30 years were precommercially thinned to stocking levels of about 200 to 300 trees per acre. These stands would likely be commercial thinned approximately 15 years from now, when the stands are 30 to 45 years old.

Alternative 1 No Action
It is difficult to quantify what the cumulative effect of not treating the stands would be. It is anticipated that the stands would develop some late-succession characteristics in the long term. However, recent research indicates that most would not develop the desired conditions for a very long time. The existing managed stands have stocking in the range of 150 to 400 trees per acre. Over time, as the stands grow taller, the risk of catastrophic blow down increases. At the landscape level, the opportunity to block up and connect late-successional habitat, primarily by thinning would be lost.

Action Alternatives (Alternatives 2 & 3)
Under the proposed action, about 79 percent of the stand acres currently available for commercial thinning would be thinned plus an additional 9 percent would be treated by creating snags and trees dropped for down wood. Under alternative 3, about 73 percent would be thinned and an additional 15 percent would be treated by creating snags and trees dropped for down wood. However, the snag and down wood treatments do little to accelerate late successional characteristics, as this treatment generally effects less than 5 percent of the trees that a commercial thinning releases.

Following the proposed treatments, barring an unforeseen occurrence, most vegetation management activities in the Project Area would be completed for approximately 10 years, assuming the proposed harvest would be completed by 2015. The next entry would be commercial thinning of stands that are currently less than 30 years old as well as possible re-entry into some of the currently proposed harvest units, to further their development.

Stands 5, 7, 11, 12, 14, 15, 16, 18, 19, 21, 24, 41, 42, 43, 46, 48, 52, 53, 55, 58, 59, 61, 62, 63, 67, 68, 70, 72, 75, 76, 78, and 79 would be thinned lighter due to wind throw or root rot concerns and would certainly benefit from another thinning. Stands 85, 86, 87, 88, and 89 would be thinned to 70 trees per acre immediately, then to 50 trees per acre 4 to 5 years after the initial harvest when the residual trees are more wind firm and have begun additional crown development, unless closer examination before thinning indicates that one entry can better accomplish these objectives. The other units are proposed for heavier thinning (55 to 75 residual trees per acre) to limit the number of entries. However, at least one more entry at some point before age 120 would probably be desirable to keep these stands on a trajectory to reach the desired condition. Although certain attributes (like deeply furrowed bark) are dependent on long time periods, cumulatively, thinning the proposed units would leave the Project Area with healthier, more stable stands that would continue to develop towards the desired condition gradually merging with the conditions currently found in the adjacent late-successional stands.

Botany

The following information is summarized from the *Biological Evaluation of PETS Vascular Plant, Bryophyte, Lichen and Fungi Species for Little Nestucca Project, December, 2006, the survey and manage species report for the Little Nestucca Project, December 2006, and the Invasive Species Assessment, Little Nestucca Project, December, 2006,* all filed within the project file at Hebo Ranger District.

Threatened, Endangered and Sensitive Plants

Potential effects of the proposed action and alternatives to the proposed action on listed (threatened and endangered), proposed for listing, and sensitive plants were evaluated by the Forest Botanist and documented in a Biological Evaluation (BE). The BE concluded that no known sites for these species occurs within or adjacent to the Project Area, but that potential habitat exists for 28 sensitive species (2 vascular plants, 14 fungi, 10 lichens, and 2 bryophytes) within the Project Area. A field survey was conducted within the Project Area that focused on these potential habitats, including soil, litter, down wood, snags, live tree and shrub boles, tree and shrub branches, rock and stream bottoms.

The diversity and abundance of the vascular plant, bryophyte and lichen flora in the Project Area is variable and, generally, dependent on tree canopy cover, the amount of hardwood trees and shrubs present, legacy down wood and slope position. Areas with tree canopy cover approaching 100 percent were lacking in these species because of low light levels. Areas with a more open tree canopy supported a greater number of species. Hardwood trees and shrubs, as well as Decay Class III through V down wood, have their own unique assemblages of lichens and bryophytes. Where these elements are present in the Project Area, the total number of species tends to be relatively high. Topography and slope position also affect the number of species present, with areas of higher humidity such as stream drainages and wetlands having a greater species diversity and abundance, as did exposed ridge tops that frequently intercept fog.

The field survey was not designed to detect any of the fourteen species of fungi with potential habitat in the Project Area. Positive identification of these require fruiting bodies (mushrooms) that may not reliably appear each year, or they fruit below-ground (truffles). A one-time survey cannot reliably determine species presence or absence for mushroom species, and surveys for below-ground truffle species requires ground raking, which is both cost-prohibitive and environmentally destructive. Since

habitat was found to be present, it is assumed that the species is likely to be in the Project Area. Field surveys did not detect any other sensitive species with potential habitat in the Project Area. The biological assessment includes a full list of species inventoried in the Project Area.

Most of the fourteen fungi species assumed to be present within the Project Area are ectomycorrhizal with conifers, where the non-reproductive portion of the fungus (hyphae) grows around tree rootlets, facilitating the uptake of water and nutrients for the tree, while deriving carbohydrates and nutrients from the tree to the fungus in a symbiotic relationship. Adverse impacts may occur if the host trees are removed. For non-mycorrhizal fungi species, adverse impacts may occur from soil disturbance and compaction associated with timber harvest, road work, and associated activities, as well as stand modification that results in microclimate changes, reduce soil moisture, relative humidity, and increases in air temperature.

Direct, Indirect and Cumulative Effects

Alternative 1 No Action

Under the no action alternative, no stand modification or ground disturbance would occur. There would be no direct, indirect or cumulative effects on sensitive fungi species.

Alternative 2 Proposed Action

Under the proposed action, short-term direct and indirect adverse effects to sensitive fungi species may occur where there is localized ground disturbance and compaction associated with new road construction, ground lead and partial suspension logging systems and landing construction. Project design criteria would limit ground disturbance to no more than 15 percent of the Project Area. Stand modification resulting from commercial thinning may also result in localized changes to microclimate, however these changes are anticipated to be short-term, lasting only until the tree canopy begins to close. A goal of this alternative is to accelerate the development of late-successional forest characteristics and increase species diversity. These outcomes would have a long-term beneficial effect for sensitive fungi species. Because adverse impacts resulting from the project are expected to be limited in scope and short-term, they are largely offset by the long-term beneficial effect of implementing this alternative. Overall, this alternative may impact individuals or habitat but is not likely to adversely affect (NLAA) populations or the species. No cumulative effects to sensitive fungi species are expected from implementation of this alternative.

Alternative 3 No New Temporary Roads

This alternative would eliminate the construction of approximately 1.9 miles of temporary road. Relative to the preferred Alternative 2, Alternative 3 would result in less ground disturbance and soil compaction, however because new road construction represents a very small proportion of the total Project Area, the effect of Alternative 3 on sensitive fungi species is the same as Alternative 2.

Northwest Forest Plan Survey and Manage plants

Potential habitat for seven (5 lichen and 2 bryophyte) Management Category A, or C, species exists in the Project Area. Pre-disturbance surveys are required for species in these two management categories if the proposed project could impact their habitat. A field survey was conducted in the Project Area and no survey and manage species were located within or adjacent to the Project Area. No impacts from project

activities under any of the alternatives are anticipated and no project specific protective measures are needed.

The 2001 Record of Decision (USDA-USDI 2001) requires that known sites for Management Category B, D, and E species within or adjacent to the Project Area be managed. A review of inter-agency database records (GeoBOB 2006) found no known sites documented within or adjacent to the Little Nestucca Thin Project Area.

Invasive Plant Species

An invasive plant survey in the Project Area found a number of invasive species that are frequently found in northwest Oregon, colonizing road shoulders and other areas of soil disturbance. These species are not classified as Noxious by the Oregon Department of Agriculture, but are nonetheless considered undesirable because they aggressively compete with and replace native species. Because they are common, attempts at control would be impractical. However, project design criteria that maintains tree canopy and minimizes ground disturbance to the extent practical would reduce their spread into natural habitat away from roads.

Species located within the Project Area that are classified as List B Noxious Weeds by the Oregon Department of Agriculture include Japanese knotweed (*Polygonum cuspidatum*), Scot's broom (*Cytisus scoparius*), and bull thistle (*Circium vulgare*).

In addition, project design criteria to reduce the risk of introducing invasive species from outside the Project Area following standards outlined in the Region 6 Preventing and Managing Invasive Plants ROD (2005) have been incorporated into the project..

Alternative 1 No Action

No actions are proposed that would result in increase the risk of invasive species introduction or expansion. The spread of invasive plants within the Project Area would continue at background levels, primarily along roads.

Alternative 2 and 3

A weed risk analysis rated the risk of weed spread or introduction for the Alternatives as high based on the known presence of weeds in close proximity to the Project Area, the use of heavy equipment, ground disturbance, and the expected importation of rock or pit material. The knotweed infestation is not located close to any activity associated with the proposed project and therefore the risk that project activities would result in expansion of this infestation or introduce it elsewhere is low. Project design criteria have been developed to reduce the risk that Scot's broom and bull thistle infestations would expand or spread away from roads and into forest stands. These measures include limiting ground disturbance and maintaining tree canopy to the extent possible, staging equipment and placing landings in weed-free areas, and the manual removal of plants in heavily infested areas.

In addition, project design criteria to reduce the risk of introducing invasive species from outside the Project Area following standards outlined in the Region 6 Preventing and Managing Invasive Plants ROD (2005) have been incorporated into the project.

Implementation of project design criteria would result in reducing the risk of invasive plant spread and introduction to an acceptable level.

Cumulative Effect

Roads serve as the primary pathway invasive plants travel to colonize new areas. Seed and plant parts that are picked up in infested areas by vehicles, animals and people can be transported along roadways where habitat conducive to their establishment and growth is readily available. The proposal to close and decommission roads under the action Alternatives would reduce the potential for new infestations in the future. Other activities likely to influence weed populations in the Project Area include ongoing weed control, road management decisions to close and/or decommission roads and weed prevention practices incorporated into all Forest Service activities, permits and contracts. With the current and foreseeable future emphasis on weed/invasive species management, noxious weed infestations are expected to decline in the Project Area as tree-crown cover increases; open road miles decrease and weed management/treatment increases. Although new invader weed species are likely to arrive in the Oregon Coast Range, the weed species, mode of spread, vectors for spread, available habitat and other factors are not predictable or foreseeable.

Wildlife

Introduction

The following information is summarized from the *Biological Evaluation and Wildlife Report for Little Nestucca Thin, December 2006*. The purpose of this biological evaluation is to identify the likely effects of the alternatives including the proposed action to federally listed or proposed wildlife species, Forest Service Regional Forester sensitive species, and federally proposed or designated critical habitat. All necessary consultation with U.S. Fish and Wildlife Service (USFWS) is completed for effect determination (USFWS Biological Opinions 1-7-05-F-0664 and 1-7-05-F-0005), available in the Hebo District Office for review. All aspects of the proposed action comply with all standards and guidelines and stipulations in the USFWS BO and effect determinations are same as stated in the BO.

Table 3-3: Existing Condition and Trends

This table summarizes the existing condition and what is expected in the stands after treatments.

Unit Number	Harvest Acres	Current Trees Per Acre**	Current QMD*	Residual TPA**	Residual QMD*
5	20	311	12.9	80	15.9
6	60	220	15.6	70	20.1
7	15	254	15.3	80	18.9
8	54	340	14.5	70	17.5
11	57	250	16.0	80	18.5
12	48	250	16.0	80	18.5
14	66	293	16.9	90	20.5
15	12	400	13.1	90	16.9
16	67	267	15.1	80	17.9
17	44	206	12.6	75	15.6
18	29	268	13.4	80	15.7
19	52	320	15.9	90	19.4
20	28	252	16.6	75	20.1
21	46	382	12.7	100	16.6

22	22	189	16.1	60	20.8
23	52	226	11.9	60	13.5
24	52	267	15.8	65	21.0
29	18	250	14.0	70	16.2
30	12	250	14.0	70	16.2
31	19	250	14.0	70	16.2
32	45	250	14.0	70	16.2
33	16	275	14.4	70	17.7
34	16	245	13.5	75	17.2
35	61	265	12.3	60	15.9
36	7	253	14.1	70	17.9
37	16	276	13.1	75	16.9
38	10	200	16.0	60	18.3
39	33	192	16.5	60	19.9
40	57	296	13.1	55	16.5
41	40	241	14.3	85	17.7
42	67	322	12.8	80	15.7
43	7	300	13.7	85	17.4
44	14	329	13.9	75	16.8
45	20	250	14.0	60	17.5
46	19	250	14.0	80	16.6
47	15	250	14.0	60	17.5
48	8	250	14.0	80	16.6
50	8	250	15.0	60	17.5
51	18	275	15.0	60	18.3
52	34	275	15.0	80	17.3
53	41	275	15.0	80	17.3
54	28	250	15.0	60	17.5
55	23	250	13.0	80	14.8
56	19	329	13.9	75	16.8
57	20	257	14.2	70	17.9
58	81	267	14.0	95	18.1
59	14	304	14.9	90	15.3
60	46	258	14.4	75	18.6
61	66	250	15.0	80	17.9
62	49	243	16.0	85	19.7
63	127	274	14.6	90	17.2
64	32	257	16.6	65	19.0
66	75	261	15.1	70	19.1
67	35	281	14.8	85	18.5
68	41	250	14.0	80	16.6
70	50	272	15.6	80	19.9
71	158	300	13.0	70	17.0
72	50	308	12.9	80	15.9
73	27	240	12.5	60	16.1
74	82	268	15.4	65	20.0
75	32	226	17.2	80	21.4
76	37	238	14.7	80	19.3
77	20	234	12.4	70	15.6

78	17	169	15.6	90	16.0
79	5	340	14.5	80	18.7
80	50	302	13.3	65	18.6
81	28	270	13.0	60	16.6
82	15	237	17.8	75	20.4
83	18	289	13.1	80	16.2
84	68	230	13.0	75	15.6
85	190	130	17.0	70	19.1
86	2	130	17.0	70	19.1
87	7	120	17.5	70	19.1
88	1	130	17.0	70	19.1
89	10	130	17.0	70	19.1
Total	**2,848**				
Ave	**38**	**257**	**14.6**	**75**	**17.7**

* Quadratic Mean Diameter – the diameter of the tree of ave basal area in each unit, quantifying the size of trees before (current) and after (residual) thinning.

**Trees per acre – the ave number of all hardwood and conifer trees with 7" and greater DBH/acre before and after thinning

Species Considered and Evaluated

The following table includes federally listed or proposed species for the Siuslaw National Forest within the project area as provided in the July 2004 list from the Regional Office.

Table 3-4:

Common Name	Species	Status
Northern Bald eagle	Haliaeetus leucocephalus	Threatened
Northern Spotted Owl	*Strix occidentalis caurina*	Threatened
Marbled Murrelet	*Brachyramphus marmoratus*	Threatened

The following table includes Regional Forester Sensitive Species for the Siuslaw National Forest. Sensitive animal species are from Regional Office lists updated July 2004 and includes Federal candidate species (C).

Table 3-5

Common Name	Species
MAMMALS	
Baird's Shrew	*Sorex bairdii bairdii*
Pacific Fringe-tailed Bat	*Myotis thysanodes vespertinus*
Pacific Fisher (C)	*Martes pennanti*
AMPHIBIANS	
Southern Torrent Salamander	*Rhyacotriton variegatus*

Threatened, Endangered and Proposed Species and Critical Habitat

Northern Bald Eagle

The Northern bald eagle nests in large old trees in mature or old growth stands near large bodies of water. History and trends in the status of bald eagle nests in Oregon are tracked annually by Isaacs and Anthony (2003). Bald eagles are known to be highly susceptible to disturbance, particularly during their nesting season (Stalmaster *et. al.*1985; McGarigal *et. al*. 1991). This effect of disturbance is important

within 0.25 mile or 0.5 mile line of sight distance, of known nest sites during this period. The closest recorded nest site is located over five miles to the west of the Project Area on private land.

Direct & Indirect Effects
Alternative 1 No Action
In this alternative, none of the managed stands within the project area would be treated so no change from current condition would occur. This alternative does not meet the purpose and need to maintain or improve habitat for terrestrial species in the area by accelerating the development of late-successional forest habitat and by improving watershed conditions. Based on this analysis, a determination of "**No effect**" is made for this species.

Action Alternatives (Alternatives 2 & 3)
Species: Although no surveys have been conducted, Northern bald eagles have been observed foraging along the Little Nestucca River near stand 40 and along Hiack Creek just west of stand 58 (personal conversation with Wayne Patterson). There is a high likelihood that the Northern bald eagle utilizes other portions of the project area for foraging activities and occurs in the vicinity of many of the treated stands and roads. Temporary direct effects, such as individual and prey displacement, may occur during commercial operation. Temporary indirect effects, such as increased noise levels, could occur during operations. If the animal is in the treatment areas during implementation, individual bald eagles could be temporarily displaced by the mechanical operations, which is a "**May affect, not likely to adversely affect**" determination. Potential impacts to individuals should not impact overall reproduction and survivability of any populations within the area. No cumulative impacts are expected.

Habitat: Based on this analysis, no suitable roosting or potential nesting habitat would be removed during projection implementation. Project design treatments would buffer riparian areas. This would protect most bald eagle perching habitat. Direct beneficial effects, such as improved habitat quality and quantity, are likely to occur as a result of the thinning. No cumulative impacts are expected.

Northern Spotted Owl
The Northern spotted owl is strongly associated with dense mature and old growth Douglas-fir forests, which provide the structural characteristics required by the owls for food, cover, nest sites, and protection from weather and predation. Suitable habitat is defined as conifer dominated stands 80 years old or older and/or have trees greater than or equal to 18 inches average dbh, multi-storied in structure, and have sufficient snags and downed wood to provide opportunities for owl nesting, roosting and foraging. The canopy closure generally exceeds 60 percent. The proposed thinning units, with the exception of units 85, 86, 87 and 89, do not have enough trees of this size to meet the criteria for suitable habitat. The habitat may be used by dispersing birds, but it does not have the complexity to be suitable habitat. The closest recorded location of an owl nest, located outside the Project Area is the Butte Creek owl in Sec 20 approximately 1.6 miles northeast of unit 11. The nest was found in 1990, it was last active in 1992. Records indicate that a barred owl was found in the nest in 2002, 2003 and 2004. The site is currently listed as unoccupied. Planned retention of large amounts of down wood would benefit some of the prey species of the spotted owl. Portions of units 85, 86, 87 and 89 are located within suitable habitat.

Northern Spotted Owl Reserve Pair Area

On federal lands within the Northern Coast Range AMA, Northern spotted owls are to be protected by establishing a RPA around each activity center. The RPA should be equal to the home range size for pairs in the Coast Range Province and encompass as much habitat as possible close to the owl activity center. All suitable habitat in the RPA would be reserved from timber harvest. Management of currently unsuitable areas should be consistent with LSR management standards and guidelines for silviculture.

The Project Area encompasses portions of the multiple-site Cascade Head RPA covering approximately 9 percent of the Little Nestucca Watershed. This multiple-site RPA is within LSR RO807. The activities proposed within the RPA are consistent with management objectives in both owl critical habitat and LSR's.

Direct & Indirect Effects
Alternative 1 No Action
An indirect and cumulative effect of this alternative is the delayed or non-development of large blocks of late-successional habitat needed by this species for maintenance and expansion of the population. This alternative does not meet the desired goals of the Forest Plan, and in particular the goals described in the *Late-Successional Reserve Assessment for Oregon's Northern Coast Range Adaptive Management Area*.

Action Alternatives (Alternatives 2 & 3)
Although no surveys have been conducted, there is a high likelihood that the Northern spotted owl utilizes the area for dispersal, foraging and nesting, and occurs in the vicinity of the proposed action. Some of the individuals could be negatively affected by treatment activity. Temporary direct effects, such as individual and prey displacement, may occur during operation. Direct beneficial effects, such as improved future habitat quality and quantity, are likely to occur as a result of the thinning. Temporary indirect effects, such as increased noise levels, could occur during operation. No cumulative impacts are expected.

Based on this analysis, "**May affect, not likely to adversely affect**" is expected for the proposed action for this species, due to disturbance if the birds are in the treatment areas after July 7th. Potential impacts to individuals should not impact overall reproduction and survivability of any populations within the area.

Northern Spotted Owl-- Designated Critical Habitat

The entire Little Nestucca Thin Project area lies within CHU's OR-41, OR-42, and OR-43, designated for the Northern spotted owl in January 1992. For spotted owls, the primary constituent elements of critical habitat are the physical and biological habitat features that support nesting, roosting, foraging and dispersal. Attributes of good to high quality nesting and roosting habitat typically include 60 to 80 percent canopy closure, a multi-layered, multi-species canopy with large overstory trees (greater than 30 inches dbh), large snags, large accumulations of woody debris and fallen trees, trees with deformities, and subcanopy open space for flying. Foraging habitat is similar, but may not support successfully nesting pairs. The number of trees to be left after thinning would range between 50 and 100 trees per acre. The thinning stand's stocking currently ranging between 170 and 400 trees per acre.

Dispersal habitat consists of trees with adequate tree size (at least eleven inches dbh) and canopy closure (at least 40 percent) to provide protection from avian predators (USDI-FWS 1992). The proposed thinning units do not contain nesting habitat, but would function as dispersal habitat as long as the canopy closure remains at or above 40 percent stand average. The areas with CWD would provide habitat for owl prey species and could serve as foraging habitat for owls. Most of the units have moderate to high levels of CWD (1100 cubic feet per acre or more).

Direct & Indirect Effects on Critical Habitat

Alternative 1 No Action

No change from current condition would occur. An indirect and cumulative effect of this alternative is the delayed or non-development of large blocks of late-successional habitat needed by this species for maintenance and expansion of the population. This alternative does not meet the desired goals of the Forest Plan, and in particular the goals described in the *Late-Successional Reserve Assessment for Oregon's Northern Coast Range Adaptive Management Area*.

Action Alternatives (Alternatives 2 & 3)

The proposed heavy thinning in units 35, 39 and 40 totaling 151 acres would occur in CHU OR-42, a 3,000 acre CHU block. This proposed thinning would reduce the dispersal habitat within the CHU by five percent. The proposed heavy thinning that would occur in units 22, 23, and 24 totaling 126 acres would occur in CHU OR-43, a 1,480 acre CHU block. This proposed thinning would reduce the dispersal habitat within the CHU by eight and one half percent. The changes to the stands being thinned will affect critical habitat components in both OR-42 and OR-43 CHU blocks, and as a result, **may effect, and is likely to adversely affect** critical habitat.

Light to moderate thinning would occur in the rest of the units within unsuitable or dispersal-only habitat. When thinning is implemented within dispersal habitat, the maintenance of at least 40 percent average canopy cover in each treatment unit would retain dispersal-quality habitat in the area but none the less degrade the quality of dispersal habitat. Direct beneficial effects, such as improved habitat quality and quantity, are likely to occur as a result of the thinning but in the short term some impacts to dispersal are anticipated as a result of the light to moderate thinning. As a result the light to moderate thinning proposed **may effect, but is not likely to adversely affect** critical habitat. No cumulative impacts are expected.

Marbled Murrelet

Marbled murrelet use older forest stands generally within 50 miles of the coast for nesting. More commonly, murrelets occupy old-growth forests compared to mixed-age and young forests in California, Oregon, and Washington. Suitable habitat for murrelets includes contiguous forested areas with conditions that support nesting murrelets. These forested areas are generally characterized by large trees greater than 32 inches dbh and multistoried stands, with a moderate canopy closure. Contiguous forests are likely to contribute to the conservation of the murrelet by reducing potential for windthrow during storms, providing protection from predation, and providing a landscape that has a higher probability of occupancy by murrelets (USDI 1996). The most common tree species used for nests in the Pacific Northwest is Douglas-fir. Douglas-fir is the main species used in Oregon, followed by the western hemlock. Individual nest trees include large trees, generally greater than 32 inches dbh with the presence of potential nest platforms or deformities such as large or forked limbs, broken tops, dwarf mistletoe infections, witches' brooms, or other formations providing platforms of sufficient size to

support adult murrelets. The diameter of nest branches ranges from 4 to 25 inches (USFWS 1997). Nest platforms are created typically on large branches with moss covering. Nests are typically located in the top third of the tree canopy and usually have a dense overhead canopy, presumably to provide protection from potential predators and weather. This cover may be provided by overhanging branches, limbs above the nest area, or branches from neighboring trees.

Direct & Indirect Effects

Alternative 1 No Action

No change from current condition would occur. There would be "No effect" on this species. An indirect and cumulative effect of this alternative is the delayed or non-development of large blocks of late-successional habitat needed by this species for maintenance and expansion of the population. This alternative does not meet the desired goals of the Forest Plan, and in particular the goals described in the *Late-Successional Reserve Assessment for Oregon's Northern Coast Range Adaptive Management Area*.

Action Alternatives (Alternatives 2 & 3)

The coniferous stands proposed for thinning are neither suitable nor potential marbled murrelet habitat. Any level of thinning would have "**No effect"** on murrelets because these areas do not currently contain any potential nesting structure and therefore are not used by murrelets. No suitable nest trees would be removed and suitable nest trees would be protected by designing prescriptions for forest stands around them within 0.5 mile that: 1) improve long term wind firmness, 2) require no openings within one tree length surrounding a potential nest tree, and 3) ensure no damage to any potential nest tree limbs.

Although no surveys have been conducted, there is a high likelihood that the marbled murrelet occurs in the vicinity of the proposed action. Activities louder than ambient noise levels and within 100 yards of a nest site may disrupt reproductive behaviors of murrelets at inland forest sites by causing nest abandonment, aborted feeding visits or significant alteration of breeding success. The closest known recorded location of a murrelet siting that exists within the Project Area is located 65 yards off the southern edge of unit 34. The siting occurred in 1991. Unit 34 will not be logged till after Aug 6th to ensure that no birds exist in the area during the time of logging. Some of the individuals could be negatively affected by treatment activity. Temporary direct effects, such as individual displacement, may occur during operation. Direct beneficial effects, such as improved habitat quality and quantity, are likely to occur as a result of the thinning. Temporary indirect effects, such as increased noise levels, could occur during operation. If a marbled murrelet is in the treatment areas during implementation, individual birds could be temporarily displaced by the mechanical operations. Potential impacts to individuals should not impact overall reproduction and survivability of any populations within the area. No cumulative impacts are expected. Based on this analysis, **"May affect, not likely to adversely affect"** is expected for the proposed action, due to potential disturbance after August 5th.

Marbled Murrelet Designated Critical Habitat

All of the proposed Little Nestucca Project Area lies within critical habitat for the marbled murrelet (OR-02-b and OR-02-e), designated in May 1996. The critical habitat rule for the marbled murrelet defined primary constituent elements of marbled murrelet habitat as: 1) individual trees with potential nesting platforms and 2) within one half mile of potential nest trees, forested areas which have a canopy height of at least one-half the site-potential tree height. Due to the age, diameter and growth form of the trees in this area, no Marbled Murrelet constituent habitat elements occur within Little Nestucca Thin

units. No CWD would be created from trees along unit edges with whorls or deformities that could support nesting murrelets or that buffer a potential murrelet nest tree.

Direct & Indirect Effects on Critical Habitat

Alternative 1 No Action

No change from current condition would occur. An indirect and cumulative effect of this alternative is the delayed or non-development of large blocks of late-successional habitat needed by this species for maintenance and expansion of the population. This alternative does not meet the desired goals of the Forest Plan, and in particular the goals described in the *Late-Successional Reserve Assessment for Oregon's Northern Coast Range Adaptive Management Area*.

Action Alternatives (Alternatives 2 & 3)
The thinning prescriptions have been designed to protect potential nest trees in adjacent stands from incidental damage and windthrow. Direct beneficial effects, such as improved future habitat quality and quantity, are likely to occur as a result of the thinning. No cumulative impacts are expected. Based on this analysis, the proposed action **may effect, but is not likely to adversely affect** murrelet critical habitat.

Sensitive Species
Baird's Shrew
The species is associated with Westside lowland conifer/hardwood forest, Westside oak and dry Douglas fir forests, and montane mixed conifer forests (Johnson and O'Neil, 2001). Important habitat features for this small insectivore include wet meadows, streambanks, marshes and decaying woody material. This habitat type exists within the Project Area.

Direct & Indirect Effects
Alternative 1 No Action
No change from current condition would occur.

Action Alternatives (Alternatives 2 & 3)
Although no surveys have been conducted there is a high likelihood that Baird's shrew occurs in the vicinity of the proposed action. Project design treatments avoid riparian and wet areas by a minimum of 30 feet, providing protection for the species if present. Some individuals however, could be negatively affected by treatment activity. Temporary direct effects, such as displacement, may occur during operation. Direct beneficial effects, such as improved habitat quality and quantity, are likely to occur as a result of the creation of more down woody material. Temporary indirect effects, such as increased noise levels, could occur during operation. No cumulative impacts are expected. Therefore, it is expected that the proposed action would not impact the species viability nor cause the species to be driven closer to Federal listing.

Pacific Fringe-tailed Bat
This species inhabits caves, mines, rock crevices and buildings for hibernation, maternity, and solitary roosts. Little is known about foraging areas, but habitats where they have been documented are salmonberry in proximity to immature conifer (Maser, 1981, p94). They feed predominately on moths along forest edges, roads, or open areas within the forest. Although no suitable roosting habitat exists

within the Project Area, foraging activities can include wide areas, and can't be discounted as occurring within the Project Area.

Proposed treatments could potentially remove habitat suitable for fringe-tailed bat prey species (moths), but at such an indiscernible level that no negative impacts to individual bats or local bat populations are expected to occur.

Direct & Indirect Effects
Alternative 1 No Action
No change from current condition would occur.

Action Alternatives (Alternatives 2 & 3)
Although no surveys have been conducted, there is a high likelihood that Pacific fringe-tailed bat occurs in the vicinity of the proposed action. Some of the individuals could be negatively affected by treatment activity. Temporary direct effects, such as individual and prey displacement, may occur during temporary road construction. Direct beneficial effects, such as improved future habitat quality and quantity, are likely to occur as a result of the thinning. Temporary indirect effects, such as increased noise levels, could occur during operations. The proposed actions would alter habitats that this species could forage over, however the planned alteration would promote historic habitats. No negative cumulative impacts are expected. Therefore, it is expected that the proposed action would not impact the species viability nor cause the species to be driven closer to Federal listing.

Pacific Fisher
This species is listed as a candidate for Federal listing with the Fish and Wildlife Service and as such is included on the Regional Foresters Sensitive Species list. This species is closely associated with Westside lowland coniferous forests that contain medium to large diameter trees, snags for denning, and suitable prey habitat of logs and forage species.

Direct & Indirect Effects
Alternative 1 No Action
No change from current condition would occur.

Action Alternatives (Alternatives 2 & 3)
Although no surveys have been conducted, there is a high likelihood that Pacific fisher occurs in the vicinity of the proposed action. Some of the individuals could be negatively affected by treatment activity. Temporary direct effects, such as individual and prey displacement, may occur during temporary road construction. Direct beneficial effects, such as improved future habitat quality and quantity, are likely to occur as a result of the thinning. Temporary indirect effects, such as increased noise levels, could occur during operations. The proposed actions would alter habitats that this species could forage over, however the planned alteration would promote historic habitats. No negative cumulative impacts are expected. Therefore, it is expected that the proposed action would not impact the species viability nor cause the species to be driven closer to Federal listing.

Southern Torrent Salamander

This species lives in very cold, clear springs, seeps and headwater streams and is documented in the northern Coast Range south of the Little Nestucca River and the Grand Ronde Valley (Corkran and Thoms, 1996, p53).

Direct & Indirect Effects
Alternative 1 No Action
No change from current condition would occur.

Action Alternatives (Alternatives 2 & 3)
Although no surveys have been conducted, there is a high likelihood that Southern torrent salamander occurs in the vicinity of the proposed action. Project design treatments avoid riparian and wet areas by a minimum of 30 feet, providing adequate protection for the species if present. Some of the individuals could be negatively affected by treatment activity due to noise. Temporary direct effects, such as displacement, may occur during temporary road and landing construction due to noise. Direct beneficial effects, such as improved habitat quality and quantity, are likely to occur as a result of the creation of more down woody material. If the animal is in the treatment areas and outside typical suitable habitat during implementation, some salamanders could be injured by the mechanical operations though this is not anticipated. No negative cumulative impacts are expected.

Table 3-6: Summary of Effects Determinations for PETS species and critical habitat

Common Name	Species	Status	Determinations of Effects		
			A1t 1	Alt 2	Alt 3
Bald eagle	*Haliaeetus leucocephalus*	Threatened	*No Effect*	*NLAA*	*NLAA*
Northern Spotted Owl	*Strix occidentalis caurina*	Threatened	*No Effect*	*NLAA*	*NLAA*
N.S.O. Critical Habitat, Heavy Thinning			*No Effect*	*LAA*	*LAA*
N.S.O. Critical Habitat, Light/ Mod Thinning			*No Effect*	*NLAA*	*NLAA*
Marbled Murrelet	*Brachyramphus marmoratus*	Threatened	*No Effect*	*NLAA*	*NLAA*
M.M. Critical Habitat			*No Effect*	*NLAA*	*NLAA*
Baird's shrew	*Sorex bairdii*	Sensitive	*No Impact*	*No Impact*	*No Impact*
Pacific fringe-tailed bat	*Myotis thysanodes vespertinus*	Sensitive	*No Impact*	*No Impact*	*No Impact*
Pacific fisher	*Martes pennanti*	Candidate	*No Impact*	*No Impact*	*No Impact*
Southern torrent salamander	*Rhyacotriton variegatus*	Sensitive	*No Impact*	*No Impact*	*No Impact*

Survey and Manage Species
Pre-disturbance surveys and management of known sites required by protocol standards to comply with the 2001 Record of Decision and Standard and Guidelines for Amendments to the Survey and Manage, Protection Buffer, and other Mitigation Measure Standards and Guidelines (as the 2001 ROD was

amended or modified as of March 21, 2004) were completed for the Little Nestucca Thin. Little Nestucca Thin also complies with any site management for any Category B, D, and E species as identified in the 2001 ROD (as modified).

Vertebrates

The only Survey and Manage vertebrate on the Siuslaw National Forest is the red tree vole (*Arborimus longicaudus*). Its habitat association is mature and old growth conifer forests. Suitable habitat exists within portions of Units 85, 86, 87, 88 and 89. Surveys were conducted in the fall/winter 2006 and 2007 using the Line Transect Survey Method of the *Red tree vole protocol* (Version 2.2) within these areas. No evidence of red tree voles were found.

Mollusks

There are two species of survey and manage mollusks on the Siuslaw National Forest. They are Puget oregonian (Crytomastix devia), and evening fieldslug (Deroceras hesperium). The Puget oregonian inhabits mature to late successional moist forest and riparian zones, under logs, in leaf litter, around seeps and springs, and often associated with hardwood debris and leaf litter and/or talus. It is often found under or near big-leaf maple and may be under sword-fern growing under these trees, or on the underside of big-leaf maple logs. The evening fieldslug is associated with wet meadows in forested habitats in a variety of low vegetation litter and debris; rocks also may be used. Little is known about this species and its habitat. There is no suitable habitat for Crytomastix, or Deroceras, therefore no surveys are needed.

Management Indicator Species

Siuslaw National Forest Plan (USDA 1990) MIS species are those that represent a larger group or guild of species that are thought to be indicators of habitat change. The MIS species on the Siuslaw Forest include American marten for mature older age 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, Aleutian Canada goose, bald eagle, brown pelican, Oregon silverspot butterfly, peregrine falcon, Roosevelt elk, and Western snowy plover.

Effects to MIS from the proposed action include: The proposed action occurs outside mature forest stands, management activities are not expected to have negative impacts on local populations or habitats of American marten or pileated woodpecker, which have been identified to indicate health of late and old growth forests. Primary cavity nesters and ruffed grouse and elk may be temporarily displaced by the disturbance activities of the mechanical operations but are not expected to abandon the Project Area. A beneficial effect is expected to occur as larger snags would be created. Aleutian goose, brown pelican, Oregon silverspot butterfly, peregrine falcon and Western snowy plover are unlikely to occur in the project area.

Neo-Tropical Migratory Birds (Land Birds)

Landbirds, including migrant and resident species, are those that generally use terrestrial and wetland habitats. Habitats these species could be found using include forest canopies, snags, understories, ground vegetation/structure, existing openings and a wide variety of structural types and successional

stages. Some landbirds expected in the Project Area include olive-sided flycatcher, tree swallow, Swainson's thrush, varied thrush, winter wren, warbling vireos, and purple finches. Impacts to landbirds can come from either disturbance or habitat alteration or both. Impacts from disturbance are due to activities above normal ambient levels proximate to nesting or feeding areas. Alternative 1 would have no disturbance impact on any landbirds because no activities are planned. Alternatives 2 & 3 have planned activities that could occur during the later portions of the breeding season for some species that would potentially be proximate to nesting and feeding sites. Since the planned activities would occur during the later part of the nesting season, and many of these species nest multiple times over the spring-summer period, only the very last nesting would potentially be disturbed allowing for at least one or possibly two clutches to be successful even during years of disturbance. Disturbance from flushing from feeding sites would have far less potential impact to landbirds than nesting disturbance. Feeding birds have much greater flexibility to locate and feed elsewhere when contrasted with fixed nest location. Overall, the number and location of alternative feeding sites in the geographic area described above further reduces the likelihood of actually incurring any measurable feeding disturbance.

Impacts to landbirds would also come in the form of habitat alternation. All alternatives would impact landbirds. The thirty to sixty-three year old managed stands are dense, even-aged stands. The number of stems per acre range is 170 to 400. The trees are tall and thin, have relatively uniform bole diameters, and have few branches over one inch in diameter. These stands typically have 90 to 95 percent crown closure, so very little light reaches the forest floor or the understory. The understory typically contains salmonberry, sword fern, huckleberry, Oregon grape and salal. Alternative 1 would impact landbirds that are adapted to a more open canopy and larger diameter trees. Alternative 2 & 3 would impact existing species associated with closed canopy and high density trees per acre. Landbirds that found an ecological niche in a more open habitat with smaller diameter trees would benefit from the action alternative. Landbirds that have specialized in only tightly closed canopy, small diameter trees, would be adversely impacted by the action alternatives.

One neotropical bird has declined as evidenced by recent monitoring (Nott, et. al. 2005) and warrants specific attention. The Western flycatcher (*Empidonax difficilis occidentalis*) has declined significantly ($0.01=P<0.05$) at one or more monitoring stations. The suggested reason for the decline (Nott, et. al. 2005) is stated as:

"*Our results strongly suggest that "Western" flycatcher is sensitive to proximal edges (i.e. patch size) of coniferous habitat. It may be sensitive to increased risks of nest predation and parasitism. The number of young and reproductive success are higher at those stations associated with a high total core area of coniferous forest habitat totaling 72% of the landscape. Large tracts of old-growth forest (large core areas of coniferous forest) and dry-upland and riparian sites (thinner canopy and some mixed habitats) are beneficial to the reproductive success of "Western" flycatchers."*

Given the above description of what is understood to be the cause of decline in Western flycatcher abundance (loss of large contiguous blocks of mature/old growth conifer habitat) and the minimal if any effect the proposed action would have on conditions causing Western flycatcher declines, there are no impacts to Western flycatchers anticipated due to the proposed action.

Since the project would occur during the land bird nesting season, there is potential for nesting disruption or harm to young of the year. However, due to the small number of individuals that might be

impacted, negative impacts to local populations of land birds within the drainage are not expected. No intentional take of migratory birds would occur under this project.

Cumulative Effects

The cumulative analysis area differs widely among different species depending on habitat associations and "home range" sizes. The EA addresses various species to display a range of impacts and cumulative impacts are discussed in each section. Current and past activities were evaluated as they impacted each species both spatially and temporally, and was determined by this analysis to be of no significant impact.

The closest project that might adversely impact some terrestrial species was the Gauldy Thin Project. It proposed to thin 388 acres in ten harvest units, construct 0.5 miles of temporary road, and open 6.3 miles of existing temporary road and 1.3 miles of existing Forest Service road. The Forest Service is conducting thinning sales within previously harvested plantations for terrestrial and aquatic habitat enhancement and the low impact of this type of activity should result in no cumulative effects because both of these projects have very similar Design Criteria and Mitigations.

This project proposes to thin approximately 2,848 acres in a watershed of 40,760 acres. The Forest Service manages 46 percent of the watershed. Since the Forest Service is only conducting thinning sales for habitat enhancement, the low impact of this type of activity should result in minimal cumulative effects.

Fish

Introduction

The following information is summarized from the *Fisheries Biological Evaluation for Little Nestucca Project, December 2006*. The Little Nestucca Project occurs within the area covered in the Little Nestucca Watershed Analysis (WA) (June, 1998).

Existing Condition and Trends

The Little Nestucca watershed covers 40,760 acres on the west side of the Coast Range. The Watershed is 12 miles northeast of Lincoln City, north of State Highway 18 and primarily south and west of State Highway 22. Portions of Yamhill, Polk, Tillamook and Lincoln counties are within the boundaries of the watershed. The Little Nestucca River drains directly into the Pacific Ocean through Nestucca Bay, where it joins the "Big" Nestucca River.

Forest land managed by the federal government covers 19,118 acres (47 percent) of the watershed. National Forest land comprises 18,892 acres and the Bureau of Land Management 226 acres. The majority of the Nestucca Bay National Wildlife Refuge is located in the estuary of the Nestucca and Little Nestucca Rivers. Private land, mostly agricultural land that is located along the lower mainstem and wide valley of the Little Nestucca River, covers 10,000 acres (25 percent) of the watershed. Private industrial forest lands cover 9894 acres (24 percent). The Oregon Department of Forestry manages 800 acres (2 percent), mostly in the upper watershed. The Van Duzer Corridor along Highway 18 crosses the southeastern part of the watershed (Table 3-7). Table 3-8 shows Land Allocations and Northwest Forest Plan Objectives.

Table 3-7: Ownership in the Little Nestucca Watershed*

Ownership	Acres	Percent
National Forest	18,892	46.3
Bureau of Land Management	226	0.6
Private Industrial Forest	9,894	24.3
Private Ownership	9,770	24.0
Oregon Department of Forestry	800	2.0
Oregon State Parks	564	1.3
National Wildlife Refuge	490	1.2
Oregon Department of Transportation	124	0.3
TOTAL	40,760	100

* Data from Little Nestucca Watershed Analysis

Table 3-8: Land Allocations for Federally Managed Lands within the Little Nestucca Watershed*

Land Allocation	LSR (acres)	AMA, not Designated as LSR (acres)	Percent (%) of Total Watershed
Late-Successional Reserve	11,186		27
Adaptive Management Area		7,932	19
Reserved Pair Area (Owls)	966	2,672	9
Bald Eagle Management	285	100	<1
Critical Habitat for Owls	4,667	1,838	16
Riparian Reserves	6,747	5,650	30

* Data from Little Nestucca Watershed Analysis

The Little Nestucca watershed contains approximately 71 miles of fish-bearing streams, of which 39 miles support Anadromous fish. Common salmonid fish species include Chinook *(Oncorhynchus tshawytscha)*, coho *(O. kisutch)*, chum *(O. keta)*, steelhead *(O. mykiss)*, and cutthroat trout *(O. clarki)*. Numerous other fish species, including asculpins *(Cottus sp.)*, lamprey (Petromyzonidae), and sticklebacks (Gasterosteidae), also inhabit the stream. Coho and chum populations appear to be depressed in the basin. Chinook and steelhead appear to be maintaining healthy populations. Data on Cutthroat trout is limited, but suggests that the anadromous component of the run is depressed. However, the resident component of the species appears healthy.

Table 3-9: Fish Species of Interest

Species		MIS	T & E	Sensitive[#]	EFH*
Coho Salmon	*Onchorynchus kisutch*	++		++	++
Chinook Salmon	*O. tshawysch*			++	++
Coastal Cutthroat Trout	*O. clarki clarki*			++	
Chum Salmon	*O. keta*			++	
Steelhead Trout	*O. Mykiss*			++	

[#]USDA Region 6

* Magnuson-Stevens Essential Fish Habitat

Coho Salmon
Coho utilize this watershed for both spawning and juvenile rearing. In freshwater Coho need clean gravel for spawning, cool temperatures, and suitable habitat for approximately 16 months of freshwater rearing. Ideal rearing conditions include off channel rearing habitat, and pools with complex Large Woody Debris (LWD). Coho numbers in the Oregon Coast ESU have been depressed, but are showing signs of recovery. Coho are present in all three of the 6th fields that comprise the Little Nestucca 5th field.. According to the WA the watershed is deficient in LWD. One objective of this project is to accelerate the development of Late Successional habitat. This would facilitate the development of large trees in the riparian areas to increase the potential supply of future LWD. In the long term this should lead to improved habitat for Coho. The project design should minimize the possibility of sediment impacting the spawning and rearing areas and preclude adverse effects of water temperatures in the watershed.

Chinook Salmon
Chinook salmon utilize the watershed for spawning and rearing. Adult Chinook spawn in the late fall in the mainstems of the streams in the basin. The eggs incubate in the gravel and in the Spring the young migrate down to the Siletz estuary. The young reach the estuary by early summer and then spend the summer rearing in the estuary. The project activities are occurring in the forested upper portions of the watershed. The project design should minimize the possibility of sediment impacting the spawning and rearing areas and preclude adverse effects of water temperatures in the watershed.

Chum Salmon
Chum salmon utilize the lower watershed for spawning. This area is on the southern fringe of the range of chum salmon. Chum salmon spawn in late Fall and the juveniles migrate immediately upon emergence. They spend a brief time (approximately 2 weeks) in the estuary and then migrate into the ocean. The project activities are occurring in the forested upper portions of the watershed. The project design should minimize the possibility of sediment impacting the spawning and rearing areas and preclude adverse effects of water temperatures in the watershed.

Coastal Steelhead
Steelhead of all life history stages can be found in the project area at various times. Steelhead utilize this watershed for both spawning and juvenile rearing. In freshwater Steelhead need clean gravel for spawning, and cool temperatures. Ideal conditions include off channel rearing habitat, and pools with complex LWD. According to the WA the basin is deficient in LWD. One object of this project is to accelerate the development of Late Successional habitat. This would facilitate the development of large trees in the riparian areas to increase the potential supply of future LWD. In the long term this should lead to improved habitat for Steelhead. The project activities are occurring in the forested upper portions of the watershed. The project design should minimize the possibility of sediment impacting the spawning and rearing areas and preclude adverse effects of water temperatures in the watershed

Coastal Cutthroat Trout
Cutthroat have a complex life history pattern including both resident and anadromous populations. Cutthroat of all life history stages can be found in the project area at various times. Cutthroat utilize this watershed for both spawning and juvenile rearing. In freshwater Cutthroat need clean gravel for

spawning, and cool temperatures. Ideal conditions include off channel rearing habitat, and pools with complex LWD. According to the WA the basin is deficient in LWD. One objective of this project is to accelerate the development of Late Successional habitat. This would facilitate the development of large trees in the riparian areas to increase the potential supply of future LWD. In the long term this should lead to improved habitat for Cutthroat. The project activities are occurring in the forested upper portions of the watershed. The project design should minimize the possibility of sediment impacting the spawning and rearing areas and preclude adverse effects of water temperatures in the watershed

Management Indicator Species

Common Name	Species
Coho Salmon	*Oncorhynhus kisutch*

Coho utilize these watersheds for both spawning and juvenile rearing. In freshwater Coho need clean gravel for spawning, cool temperatures, and suitable habitat for approximately 16 months of freshwater rearing. Ideal rearing conditions include off channel rearing habitat, and pools with complex LWD. Coho numbers in the Oregon Coast ESU have been depressed, but are showing signs of recovery. Coho are present in both the Lower Drift and Schooner 6th fields. According to the WA the basin is deficient in LWD. One objective of this project is to accelerate the development of Late Successional habitat. This will facilitate the development of large trees in the riparian areas to increase the potential supply of future LWD. In the long term this should lead to improved habitat for Coho. The project design should minimize the possibility of sediment impacting the spawning and rearing areas and preclude adverse effects of water temperatures in the watershed

Aquatic Habitat (Existing Conditions)
For analysis purposes the existing habitat will be examined using five parameters; Water Quality, Substrate, Large Woody Debris, Stream Structure and Access. The Watershed Analysis presented the following table as an evaluation of fish habitat.

Table 3-10: Stream Habitat Ratings

HUC	Subwatershed	Substrate	LWD	%Pools	Pool Quality	Off Channel
1710020354C	Bear	N	N	A	A	P
1710020354D	Austin/McKnight	A	A	A	N	A
1710020354E	Louie/Baxter	N	N	A	N	N
1710020354F	Sourgrass	N	N	P	N	N
1710020354F	Stillwell/Hiack	A	A	P	N	P
P-"Properly Functioning" A–"At Risk" N-"Not Properly Functioning"						

This assessment was prepared about 10 years ago, but the overall description of aquatic habitat is still accurate. Extensive development has resulted in simplified stream channels and disrupted riparian function. The headwater forested areas are in the best condition with the lower heavily developed areas more degraded. Government, private, Watershed Councils and other interested groups are involved in

active habitat restoration. The lack of over winter habitat has been recognized as a key factor in limiting salmonid production. The lack of LWD in the streams is a major component in the poor quality habitat.

Substrate – The WA determined that substrate was either at risk or not properly functioning in the watershed. The primary factor influencing this indicator is the lack of LWD to create the structures needed to develop a normal substrate regime.

Large Woody Debris (LWD) – LWD was determined to be at risk or not properly functioning in the basin. This is a legacy of past land use practices. The logging of large conifers from riparian areas, stream cleaning and fire all contributed to this deficiency of LWD.

Stream Structure – Stream structure refers to the presence of LWD, off channel rearing areas, and to the presence of pools and other habitat types. This factor is also considered to be at risk or not properly functioning in most of the basin.

Access – This refers to the ability of fish to access all potential habitat in the basin. There are some natural barriers in the basin, such as the falls on Squaw Creek. The major impact on this indicator is the extensive road network that has been developed in the basin. This system was primarily developed to utilize the timber resources in the basin. The following table from the WA illustrates the amount of roading in the basin.

Table 3-11: Road Densities by Subwatershed

Subwatershed	Forest Development Road Density*	Total Road Density
Austin/McKnight	5.2	5.9
Bear 1	5.7	5.7
Fall	5.6	5.6
Lower Little Nestucca	3.9	4.7
Louie/Baxter	3.6	4.0
South Fork Little Nestucca	5.7	5.7
Sourgrass	6.7	7.7
Stillwell/Hiack	6.9	6.9
Upper Little Nestucca	3.6	4.1
Nestucca Bay	2.0	2.6

*Road miles per square mile of total landbase within the sub watershed.

This is a reasonably high density, and in a basin with a large number of streams this means numerous crossings. One aspect of this project was to inventory those culverts to determine their condition. A list of culverts needing attention in the project area was developed.

Direct and Indirect Effects

Alternative 1 No Action

In this alternative, none of the managed stands in the Project Area would be treated to control density, no riparian treatments would be done. Currently closed Forest and temporary roads would remain closed. However, due to a limited road maintenance budget, not all of the roads would be maintained.

Those roads that fail may not be repaired. Those that brush-in would remain closed until they are opened for project use.

Alternative 2 Proposed Action
The Siuslaw National Forest proposes to implement the following actions between 2007 and 2012, to commercially thin harvest units that total 2,848 acres. This would be approximately 6.5 percent of the 5th field watershed's land area.

Direct/Indirect Effects to T&E Species
There are no listed fish species present in the basin.

Direct/Indirect Effects to Sensitive and Management Indicator Species
The MIS and Sensitive species overlap therefore they have been combined to simplify analysis. This project should have minimal direct impacts on Sensitive and MIS species. The primary direct effects will be on aquatic habitat. These effects will be discussed as they relate to the important components of aquatic habitat. These components are water quality, substrate, LWD, stream structure and access

Water Quality – The two primary parameters that could be affected by this project are water temperature and turbidity/sedimentation. The Watershed Restoration Report prepared for this project by the Forest Hydrologist specifically addressed the temperature issue. The full report is available in the project file.

The parameter that has the most potential to be impacted is turbidity/sedimentation. The actions that could potentially deliver sediment to the streams are thinning, yarding, road building / construction, timber haul, culvert removal or replacement, timber haul and road decommissioning.

Thinning of existing forest stands has no causal mechanism for mobilizing sediment for transport into streams. All streams are protected by no cut buffers and the small size of the trees precludes the actual falling from causing any significant ground disturbance.

Helicopter, ground based and skyline cable yarding methods would be used for this project. Cable yarding corridors are narrow 10 to15 feet wide soil is rarely disturbed if at all by the falling and removal of trees for thinning projects of this nature. Full suspension across all streams is required and would prevent ground disturbance within the no cut buffers. For cable yarding logs would be brought to landings with one-end suspension. In general, whole tree yarding would be utilized in the project. Due to the small tree size, existing vegetation, duff layer and cushioning provided by the limbs remaining on the trees, ground disturbance is minimized during yarding. In addition, significant amounts of limbs and tops would be left in the units due to breakage occurring during falling and yarding operations. This remaining debris would assist in protecting the ground surface from erosion. It is expected that excessive amounts of limbs and tops collected at the landing would be redistributed in yarding corridors to further protect the most potentially disturbed areas. No overland flow is likely in our coastal forests types (Anderson et. Al. 1997, Harr 1977) and this coupled with the components listed above result in no or minimal sediment delivery to streams as a result of cable yarding.

Ground based yarding has been restricted to gradual slopes, less than 30 percent. No streams are present in these areas and no more than 11 percent of the area within these units would be impacted. Ground based yarding would occur only during the summer. Helicopter yarding further reduces ground impacts within the stands. Best Management Practices (BMPs) require specific guidelines regarding soil

compaction and disturbance related to ground based yarding. Protection measures are taken to minimize impacts on residual timber, soil and water quality. Operators are required to use designated skid trails and where feasible reuse skid trails from previous entries. Some soil compaction would occur as a result of ground based yarding. Due to location within the watershed (greater than 3,900 feet from coho habitat), the topography (wide, flat, ridgetops), nature of the soil (high level of organics and thick understory vegetation) and the complete lack of any possible delivery mechanism (no drainages in the areas of proposed ground based yarding) there is not believed to be any causal mechanism for sediment delivery.

This project will construct about 1.9 mile of semi-permanent roads and open about 35 miles of existing closed roads to facilitate access to harvest stands. In addition, about 600' of new permanent road will be constructed. However, this road segment is on a ridgetop with no stream crossings nd presents no risk of sedimentation. All the constructed and opened roads would be closed and stabilized and closed upon completion of harvest or end of current operating season, whichever comes first.

New semi-permanent road construction would not cross any streams and there would be no need for culvert installation. None of the new road segments have any direct hydrologic connection and none are valley bottom roads. Rock would be placed on new roads only as necessary, and would be left in place after the project is completed. All road work would be done during the dry season (June through October).

Opening the closed roads would require some minor reconstruction/maintenance. They will be brushed and brought up to minimum standards and rock placed on surfaces only as necessary. These roads would be for temporary logging use only and would be re-closed at the completion of the project. Reopened and semi-permanent roads used for the project would be blocked to prohibit future disturbance by vehicles, and water barred to capture and remove any surface runoff upon completion of the project.

Open roads would be storm proofed and blocked to traffic if they have to set through extended periods of wet weather.

Road maintenance on the log haul routes may include replacing surface rock, or repairing worn asphalt surfacing, cleaning ditches and culverts, brushing, and adding ditch relief culverts. This maintenance would occur during dry soil conditions, prior to hauling logs, and during haul if necessary. Steps will be taken during haul to ensure sediment does not enter streams by using the Forest Service BMP's.

Landings are not specifically identified at this point in the project. Logging feasibility is assessed by our logging specialist and likely landing locations are identified and analyzed. Precise logging locations are left to the discretion of the operator that receives the contract. Landings would all be located along or at the ends of roads and all would be positioned on the ridgetops, compacted soils at these sites would be treated after use, if necessary. All locations would be approved by Forest Service personnel.

The following general design criteria apply:

- Do not reuse existing road prisms where road stability is a major concern.
- New semi-permanent roads are on stable ridge top locations. The logging plan was designed to minimize the need for new temporary roads (SLMP: 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.

- Water bar and close semi-permanent roads between operating seasons or as soon as the need for the road ceases, to minimize sedimentation from roads. Seed exposed soils with native species (if available) and spread landing slash by machine over landing sites (unless tree planting is planned) and temporary roads with native (non-rock) surfaces. This practice would be more cost effective than machine piling and burning of landing piles and would help to stabilize disturbed soils.

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

With the current project design and BMP's this roadwork is not expected to deliver any significant amounts of sediment to streams in the basin. The location of the new road construction is shown on the project map.

The project also proposes to replace 18 culvert crossings prior to thinning activities. Seventeen of these crossings are being replaced with a culvert designed to handle 100 year flow events. The remaining culvert would be designed to facilitate fish passage. Seven of these crossings are within ¼ mile of Essential Fish Habitat (EFH). Standard design criteria would be used to minimize impacts on aquatic habitat. The timber sales are scheduled to occur from 2007 through 2012 and all eighteen culverts will be replaced within this time frame. The project also identifies 40 culverts that should be replaced in the basin. These replacements are not required for the thinning operation, but were identified as restoration projects to benefit the resource. Eight of these 40 culverts are within ¼ mile of EFH and one is identified as a fish passage issue. Funding for these culverts has not been identified at this time. These culverts will be replaced as funding becomes available and the time frame to complete this replacement is unknown at this time. Standard BMP's would be used to minimize impacts in all culvert replacements. These include working only during the dry season and diverting live streams if necessary. The replacements proposed in this project would also occur over a period of years to lessen any impacts. Culvert replacements can add sediment to a stream system, and the number of replacements proposed in this project increase this potential. However, with the design criteria, BMP's, and time frame involved resource impacts from this project would be minimized. The amount of sediment is expected to reach EFH habitat should be small and spread out over an extended time frame. This would have a short term adverse effect by increased sediment delivery. However, the long term effects of these culvert replacements would be an improvement over current conditions. The larger size of the replaced culverts would facilitate a more normal hydrologic regime in the basin. In addition, this would significantly reduce the risk of catastrophic events due to culvert and fill failures.

The project also identifies 7 miles of road for decommissioning. Most of this mileage is not in close proximity to streams. However, there is the possibility of short term adverse effects due to increased sediment delivery. However, the long term effects of these road decommissionings would be an improvement over current conditions.

Timber haul also has the potential to contribute sediment to streams if appropriate safeguards are not in place. Standard BMP's and the Siuslaw road rules will provide adequate protection for aquatic resources during the dry season. For operational reasons, 24 stands are being made available for potential winter haul. Additional criteria have been developed to add additional resource protection for this activity.

- Adverse effects on fish & wildlife must be mitigated.
- All helicopter harvest units will be available for winter haul.
- Stable temporary or system roads that require minimal additional rock.

- Preference is ridge top and/or well drained roads.

The design criteria and mitigations should minimize the risk of sediment reaching streams. Haul may have a small short term adverse effect on EFH habitat. But the basin wide effect of this activity should be insignificant.

Large Woody Debris (LWD) - LWD serves a key function in aquatic habitat. LWD is recruited to the stream by two primary methods. Riparian trees can fall and land in or partly in a stream channel. Slides or other earth movements can also be an important source of LWD for streams. Thinning and yarding would remove some trees near streams. Some trees would be removed within 15 feet of intermittent channels, and within 30 feet of perennial channels. These are minimum no cut buffers and in many cases the no cut buffers along streams are significantly larger. These actions would reduce the number of small trees in riparian areas in the project area and potentially reduce recruitment of LWD to the streams. Trees scheduled for removal are on the outer edge of the potential recruitment zone, with a low probability of falling into the adjacent stream. The existing riparian areas are dominated by small conifers (12 to18 inch diameter) which do not meet the size criteria for LWD. Removal of these small trees from overstocked stands would allow for the more rapid growth of the retained trees, allowing the future recruitment of larger pieces of wood to streams which is more functional for providing aquatic habitat.

Some overstocked plantation stands would not be thinned due to other issues, so there would be some recruitment of small sized trees in the watershed due to overcrowding and natural succession. Other riparian stands were not treated historically and are in late seral condition, these stands would provide a short-term source of large, high quality woody material to the stream network. Retention of at least 60 trees per acre and no treatment of the trees immediately adjacent to streams would also provide some undersized material for potential recruitment to the stream network. The stands are heavily overstocked at present. For the existing trees to reach a size where they can function as LWD, compensatory mortality of existing trees will have to occur to provide the rearing space for the remaining trees to reach an adequate size. This natural mortality process can be quite slow and can take an extended period of time. By the time the remaining trees reach a size to function as LWD the stocking levels will have to be significantly reduced. Thinning can expedite this natural pruning process allowing trees to reach a functional size significantly sooner than if left unthinned. Most of the treated stands encompass only intermittent streams, and no mechanism exits to transport LWD from these areas to fish habitat. Those stands near or adjacent to fish habitat generally have wider no cut buffers due to other site related conditions. Since no trees that meet LWD criteria would be removed, and no cut buffers exist along all stream channels, this project should not have any significant effect on the supply of LWD in the basin.

Substrate – The WA determined that substrate was either at risk or not properly functioning in the watershed. The primary factor influencing this indicator is the lack of LWD to create the structures needed to develop a normal substrate regime. Since the proposed project would have no significant effect on the LWD supply or change hydrologic regimes in the basin it should have minimal effect on stream substrate.

Stream Structure – The WA determined that substrate was either at risk or not properly functioning in the watershed. The primary factor influencing this indicator is the lack of LWD to create the structures needed to develop a normal substrate regime. Since the proposed project would have no significant effect on the LWD supply or change hydrologic regimes in the basin it should have minimal effect on stream substrate.

Access - The project would not add any new barriers to fish passage in the basin. It also proposes to replace one fish passage barrier as a condition of the project and identifies three more barriers to be replaced as funds are identified. Thus, this project can be considered to improve fish passage in the basin.

Alternative 3 No New Temporary Roads
Effects if this alternative would be similar to the effects of the proposed actions due to the similarity of the actions. If anything the effects would be less due to the smaller amount of road activity. The lack of road building eliminates any possibility of mobilizing sediment from construction activities. This alternative would move the area towards Late Successional characteristics, but at a slower rate due to the smaller acreage thinned.

Table 3-12: Timber sale activities from 1997 to 2003 on federal lands in the 5th field watersheds affected by the Little Nestucca Project.

Timber Sale Name	Type of Harvest [1]	Year Implemented	Area Treated (Acres)	Total New Road Construction (Miles)[2]	New Permanent Road Construction (Miles)	Existing Road Decommission (Miles) [3]	Existing Roads, Drainage Improved &/or Road Rocked (Miles) [4]
Gauldy	Thin	2006-Present	388	0.5	0	6.8	7

[1] Commercial Thin, Density Management
[2] Total for temporary, and permanent roads
[3] [4] Include only improvements to existing roads which will remain after the timber sale

Direct/Indirect Effects on Essential Fish Habitat
The Magnuson–Stevens Act designated Essential Fish Habitat for coastal coho and Chinook populations. The project is designed to minimize adverse impacts on this designated habitat. The removal/replacement of culverts in the basin and timber haul will generate some sediment that could result in short term minor adverse effects to EFH. The design Criteria and Mitigations would minimize adverse effects on EFH habitat. The long term effect of the project would be an improvement to EFH habitat by restoring more natural hydrologic processes in the basin and restoring fish passage to currently blocked habitat.

Cumulative Effects
All of the species discussed are salmonids and have similar habitat requirements. This project proposes to thin 2,848 acres in a watershed of 40,760 acres. Table 3-12 shows other Forest Service activities in the watershed. The Forest Service owns 46 percent of the watershed. Since the Forest Service is only conducting thinning sales for habitat enhancement, the low impact of this type of activity should result in minimal cumulative effects. Previous thinning projects in other sections of the watershed will also facilitate obtaining Late Successional Reserve objectives.

Other Activities on National Forest System Land-- The other foreseeable routine actions, which may include noxious weed control, road maintenance, administrative road use, public recreational use, and

small forest products gathering. These activities do not involve the use of heavy equipment other than on existing road surfaces. Based on the types and extent of these uses in the Little Nestucca Project Area, no detrimental soil disturbance is anticipated.

State, BLM and Private Land---The activities on these land ownerships are difficult to quantify. Most of the private land management in the watershed consists of removing forest product, primarily by clearcutting. These actions are guided by the Oregon Forest Protection Act. This act requires streams to be buffered. However, the conifer stands on private land are managed for short rotations, so the development of large conifer trees does not occur. The BLM manages the land similar to the Forest Service.

Heritage

The following information is summarized from the *Pre-project Heritage Resource Inventory of Little Nestucca Project, January, 2007* report. For the proposed commercial thinning, and under planting, no cultural or historic sites were found in the commercial thin units by surveys conducted in 2007. Surveys for road stabilization or new construction, are not needed because the sites have been previously disturbed.

Project implementation would cease if any cultural resource sites were located. Documentation, evaluation, and consultation with the Oregon State Historic Preservation Officer (SHPO) would be required for the archaeological property before ground-disturbing activities would be allowed to proceed in the Project Area.

Economics

An analysis for the logging cost and some road work has been completed for this sale. The harvest acres and volumes used for this analysis are from the silviculture report. Log costs were calculated with the use of the program log cost 7.1 and referred to past studies. The information is a summary of the *Little Nestucca Economic Analysis, December, 2006*. For the commercial harvest, three harvest systems are planned: Skyline, ground based systems and helicopter. In general, ground based system harvesting is the most cost efficient.

Assumptions made for this analysis:
New Spur roads cost to build – $3.20 per foot.
Existing roads cost to reopen - $1.50 per foot.
Helicopter log landings cost – $450 per landing.
Helicopter service landings cost - $600 per landing.

There are 9855 feet of new temp spurs measured so $3.20 * 9855 ft = $ 31,536.
Existing roads to reopen 57820 feet at a cost of $86,730.
These spurs at 15 feet wide will affect about 3.5 acres. This does not account for landings.
Landings plan to be 60 by 40 feet or 2,400 sq feet or .05 acres for each landing.
Helicopter log landings 10 at $450 per landing or $4,500.
Helicopter service landings 5 at $600 per landing or $3,000.
Plan for harvest a total of 39,805 MBF.
Roads and landing cost will be $125,766.

Results of Logcost 7.1 runs.
There are several yarding methods being analyzed to log the entire sale.
Skyline logging at $191.91 per mbf.
Ground-base logging at $110 per mbf.
Past sold sales have sold for $212.76.
Past studies show for skyline logging a cost for stump to truck of $140 per mbf, for ground based logging a cost for stump to truck of $90.18 per mbf.

Using the study numbers the results are:
The skyline stump to truck costs are, 36229mbf x $140 stump to truck or $5,072,060.
The ground base stump to truck costs are, $1,495mbf x $90.18 or $134,819.
Helicopter stump to truck costs are, $325mbf x $2,081 or $676,325

$5,883,204 (stump to truck costs) x $212.76 (average past sales value) = $8,468,912 (Total value).

Alternative 1
No revenues would be generated to fund programs such as forest road maintenance, watershed enhancement projects. Approximately 36 MMBF (million board feet) of timber, in need of thinning, would be unavailable to aid in meeting the public demand for wood products. In addition, loss of potential growth by not treating these forest stands would contribute to a future loss of federal timber receipts.

Action Alternatives (Alternatives 2 & 3)
Alternative 2 would commercially thin about 2,848 acres and alternative 3 would commercially thin about 2,580 acres and yield approximately $8,468,912.00 gross revenue. The estimated total costs are $6,008,970.00 for alternative 3. The estimated net gain of $2,459,942.00 could be used for other watershed enhancement projects, road closures and NFS road improvements. The economy of the local area would also benefit by opportunities for employment.

Air Quality
Smoke emissions from slash burning would result in short term effects to visibility within the immediate proximity of the piles and to a lesser degree down wind. Initially smoke would be lofted up by convective heat and be transported out of the area by wind currents. The effects of these emissions would depend largely on transport winds and mixing heights. These factors are analyzed daily and approvals to and burning instruction are issued by the Salem Smoke Management Office.

All burning actives would adhere to the requirements of the Federal Clean Air Act for the Prevention of Significant Deterioration and comply with the Nation Ambient Air Quality Standards, and visibility protection. Smoke production would not exceed PM10 emissions level described in the State Implementation Plan of the Oregon Smoke Management Plan.

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

Alternative 1 will not directly generate smoke in the area. For both action alternatives, thinning the stands would generate slash, increasing the fuels and the risk of fire hazard from the fuels in the short-

term (1 to 2 years). Prescribed fire methods would be used to reduce the risk of fire hazards from these fuels. Burning the slash would generate smoke, causing short term effects to air quality such as a hazy atmosphere, low visibility, and a smoky smell in the area; however, wind and other atmospheric conditions dissipate the smoke within 1 to 2 days. All prescribed burning operations would comply with Oregon Smoke Management Guidelines. Impacts to downwind residents and communities will be evaluated and minimized on burn days. Burning hand and machine piles will take place when atmospheric conditions are optimal for smoke dispersion, usually in the late fall or winter.

Recreation

Introduction

For discussion purposes, recreation is divided into three categories: Developed, Dispersed and Wilderness/Roadless. Developed recreation examples are campgrounds, trails and trailheads, ski areas etc. Dispersed recreation includes those numerous activities that occur outside developed recreation sites. Examples are camping outside developed campgrounds, sightseeing, rock climbing, hunting, fishing, gathering special forest products etc. Wilderness areas are areas set aside by Congressional action. These areas are typically large primitive areas with limited access. Dispersed recreation activities can occur in these areas. Most do not have developed facilities within them. Roadless Areas may contain wilderness characteristics, but have not been officially designated by Congress. Typically, they are a Management Area in Forest Plans. The Forest Plan determines whether these areas should be recommended for wilderness designation. In the Little Nestucca Project Area there are no developed recreation sites, Wilderness or Roadless Areas. The characteristics of the Project Area were reviewed during the various Roadless Area reviews and determined not to have the characteristics of Roadless Areas. No developed recreation sites are planned for this Area.

Existing Condition and Trends

Paved state and county roads provide access to the Little Nestucca Project Area. This makes the Area relatively easy to access by a variety of vehicles.

The factors that affect recreational use in the area are weather, condition of roads, and the type of activity. Types of activities include a variety of dispersed recreation activities. Presently, the existing open Forest road system makes about thirty percent of the area accessible for dispersed recreation activities. This estimate assumes that most activities are restricted to within an average of 200 feet of the roads, due to the steep, brushy terrain that limits cross-country or off road travel.

The amount of use and quality of the recreation experience is difficult to quantify, because of the variety uses that occur in the area. However, several patterns are evident:

- Most of the use occurs during the summer and fall months. Dispersed camping occurs on or along most of the open Forest roads.
- The conditions, maintenance and location of the roads greatly influences dispersed recreational uses. The relatively good condition of the Key NFS roads allows a variety of vehicles to use them. The Maintenance Level 2 and those Maintenance Level 1 roads that are not closed are, generally, only passable by two and 4-wheel drive high clearance vehicles. ATVs and motorcycles can use most of the open roads in the area. The extensive road system and its condition provide the opportunity for people to find some solitude.

- Climate and terrain influence the conditions of the roads in the area. Due to high amounts of rainfall, steep slopes with unstable soils, requirements to protect aquatic and wildlife resources, and rapid growth of vegetation the roads need regular maintenance.
- The demand for recreational opportunities is expected to increase an estimated 1 to 2 percent per year on the Siuslaw National Forest. Exactly how much this affects the Little Nestucca Project Area is not quantifiable.

Direct and Indirect Effects
The amount and kinds of recreational uses that may occur in the Project Area is directly related to the amount and condition of the NFS roads.

Alternative 1 No Action
In this alternative, NFS roads would be maintained as available funds allow. It is expected that some of the roads would close due to rapid vegetation growth as there is not enough funds to maintain all of the drivable NFS roads in the Project Area. The Key NFS roads should receive some maintenance, but there may not be sufficient funds to maintain them to existing condition in the long term. As roads become closed some recreational opportunities would be reduced. Exactly how much is not quantifiable because it is impossible to determine which roads would close or to what extent, and what influence this would have.

Action Alternatives (Alternatives 2& 3)
The effects of these alternatives are about the same as the No Action alternative. Traffic associated with treatment activities would conflict with recreational vehicle traffic. However, there would likely be a slight improvement in the condition of those NFS roads used for timber haul, as some of the funding from the commercial sale(s) would be used to maintain these roads. Additional funds may be available from these sale(s) to make slight improvements in these roads. These improvements may include replacing old culverts, cleaning drainage ditches, and resurfacing some of the gravel travel surfaces.

Cumulative Effects
The cumulative effect on recreation over time depends how many drivable NFS roads become closed. It is expected that the amount of drivable NFS roads would decrease over time. Exact amount of this decrease or its total effects are difficult to quantify as it is uncertain which roads would become closed.

Fire and Fuels
The following information is summarized from the *Fire and Fuels report for the Little Nestucca*, *January, 2007*. This report is located in the Little Nestucca Project analysis file. The fire occurrence in the sale area is relatively low, but the potential for a very damaging wildfire does exist when conditions are right. The highest potential for ignition is the human factor, for example fires are more likely to be started by recreational users of the forest, commercial activity, and arson. Most if not all lightning is accompanied by a significant amount of rainfall, sufficient to reduce the probability of wildfire ignition.

Direct and Indirect Effects
Alternative 1 No Action
In this alternative no thinning would be done. The closure, over time, of some of the NFS roads may hinder fire management and suppression actions if there is a fire.

Alternative 2 Proposed Action
Thinning in the managed stands would result in an increase of fuels on the forest floor from the harvest activities. The fuels are expected to decay over time, decreasing the risk of wildfires. Past thinnings have had a window of three to four years in which the stand is capable of supporting a surface fire. The expected amount of logging slash and coarse woody debris created would be low to moderate.

Typically, thinning slash levels are sufficient to support a surface fire for several years following harvest. In addition, with the reduced overhead canopy the brush is likely to increase growth, which adds to the live fuel loading. Similarly, as the canopy is opened up, dead fuels, duff, and surface vegetation would be dried out, lowering the fuel moisture and increasing the flammability.

Fire behavior coming from these types of fuel loadings under dry late summer time conditions, would put off fireline intensities and flame lengths that would most likely be beyond the capability of direct attack by initial attack resources.

Since human caused fires are the primary ignition source in the sale area the main travel routes (secondary low clearance) would be the focus for hazard abatement. There are three of these roads through the project area which will require a 50 foot fuel break. Units adjacent to FSR 1200, 2234, and 2281 will require a 50 foot fuel break. The units adjacent to secondary high clearance roads will require a 33 foot fuel break. These will be units along FSR 1633, 1280, and 2280. In some instances where travel routes have activity fuels on both sides of the road, the fuel breaks will also be needed on both sides of the road. These fuel breaks will be accomplished by hand or machine piling.

Prescribed fire plans are prepared for all burning activities. The plans are designed to ensure that resource and fire management objectives are met by setting parameters under which the burning may take place. Prescribed burning would be conducted in a manner that would minimize damage to reserve trees, duff, and soil, and to avoid loss of large, coarse woody debris.

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 and shrubs. 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 re-burning or becoming an escaped fire. The timing of prescribed burns depends on these parameters and the availability of adequate fire suppression resources as a contingency plan in the event of an escaped fire.

Alternative 3 No New Temporary Roads
In this alternative about 221 acres would not be thinned. Therefore, the effect of this alternative is some what less than the Proposed Action alternative.

Cumulative Effect
The highest risk of an unplanned ignition would occur when the thinning slash is present near drivable NFS roads. The highest risk would occur if all the units were thinned in the same year or two.

However, this is not the case. These thinnings are planned to occur over a 5 year period which lessen the risk over time. Also, the risk is reduced further by piling and burning the slash along these NFS roads. The cumulative effect of the NFS roads closing over time is not quantifiable.

Expected fire intensity is likely to be higher as the fuel loading is increased. As a result, cumulative impacts to other resources would also increase with higher fire intensities. There could be damage to soils by burning off nutrients and organic matter, which would increase the potential for overland flow. The severity of the damage is directly linked to the intensity of the fire.

Accomplishing activity fuel treatment projects in the units adjacent to major travel routes would reduce the threat to wildfire as would additional fire prevention, warning signs, and a higher emphasis during fire watch and patrolling while interacting with the public.

Environmental Justice

The action alternatives were assessed to determine if there would be a disproportionately impact to minority or low income populations, in accordance with Executive Order 12898. The area that may be influenced by the proposed activities is Tillamook County, Oregon. Based upon census information from the State, Native Americans are the only minority group in these counties whose population level is higher than the state average. They were contacted about the proposed activity during the scoping process. They did not comment on the project. Since these activities are small in size and duration, it appears that Native Americans would not be adversely affected.

The poverty level in Tillamook County, based upon State information, is above the state average. This means the number of families in the county that have incomes below the state's poverty level is higher than the state's average. These activities if done may provide some employment to these families. However, the effects would be temporary, because these activities are small in size and duration.

Unavoidable Adverse Effects

Implementation of any alternatives may result in some adverse environmental effects. The severity of the effects can be minimized by adhering to the Design Criteria listed in Chapter 2, Forest Plan Standards and Guidelines and Best Management Practices. If management activities occur, however, some effects cannot be avoided. Even the No Action alternative has effects.

Cultural Resources

There is no assurance that every cultural resource site would be located in advance of all planned management activities. Some ground-disturbing activity may affect an undiscovered historic or prehistoric site. Sites discovered in this manner would be immediately protected from further disturbance.

Wildlife

Some disturbance may occur due to activities occurring during the murrelet and spotted owl nesting seasons. The continual use of open NFS roads may disturb some wildlife species. The quantity and quality of late-successional habitat may be reduced due to delayed development and/or no change in stand structure of those young managed stands that are not treated.

Air Quality

Temporary seasonal effects on air quality are unavoidable under any of the action alternatives, due to dust from traffic associated with them and smoke from burning slash piles. These effects would be temporary.

Soil Resources
Under the action alternatives, some soil displacement and compaction is expected due to road stabilization, temporary road construction, hauling logs on roads, maintenance of open NFS roads and ground based equipment.

Relationship between Short-Term Use and Long-Term Productivity

Short-term uses are those uses that generally occur annually. Long-term productivity refers to the ability of the land to produce a continuous supply of a resource.

Soil Resources
As described in the Soil Resource section of this chapter, proposed activities would result in a decrease in long-term soil productivity for areas where soil is compacted or heavily disturbed. Over time productivity is expected to increase as compaction is reduced and stand treatments improve vegetation growth.

Water Quality
The results of effects analysis indicates that stream channel conditions are expected to be protected, and quality is not expected to be impacted by proposed activities. Short-term effects may occur as described in the Water Quality section of this chapter, however no long term impacts are expected, and the trend on NFS land over time is expected to improve.

Wildlife
Short term - Disturbance of nesting, and/or fledging murrelets and/or spotted owls by commercial thin activities may occur for approximately 10 years once operations begin.
Long term - Development of late-successional habitat should improve murrelet and spotted owl habitat. If the young managed stands are not treated, late-successional "productivity" would be delayed and may not occur.

Vegetation
Harvest of timber would reduce snag and down recruitment in the smaller size classes for several decades in return for speeding up recruitment in the larger size classes and the potential for these stands to be occupied by the northern spotted owl and murrelets sooner.

Irreversible and Irretrievable Commitments of Resources

An irreversible commitment of resources refers to the loss of production or use of a resource due to a land use decision that once executed cannot be changed. An irretrievable commitment of resources applies to losses of production or use of renewable resources for a period of time.

Soil Productivity
Soil compaction and erosion caused by road building and by timber ground based harvest operations could reduce soil productivity. The time lost in this state of lower productivity is irretrievable, but the

soil resource can be rebuilt over long periods of time. None of the alternatives would result in an irreversible commitment of this resource.

Vegetation
Timber harvest would change plant succession, stand development, and species composition. If some of the stands are not treated, the time lost for them to develop late-successional characteristics is irretrievable. If the stands are damaged or destroyed, the time lost for replacement is irretrievable.

Cultural Resources
Any activity that disturbs a cultural resource may be an irreversible and usually irretrievable commitment of these resources.

Other Disclosures

- 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.
- 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.
- The proposed project is not in or adjacent to an inventoried roadless area.
- 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, 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.

Chapter 4 Agencies and Persons Consulted

Introduction

As described in chapter 1, public 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 consultations are summarized below.

Federal Agencies

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 Northern bald eagle, Northern spotted owl, or marbled murrelet (FWS references: 1-7-05-F-0005 and 1-7-05-F-0664).

NOAA Fisheries

NOAA Fisheries is responsible for aquatic species listed under the Endangered Species Act. No listed species occur within the project area. The Hebo district fish biologist did talk with NOAA about the project.

Local Confederated Tribes

The Confederated Tribes of Siletz, and the Confederated Tribes of the Grand Ronde Community were informed of the Project's proposed actions during the initial public-notification process. No comments on the proposed actions 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, and Oregon Department of Fish and Wildlife were notified about the proposed project. No comments were received.

Local Governments

County soil and water districts; were notified, with one positive response.

Watershed Councils

Members of the Nestucca/Neskowin watershed council were notified. The project was discussed during a meeting in the Fall of 2005. Project support was expressed by the group.

List of Preparers

Forest Service Interdisciplinary Team

Nathan Pearson	Hebo RD, Siuslaw NF	Fuels/Fire Management
Janet Moser	Hebo RD, Siuslaw NF	Wildlife/Team Leader/EA Writer
Barb Ellis-Sugai	Hebo RD, Siuslaw NF	Soils/Hydrology
Wayne Patterson	Hebo RD, Siuslaw NF	Silviculture
Dan Johnson	Hebo RD, Siuslaw NF	Logging Systems/Economics
John Casteel	Hebo RD, Siuslaw NF	Fisheries
Doug Shank	Sweet Home RD, Willamette NF	Soils/Geology
Ken McCall	Supervisor Office, Siuslaw NF	Transportation Planner
Maurice Jeffries	Hebo RD, Siuslaw NF	Sale Administrator/Heritage
Martin Stein	South Zone, Siuslaw NF	Botanist

Additional support and review provided by:

Frank Davis	Supervisor Office, Siuslaw NF	NEPA Coordinator
Pat Babcock	Supervisor Office, Siuslaw NF	Sale appraisals

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Appendix A: Public Comments to Scoping Document Summary Table

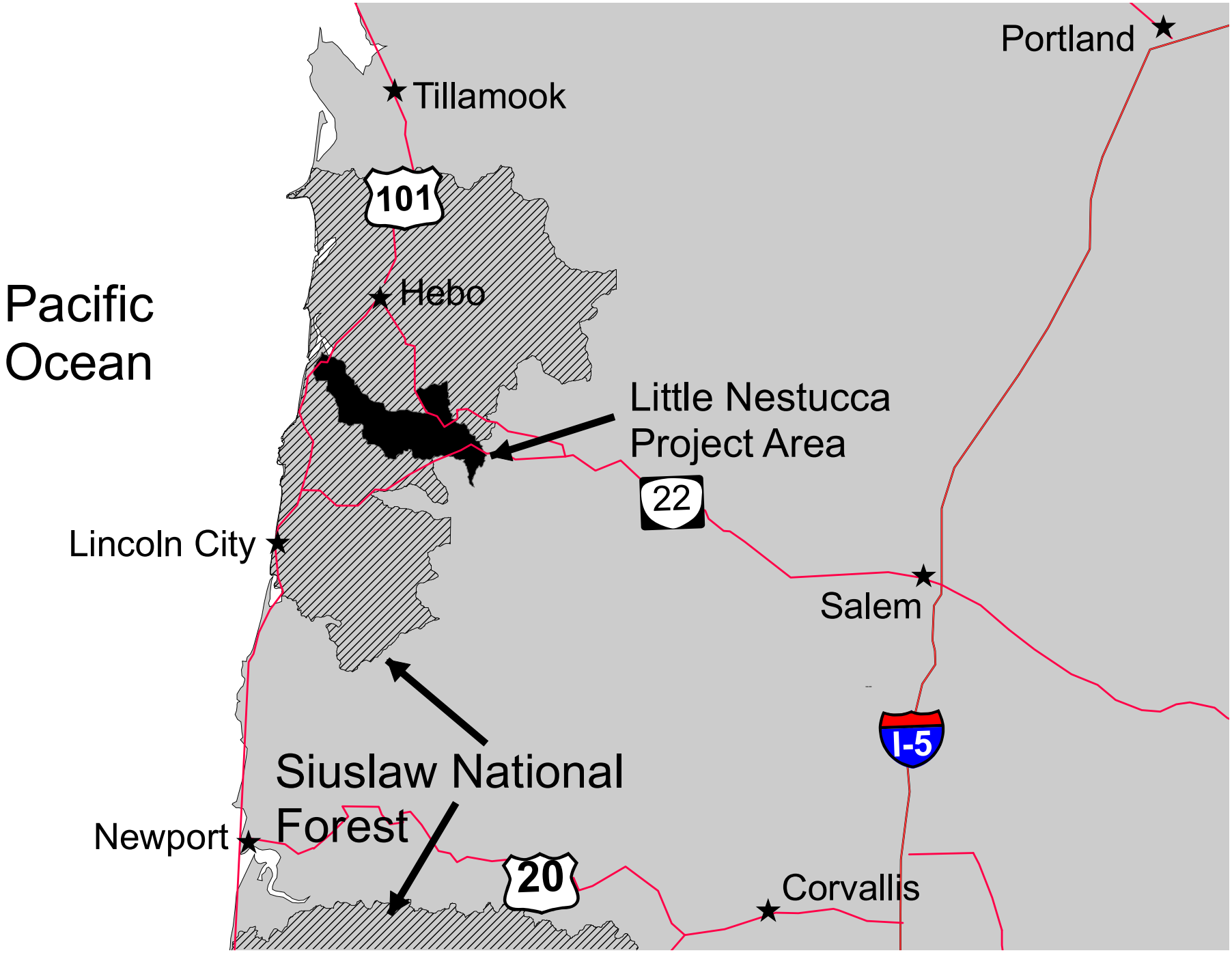
Project Name: Little Nestucca

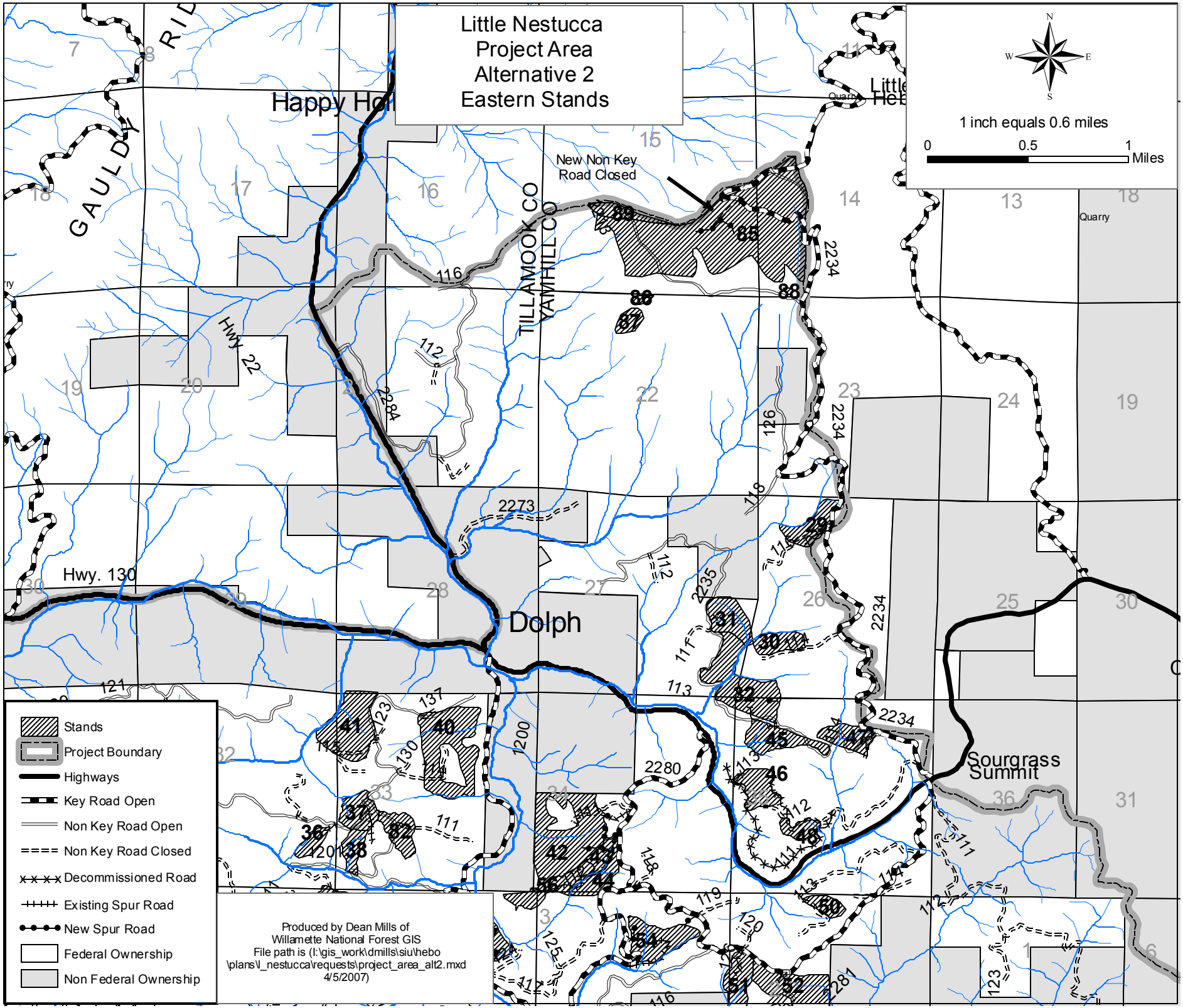
Name/Address	Disposition of Comments	
Letter No. 1 Marlon Fessler & Lee Sliman 48005 Little Nestucca River Road, Cloverdake, OR 97112	Concern about increasing traffic on Rd 1650. Would like to have road gated and decommissioned when project is completed.	Not a significant issue. Road 1650 is scheduled to be put into Maintenance Level 1 when Project is completed.
Phone Call- #2 Kernville Gleneden Beach-Lincoln Beach Water District Mark Snyder, Superintendent Gleneden Beach, OR 97388 Ph: (541) 764-2475 Ph: (541) 764-2459	Mr. Syder stated that although the water district had no lands in the project area he thanked the Ranger District for the information on Little Nestucca Thin	Not a significant issue. This is a comment.

Letter #3 Oregon Wild P.O. Box 11648 Eugene, OR 97440 Ph: 541-344-0675 Fax: 541-343.0996	1. **Thinning**: In general OW supports thinning that enhances forest health. In Late Successional Reserves we support variable density thinning of these young stands if there is no road construction.	Alternative 3 in the Little Nestucca EA proposes no new road construction. Variable density thinning prescriptions are utilized throughout the project.
	2. In young stands in Riparian Reserves, we support thinning activities that enhance the development of trees to shade streams or become sources of coarse woody debris, as long as these activities do not result in yarding corridors, roads or other yarding activities impacting water quality and aquatic habitat.	Not a significant issue. Project designed so there would be minimal effects to water and aquatic habitat.
	3. If the off-site plantations are in an LSR, trees over 80 years old can't be harvested. Do you plan on cutting and leaving the trees or using as CWD. Please explain your plans for these units more explicitly.	Hebo RD falls within the Northern Coast AMA which allows trees up to 110 years old to be harvested within an LSR.
	4. **Roads**: Please disclose where new temp roads will be built. The EA must clearly state whether any roads are proposed for construction or reconstruction within Riparian Reserves, and which (if any) will require stream crossing(s).	Not a significant issue. This is a comment. EA will address concern.
	5. Should do an analysis that illustrates how many acres of thinning are reached by each road segment. In the EA, please provide a stand by stand description of the road spur lengths and the acres each spur accesses.	Not a significant issue. This is a comment. EA will address concern.

Letter #3(cont) Oregon Wild P.O. Box 11648 Eugene, OR 97440 Ph: 541-344-0675 Fax: 541-343.0996	6. **Roadless Areas**: Avoid timber harvest, roads, mining, development and motorized recreation in roadless areas $\geq$ 1000 acres or any roadless area adjacent to existing wilderness or parks and all inventoried roadless areas. The EA should disclose any impacts to roadless areas and roadless values that might be degraded.	Not a significant issue. There are no inventoried roadless areas in or adjacent to the project area.
	7. **Water Quality:** Project analysis should separately discuss each of the Aquatic Conservation Strategy objectives. Any commercial harvest activities or road construction in key watersheds or municipal watersheds should be avoided in order to protect water quality.	Not a significant issue. Meeting ACS objectives is determined at the watershed scale not project scale. Mitigations would be included in the EA to protect riparian areas.
	8. **Fish & wildlife**: Special status species surveys must be completed prior to developing NEPA alternatives and before the decision is determined. On-the-ground field reconnaissance surveys must be done and used to develop NEPA alternatives.	Not an significant issue. Assume presence. Field surveys have been conducted for Red Tree Voles. Design project to mitigate.
	9. **NEPA Documentation**: a full range of action alternatives should be considered for this sale. An alternative that avoids new road construction should be developed. In addition, using thinned 100 year old trees for CWD placement in plantation stands and in-stream projects should be considered.	Not a significant issue. This is a comment. EA will include a full range of reasonable alternatives. Alternative 3 in the Little Nestucca EA proposes no new road construction.

Little Nestucca Project Area
Vicinity Map

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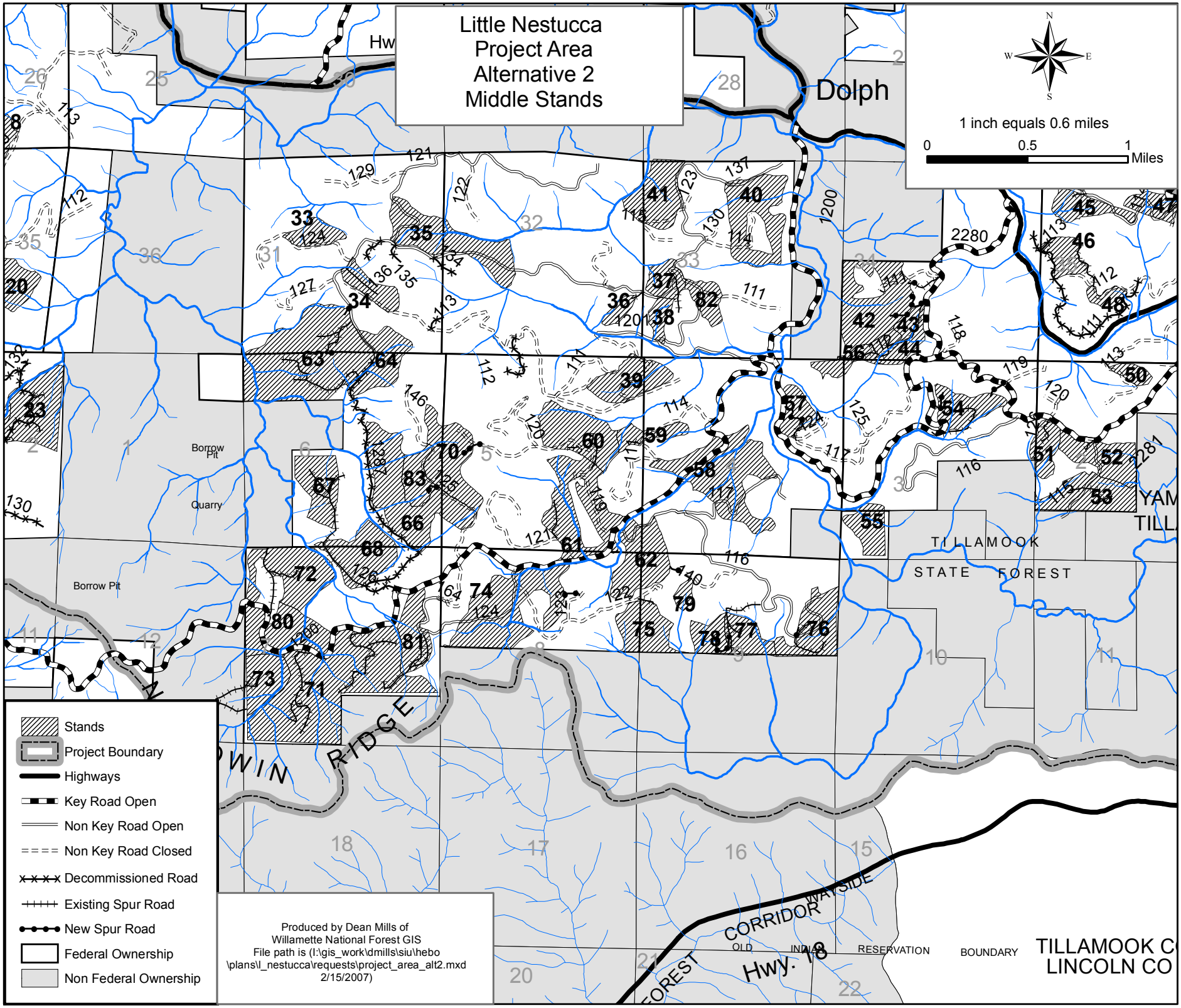
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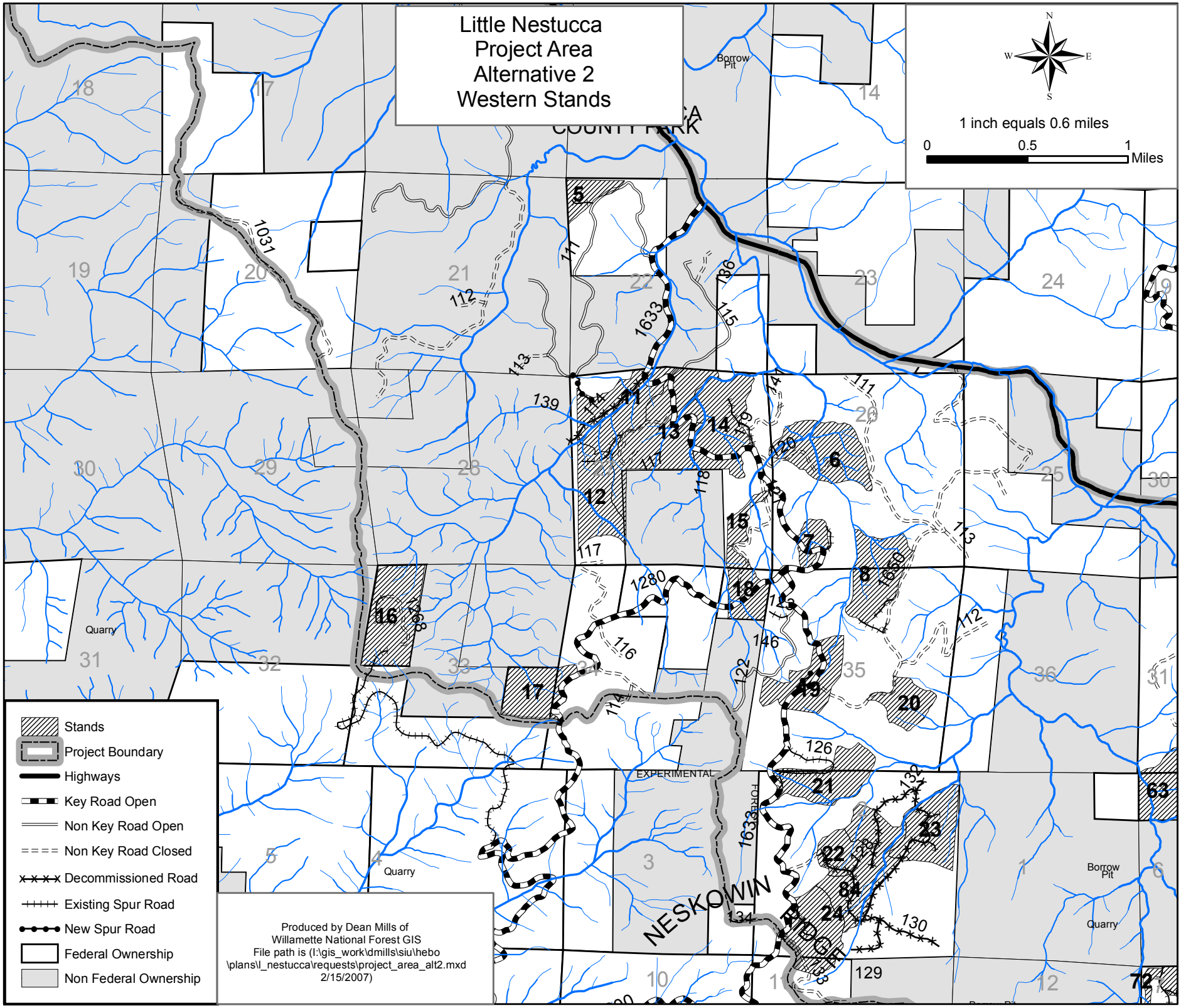
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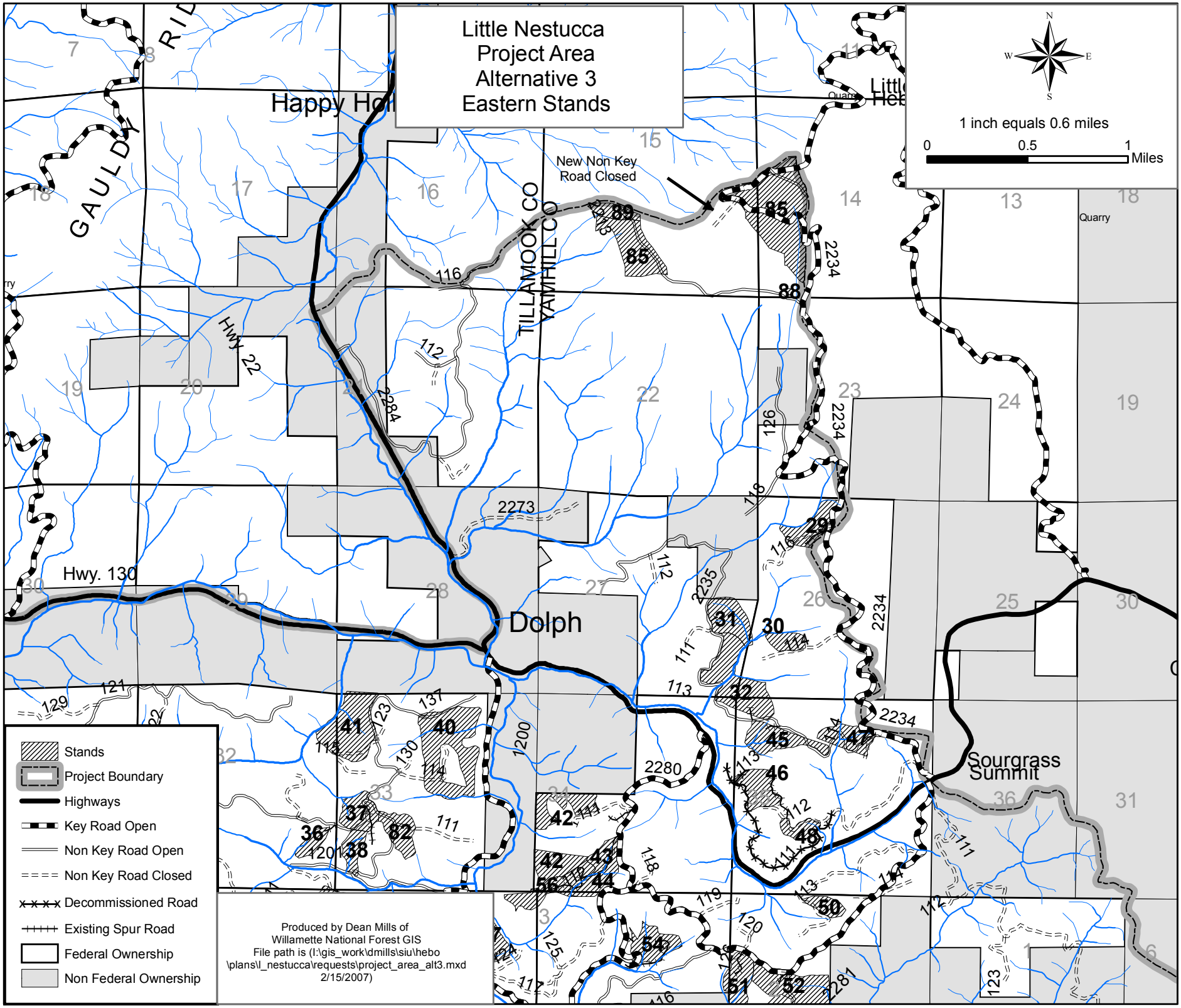
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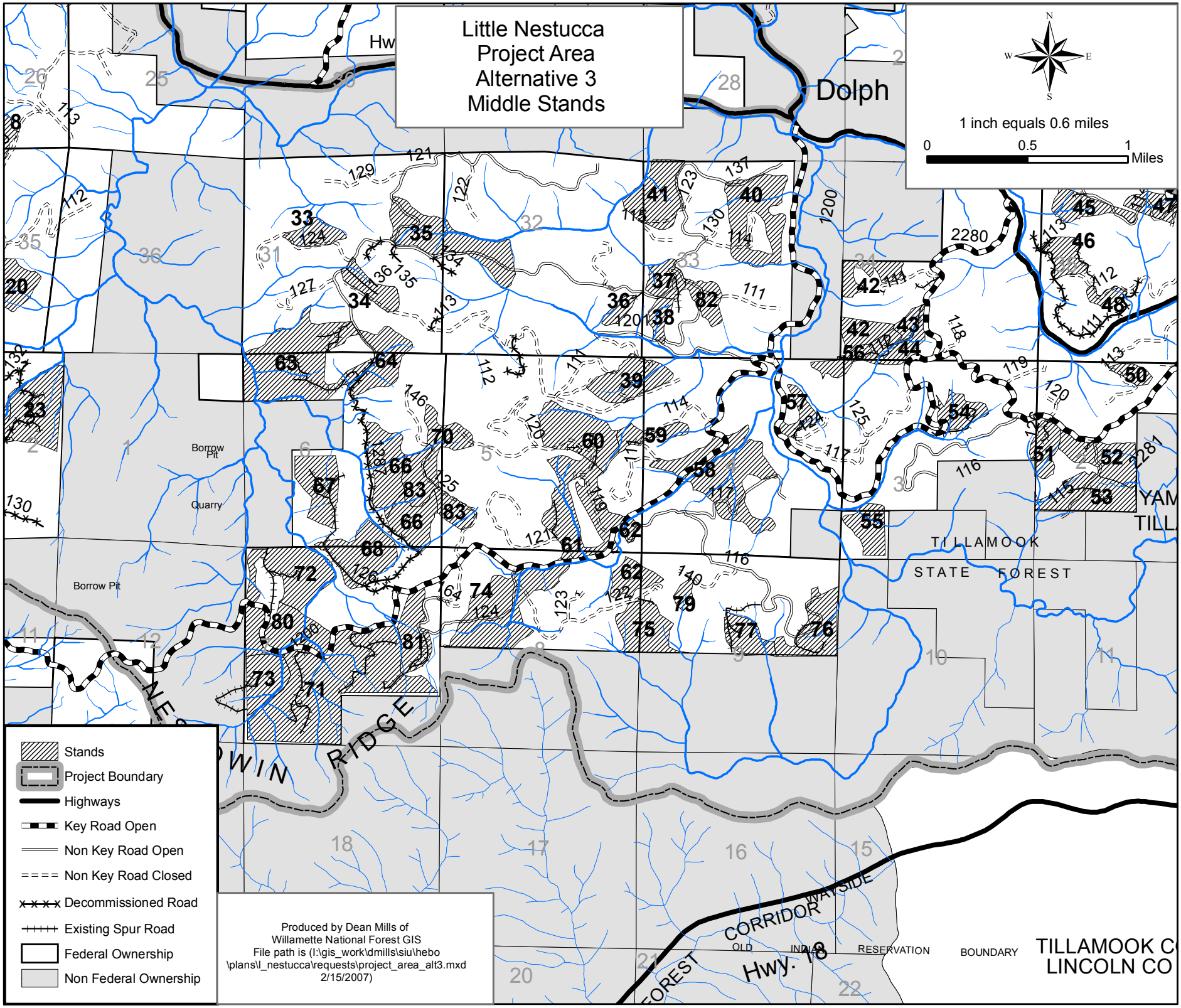
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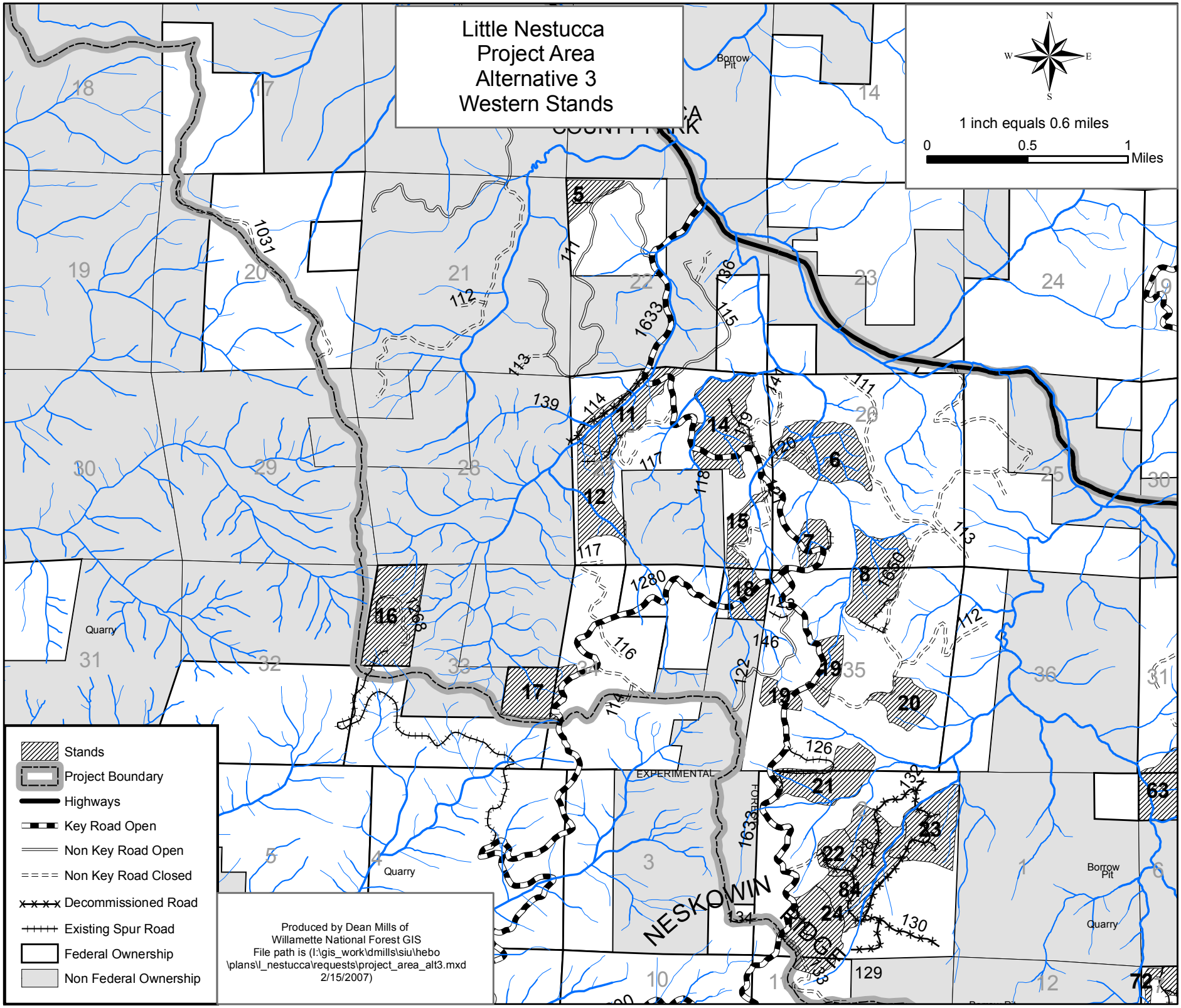
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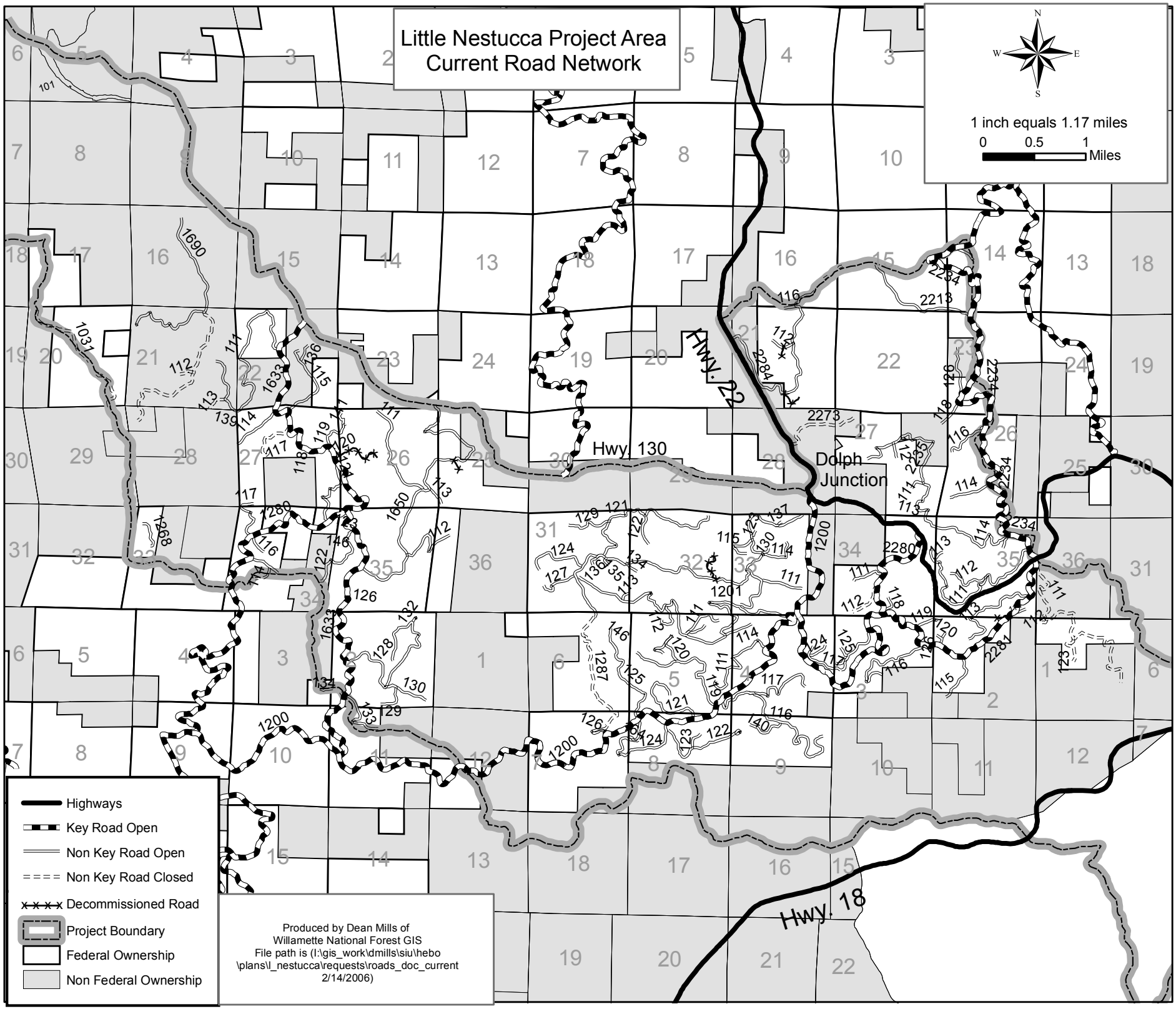
Little Nestucca Project Area
Current Road Network
N
W
E
S
1 inch equals 1.17 miles
0 0.5 1
Miles
Hwy. 22
Hwy. 130
Dolph Junction
Hwy. 18
Highways
Key Road Open
Non Key Road Open
Non Key Road Closed
Decommissioned Road
Project Boundary
Federal Ownership
Non Federal Ownership
Produced by Dean Mills of
Willamette National Forest GIS
File path is (I:\gis_work\dmills\siu\hebo
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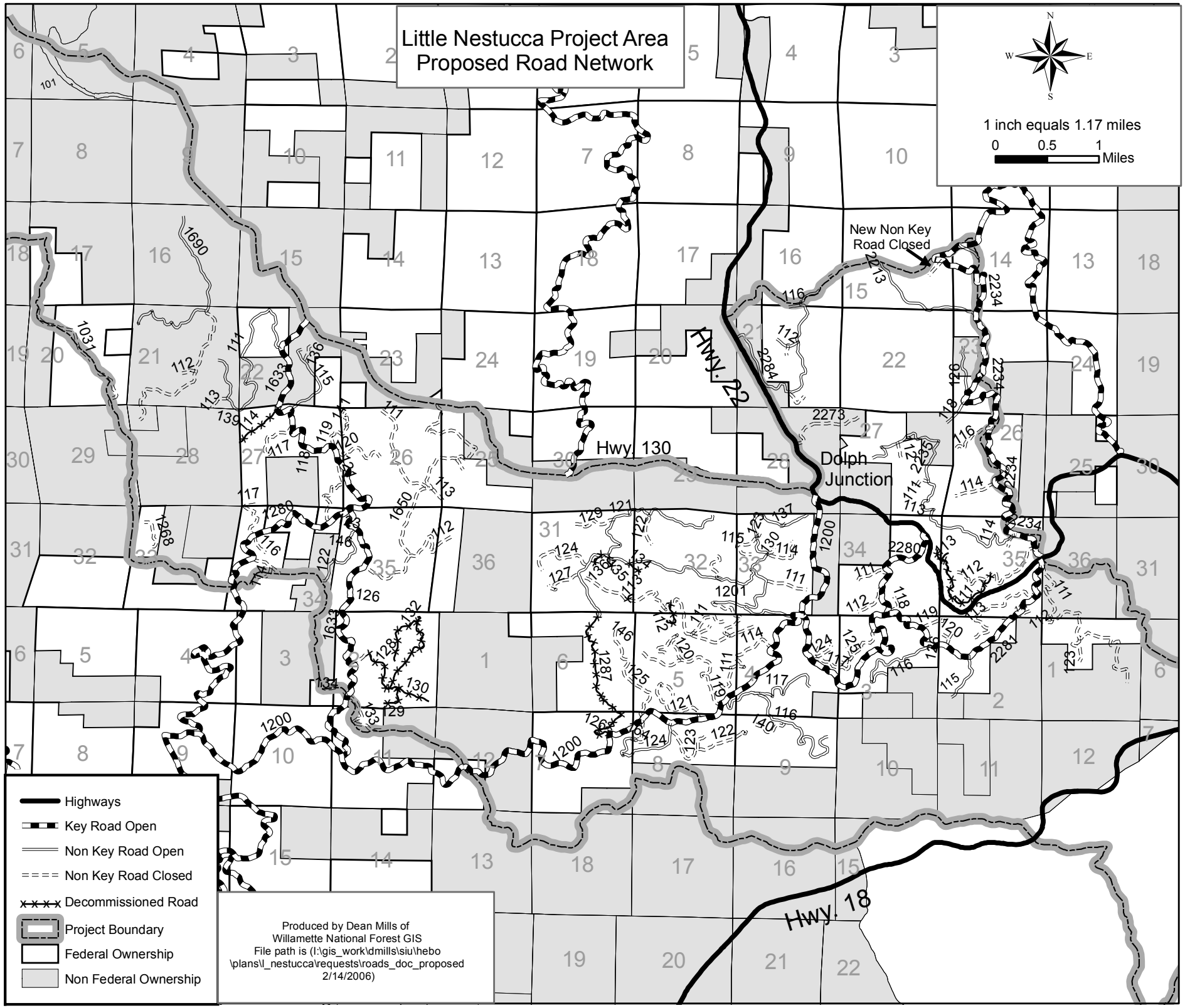
Little Nestucca Project Area
Proposed Road Network
N
W
E
S
1 inch equals 1.17 miles
0 0.5 1
Miles
New Non Key
Road Closed
Hwy. 22
Hwy. 130
Dolph
Junction
Hwy. 18
Highways
Key Road Open
Non Key Road Open
Non Key Road Closed
Decommissioned Road
Project Boundary
Federal Ownership
Non Federal Ownership
Produced by Dean Mills of
Willamette National Forest GIS
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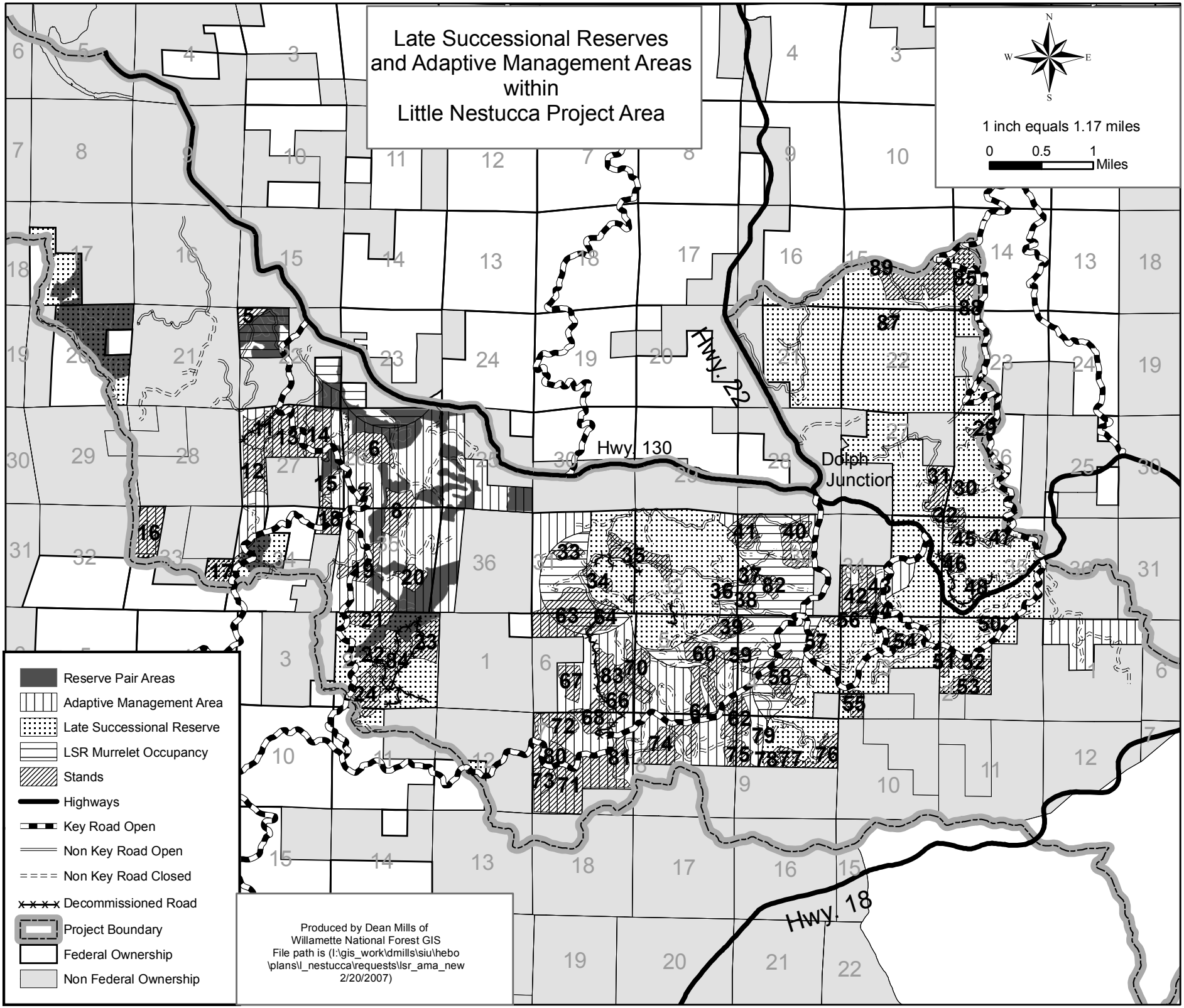
2/14/2006)


Late Successional Reserves
and Adaptive Management Areas
within
Little Nestucca Project Area
N
W
E
S
1 inch equals 1.17 miles
0 0.5 1
Miles
Hwy. 22
Hwy. 130
Dolph Junction
Hwy. 18
Reserve Pair Areas
Adaptive Management Area
Late Successional Reserve
LSR Murrelet Occupancy
Stands
Highways
Key Road Open
Non Key Road Open
Non Key Road Closed
Decommissioned Road
Project Boundary
Federal Ownership
Non Federal Ownership
Produced by Dean Mills of
Willamette National Forest GIS
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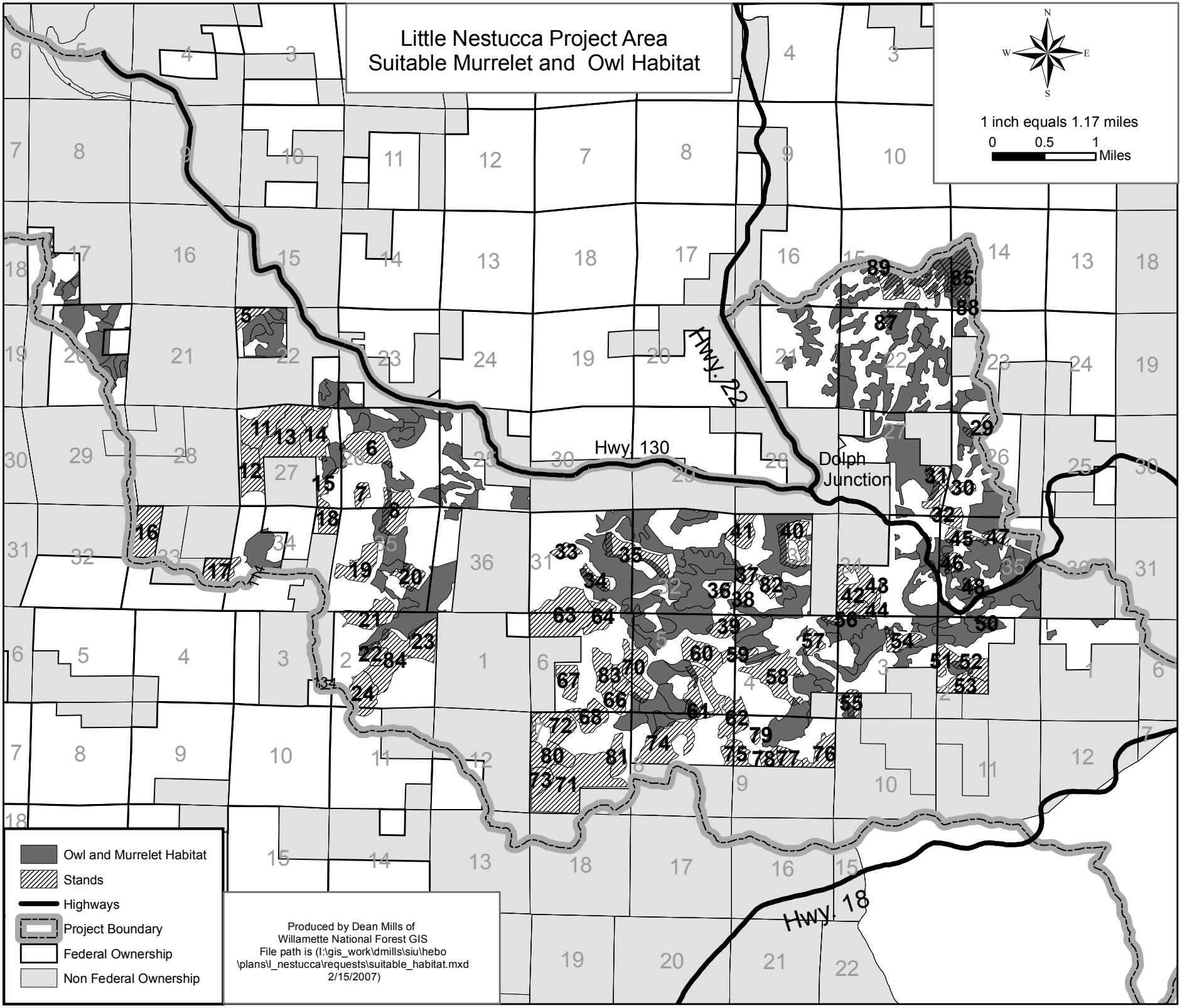
2/20/2007)


Little Nestucca Project Area
Suitable Murrelet and Owl Habitat
N
W
E
S
1 inch equals 1.17 miles
0 0.5 1
Miles
Hwy. 22
Hwy. 130
Dolph Junction
Hwy. 18
Owl and Murrelet Habitat
Stands
Highways
Project Boundary
Federal Ownership
Non Federal Ownership
Produced by Dean Mills of
Willamette National Forest GIS
File path is (I:\gis_work\dmills\siu\hebo
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2/15/2007)