



ECONOMIC ANALYSIS OF
CRITICAL HABITAT DESIGNATION
FOR THE NORTHERN SPOTTED
OWL

Final Report | November 20, 2012

prepared for:

U.S. Fish and Wildlife Service

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TABLE OF CONTENTS

LIST OF ACRONYMS AND ABBREVIATIONS

EXECUTIVE SUMMARY ES-1

CHAPTER 1 INTRODUCTION 1-1

- 1.1 Previous Federal Actions 1-2
- 1.2 Proposed Critical Habitat Designation 1-3
- 1.3 Economic Activities Considered in this Analysis 1-7
- 1.4 Organization of the Report 1-8

CHAPTER 2 FRAMEWORK FOR THE ANALYSIS 2-1

- 2.1 Background 2-2
- 2.2 Categories of Potential Economic Effects of Species Conservation 2-4
- 2.3 Analytic Framework and Scope of the Analysis 2-7
- 2.4 Sources of Information 2-15
- 2.5 Presentation of Results 2-15

CHAPTER 3 BACKGROUND 3-1

- 3.1 Timber Industry Trends 3-1
- 3.2 Forces Driving Timber Industry Trends 3-17
- 3.3 Background on Federal Land Payment Programs 3-19
- 3.4 Background on Ecological Forestry 3-23

CHAPTER 4 TIMBER IMPACTS - FEDERAL LANDS 4-1

- 4.1 Step 1 – Identify Federal Lands Proposed for Critical Habitat Designation 4-2
- 4.2 Step 2 – Identify Areas Where Potential Incremental Impacts May Occur 4-3
- 4.3 Step 3 – Evaluate the Geographic Distribution of Areas Where Potential Incremental Effects May Occur Across Critical Habitat Subunits 4-9
- 4.4 Step 4 – Quantify the Relative Magnitude of Potential Changes in Future Timber Harvest Volumes 4-16
- 4.5 Analytic Results 4-32
- 4.6 Additional Sensitivity Analysis 4-37

CHAPTER 5 TIMBER IMPACTS - STATE AND PRIVATE LANDS 5-1

- 5.1 Step 1 – Identify State and Private Acres Proposed for Designation 5-1
 - 5.2 Step 2 – Identify Acres Potentially Subject to Incremental Impacts 5-3
 - 5.3 Step 3 – Estimate the Relative Costs of Changes to Timber Harvest on Private Lands 5-29
 - 5.4 Key Sources of Uncertainty 5-31
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CHAPTER 6 REGIONAL IMPACTS 6-1

- 6.1 Socioeconomic Profiles of Subject Counties 6-1
- 6.2 Summary of Socioeconomic Analysis 6-8
- 6.3 Discussion of Potential Impacts of Critical Habitat 6-9
- 6.4 Key Sources of Uncertainty 6-11

CHAPTER 7 POTENTIAL ECONOMIC IMPACTS TO LINEAR PROJECTS 7-1

- 7.1 Existing Baseline Protections 7-1
- 7.2 Frequency of Future Linear Project Activity 7-4
- 7.3 Summary of Administrative Costs 7-11

CHAPTER 8 POTENTIAL ECONOMIC BENEFITS 8-1

- 8.1 Estimating Conservation Benefits 8-2
- 8.2 Qualitative Discussion of the Ancillary Benefits of Critical Habitat Designation for the Northern Spotted Owl 8-9
- 8.3 Discussion 8-13

REFERENCES R-1

APPENDIX A ADDITIONAL STATUTORY REQUIREMENTS A-1

- A.1 RFA/SBREFA Analysis A-1
- A.2 UMBRA Analysis A-10
- A.3 Federalism Implications A-10
- A.4 Potential Impacts to the Energy Industry A-11

APPENDIX B INCREMENTAL EFFECTS MEMORANDUM FOR THE ECONOMIC ANALYSIS OF THE PROPOSED RULE TO REVISE CRITICAL HABITAT FOR THE NORTHERN SPOTTED OWL B-1

APPENDIX C CONTACTS C-1

APPENDIX D SENSITIVITY OF RESULTS TO DISCOUNT RATE D-1

LIST OF ACRONYMS AND ABBREVIATIONS

BLM	Bureau of Land Management
BMP	Best Management Practices
CAL FIRE	California Department of Forestry and Fire Protection
CalTrans	California Department of Transportation
CEC	California Energy Commission
CEQA	California Environmental Quality Act
Corps	U.S. Army Corps of Engineers
CWA	Clean Water Act
DFW	Department of Fish and Wildlife
DNR	Department of Natural Resources
DOD	Department of Defense
DOTs	Departments of Transportation
EFSC	Energy Facility Siting Council
EFSEC	Energy Facility Site Evaluation Council
EIS	Environmental Impact Statement
EPA	Environmental Protection Agency
ESA or Act	Endangered Species Act
FERC	Federal Energy Regulatory Commission
HCPs	Habitat Conservation Plans
IE	Incremental Effects
ISC	Interagency Scientific Committee
ITP	Incidental Take Permit
LRMP	Land and Resource Management Plan
LSR	Late Successional Reserves
MBF	thousand board feet
MMBF	million board feet
NAICS	North American Industry Classification System
NEPA	National Environmental Policy Act
NPDES	National Pollution Discharge Elimination System

NPS	National Park Service
NSO or species	northern spotted owl (<i>Strix occidentalis caurina</i>)
NWFP	Northwest Forest Plan
ODOT	Oregon Department of Transportation
O&C	Oregon and California Land Grant
OMB	U.S. Office of Management and Budget
PILT	Payments in Lieu of Taxes
PSQ	Probable Sale Quantity
REIT	Real Estate Investment Trust
RFA	Regulatory Flexibility Act
RFP	Registered Professional Forester
RMP	Resource Management Plan
SBREFA	Small Business Regulatory Enforcement Fairness Act
SEPA	State Environmental Policy Act
Service	U.S. Fish and Wildlife Service
SHAs	Safe Harbor Agreements
SOSEAs	Spotted Owl Special Emphasis Areas
SRS	Secure Rural Schools and Community Self-Determination Act
THP	Timber Harvesting Plan
TIMO	Timberland Investment Management Organizations
UMBR	Unfunded Mandates Reform Act
USFS	United States Forest Service
WSDOT	Washington Department of Transportation
WTP	Willingness to Pay

EXECUTIVE SUMMARY

1. The purpose of this report is to identify and analyze the potential economic impacts of the designation of critical habitat for the northern spotted owl (*Strix occidentalis caurina*) (hereafter, “NSO” or “species”) in the United States.¹
2. Section 4(b)(2) of the Endangered Species Act (the Act) directs the Secretary of the Interior to designate critical habitat

“...on the basis of the best scientific data available and after taking into consideration the economic impact, and any other relevant impact, of specifying any particular area as critical habitat. The Secretary may exclude any area from critical habitat if he determines that the benefits of such exclusion outweigh the benefits of specifying such area as part of the critical habitat, unless he determines, based on the best scientific and commercial data available, that the failure to designate such area as critical habitat will result in the extinction of the species concerned.”²
3. The information presented in this report is intended to assist the Secretary in determining whether the benefits of excluding particular areas from the designation outweigh the benefits of including those areas in the designation. In addition, this information allows the Service to address the requirements of Executive Orders 12866, “Regulatory Review and Planning,” and 13563, “Improving Regulation and Regulatory Review;” the Regulatory Flexibility Act (RFA), as amended by the Small Business Regulatory Enforcement Fairness Act (SBREFA, 5 U.S.C. 601-612); the Unfunded Mandates Reform Act (UMRA; P.L.104-4); Executive Order 13132, “Federalism;” and Executive Order 13211, “Actions Concerning Regulations that Significantly Affect Energy Supply, Distribution, or Use.”
4. Finally, this report was prepared with attention to the memorandum issued by the President to the Secretary of the Interior on February 28, 2012, regarding the proposed revised critical habitat for the northern spotted owl, and focusing on minimizing regulatory burdens. We re-state in the text box below the information regarding this memorandum provided in the Notice of Availability (NOA) for this report.³

¹ This final economic analysis analyzes the proposed designation as described in the Proposed Rule, incorporating information received during the public comment period on the draft economic analysis. This analysis does not reflect changes to the proposed critical habitat designation made in the Final Rule. Consequently, description of the habitat designation in the Final Rule may differ from maps and figures presented in this report.

² 16 U.S.C. §1533(b)(2)

³ 2012 Proposed Rule; Extension of Public Comment Period; Announcement of Public Meetings and Public Hearing, 77 FR 27010.

SERVICE RESPONSE CONCERNING PRESIDENTIAL DIRECTIVE

On February 28, 2012, the President issued a memorandum to the Secretary of the Interior regarding the proposed revised critical habitat for the northern spotted owl, specifically on minimizing regulatory burdens. In that memo, the President gave the following direction to the Secretary:

“In order to avoid unnecessary costs and burdens and to advance the principles of Executive Order 13563, consistent with the ESA, I hereby direct you to take the following actions:

- (1) publish, within 90 days of the date of this memorandum, a full analysis of the economic impacts of the proposed rule, including job impacts, and make that analysis available for public comment;
- (2) consider excluding private lands and State lands from the final revised critical habitat, consistent with applicable law and science;
- (3) develop clear direction, as part of the final rule, for evaluating logging activity in areas of critical habitat, in accordance with the scientific principles of active forestry management and to the extent permitted by law;
- (4) carefully consider all public comments on the relevant science and economics, including those comments that suggest potential methods for minimizing regulatory burdens;
- (5) give careful consideration to providing the maximum exclusion from the final revised critical habitat, consistent with applicable law and science; and
- (6) to the extent permitted by law, adopt the least burdensome means, including avoidance of unnecessary burdens on States, tribes, localities, and the private sector, of promoting compliance with the ESA, considering the range of innovative ecosystem management tools available to the Department and landowners.”

To comply with this directive, the Service has taken the following steps:

- (1) We conducted and completed, as per normal practice, an economic analysis on the probable impacts of the proposed revised critical habitat, specifically in the areas of timber harvest and linear projects, and included a consideration of potential impacts to jobs. In this document, we announce the availability of this draft economic analysis for public review and comment. As discussed in more detail below, we found that, depending on the decisions made and future directions taken by Federal action agencies, the incremental impacts of the proposed critical habitat revision will likely be minimal, or may even have a positive impact, if ecological forestry prescriptions are applied. This analysis will be refined and revised, based on information we receive during our comment period, and a final economic analysis will be made available at the time of publication of the final rule.
- (2) In our proposed rule (77 FR 14062; March 8, 2012), we proposed several options that we are considering for our final designation, three of which address the potential exclusion of private and State lands from the final critical habitat determination. In making the final determination, we will consider the best available scientific and commercial information, including information we receive during our public comment period. This information will be used in our evaluation process, described in section 4(b)(2) of the Act, which will examine the benefits of inclusion and the benefits of exclusion of specific areas from the final critical habitat designation, so that the Secretary may make informed decisions regarding exclusions.

- (3) In our proposed rule, we provided a description of ecological forestry management actions that are compatible with both northern spotted owl recovery and timber harvest, as recommended in the Revised Recovery Plan for the Northern Spotted Owl (76 FR 38575; July 1, 2011), which, in some areas, may actually increase harvest relative to recent realized levels (but not necessarily to planned levels under the NWFP). While it is outside the purview of the Service to direct forestry management, we will consult with Federal action agencies and make recommendations on the best measures to provide protections for the owl and have minimal negative economic impacts.
- (4) It is the normal practice of the Service to solicit public review and comment on all rule-making actions, and, as noted above, we consistently follow the standard of using the best available scientific information in making critical habitat determinations. In our proposed rule (77 FR 14062; March 8, 2012), we requested specific information from all interested parties, and additionally have requested comment from expert peer reviewers. In this notice, we have added several additional specific questions for comment, including questions on the analytic framework and information in our draft economic analysis, and we will use all information received in our analysis and final determination.
- (5) In our March 8, 2012, proposed rule (77 FR 14062), we identified several options we are considering for the final designation which include the consideration of excluding private, State, and Congressionally Reserved lands within the proposed critical habitat. Additionally, we have solicited comments and information regarding any other areas that may be appropriate for exclusion. Again, the Secretary will consider all appropriate exclusions, and use the best available scientific and commercial information to inform his evaluation in making any exclusions to the final designation, as provided by section 4(b)(2) of the Act.
- (6) The Service appreciates, and is sensitive to, the potential for regulatory burden that may result from our designation of critical habitat for the northern spotted owl under the Act. Our analysis indicates that the proposed revision of critical habitat, as informed by the Revised Recovery Plan for the Northern Spotted Owl (76 FR 38575; July 1, 2011), is anticipated to have little incremental effects above and beyond the conservation measures already required as a result of its threatened status, and thus is expected to impose minimal additional regulatory burden. The Service appreciates, and relies on the many partners we have in conservation, including private landowners, Tribes, States, and local governments, and strongly desires to promote conservation partnerships to conserve, protect, and enhance fish, wildlife, plants, and their habitats for the continuing benefit of the American people.

DESCRIPTION OF PROPOSED CRITICAL HABITAT

5. The proposed critical habitat designation includes 11 units and 63 subunits in California, Oregon, and Washington. Together, the units total approximately 13,961,684 acres.⁴ Approximately 3,988,776 acres of the proposed critical habitat are located in California, 5,116,835 acres in Oregon, and 4,856,074 acres in Washington.

⁴ GIS data provided by the Service, March 8, 2012. Acreage numbers throughout this report may differ slightly from those provided in the Proposed Rule due to minor boundary adjustments included within the GIS data used to inform the Economic Analysis.

6. Approximately 12,021,123 acres (86.1 percent) of the proposed critical habitat are Federally-managed by the United States Forest Service (USFS), Bureau of Land Management (BLM), National Park Service (NPS) and Department of Defense (DOD). Approximately 670,671 (4.8 percent) acres of proposed critical habitat are managed by State agencies and 1,269,890 acres (9.1 percent) are privately owned. Exhibit ES-1 provides a breakdown of the lands proposed as critical habitat by ownership. For maps depicting the location of proposed acres, see Chapter 1 of this report or the proposed rule.

EXHIBIT ES-1. LAND OWNERSHIP WITHIN NORTHERN SPOTTED OWL PROPOSED CRITICAL HABITAT

TYPE	LAND AREA (ACRES) ^{1, 2}	PERCENT TOTAL AREA (ACRES) ²
US Forest Service	9,524,623	68.2%
Bureau of Land Management	1,483,607	10.6%
National Park Service	998,580	7.2%
Other Federal (DOD)	14,313	0.1%
State	670,671	4.8%
Private	1,269,890	9.1%
TOTAL	13,961,684	100%
Notes: 1. Acreage numbers throughout this report may differ slightly from those provided in the Proposed Rule due to minor boundary adjustments included within the GIS data used to inform the Economic Analysis. 2. Totals may not sum due to rounding.		

7. The Act provides the Secretary of the Interior with the discretion to exclude certain areas from the final designation after taking into consideration economic impacts, impacts on national security, and any other relevant impacts of specifying any particular area as critical habitat. The proposed critical habitat additionally identifies a number of specific alternatives based on potential exclusions from the final rule. As described in the proposed rule, the final designation may reflect any of a variety of possible combinations of exclusions (including no exclusions). Lands under consideration for exclusion from the final designation of critical habitat include: all private or State lands with conservation agreements (habitat conservation plans, safe harbor agreements, or other formal agreements), totaling 936,816 acres; all State Park lands (164,776 acres); National Park lands, Federal Wilderness Areas, and other Congressionally reserved natural areas (2,631,736 acres); and all additional private or State lands without formal conservation agreements (837,148 acres). The total area under consideration for exclusion totals approximately 4,570,476 acres. This analysis, however, evaluates the potential economic impacts as if the area proposed in its entirety were critical habitat, without presupposing the potential outcome of any subsequent exclusion determinations by the Secretary. However, as the Secretary indicated in the proposed rule, he will give strong

consideration to exclude the maximum areas from the final designation consistent with applicable law and science.

REGULATORY CONTEXT

8. Considerable efforts have already been undertaken to protect the NSO. The species was first listed under the Act as a threatened species on June 26, 1990, and critical habitat was designated on Federal lands less than two years later, in early 1992.⁵ During the same period, a series of lawsuits over Federal timber sales led to the 1991 court injunction that halted the majority of timber sales occurring on Federal lands within the range of the NSO. In response to the lawsuits, President Clinton convened a forest conference in 1993 and issued a mandate for Federal land-management and regulatory agencies to develop a plan to resolve the conflict. The resulting Northwest Forest Plan (NWFP) was adopted in 1994. This plan has been the primary tool guiding Federal forest management and endangered species protection in the region since its adoption.
9. In 2008, the Service finalized a revised designation of critical habitat, which was based on the Service's Draft Recovery Plan published the same year.⁶ Again, the Service limited its designation to Federal lands. Both the 2008 critical habitat designation and the 2008 recovery plan were challenged in court.⁷ On October 12, 2010, the Court remanded the 2008 critical habitat designation and adopted the Service's proposed schedule to issue a new proposed revised critical habitat rule for public comment by November 15, 2011, and a final rule by November 15, 2012. The deadline for publication of the Proposed Rule was later extended to February 28, 2012.
10. In response to the Court's order, the Service published the current proposed rule.⁸ As described above, this revised rule proposes 13,961,684 acres of critical habitat. The Service's proposal includes State and private lands as critical habitat for the NSO, although the Service has proposed alternatives that consider excluding these lands to various degrees from the Final Rule. To support the Secretary's decision process, the study area for the analysis presented in this report covers all acres considered in the proposed rule, including lands under consideration for exclusion from the Final Rule. Thus, we analyze all acres as though they are ultimately designated as critical habitat. The results provide information on the potential benefits of excluding these acres from designation.
11. The Service identifies a series of economic activities potentially affecting the NSO and its habitat within the boundaries of the proposed critical habitat. These activities include timber management, wildfire management, road construction and linear projects, and other forest and species management activities. We focus our efforts on analyzing potential impacts to timber management. We also discuss wildfire management in the context of timber management activities and separately estimate economic impacts to

⁵ 1990 Final Listing Rule, 55 FR 26114; 1992 Final Critical Habitat Rule, 57 FR 1796.

⁶ 2008 Final Critical Habitat Rule, 73 FR 47325.

⁷ *Carpenters' Industrial Council v. Salazar*, Case No. 1:08-cv-01409-EGS (D.DC)

⁸ 2012 Proposed critical Habitat Rule, 77 FR 14104.

road construction and linear projects. Finally, we consider the potential distributional effects of the rule, including regional employment and governmental revenue impacts.

REGIONAL ECONOMIC CONTEXT

12. The timber industry has long been an economic driver in the Pacific Northwest, providing a substantial share of the economic foundation for many rural communities. Over the past 20 years, the industry has undergone significant changes that have manifested in reduced timber-related jobs and revenues. The drivers of change are many and varied; some are politically contentious and high-profile, such as the controversies over forest management practices and protective measures for endangered species (including the NSO, marbled murrelets, and Pacific salmon), and others are complex and variable, such as globalization of the timber market and modernization of the industry.
13. Overall, the volume of timber harvested in the 56 counties where revised critical habitat is proposed has decreased by 51 percent over the past 20 years, from approximately 12.4 billion board feet to 6.0 billion board feet.^{9,10,11,12} In addition, actual Federal timber harvests have not kept pace with the levels anticipated by the NWFP due in part to controversy over harvesting mature and old-growth stands, which were expected to be the primary harvest component in the first few decades of the plan. For example, planned annual harvest levels under the NWFP totaled over 800 million board feet from 1999 to the present, while actual harvest levels in recent years have been approximately 60 percent of this planned total.¹³ As the availability of Federal timber sales decreased, the relative importance of harvests from private lands increased.
14. Employment in the Pacific Northwest timber industry has also declined over the past 20 years by approximately 52 percent. Many variables have contributed to the decline in timber industry employment, including the decline in the availability of Federal timber, mechanization, transfer of capital investment away from the region, closure of less efficient mills, and fluctuating demand for wood products. It is important to view changes in timber industry employment in the Pacific Northwest within the greater context of regional market conditions.
15. Between 1990 and 2000, timber industry employment in the NWFP area declined by approximately 30,000 jobs. Meanwhile, there were increases in both population and total

⁹ California State Board of Equalization, "California Timber Harvest By County: Year 2010 Quarter 1 to 4." Accessed at <http://www.boe.ca.gov/proptaxes/pdf/ytr362010.pdf> March 2012.

¹⁰ California State Board of Equalization, "California Timber Harvest By County: 1994-2009." Accessed at <http://www.boe.ca.gov/proptaxes/pdf/yr3694to09.pdf> March 2012.

¹¹ Oregon Department of Forestry, "Oregon Annual Timber Reports." Accessed at http://www.oregon.gov/ODF/STATE_FORESTS/FRP/annual_reports.shtml March 2012.

¹² Washington State Department of Natural Resources, "Washington State Timber Harvest." Accessed at http://www.dnr.wa.gov/BusinessPermits/Topics/EconomicReports/Pages/obe_washington_timber_harvest_reports.aspx March 2012.

¹³ USFS, Pacific Northwest Region, Northwest Forest Plan—The First 15 Years (1994-2008): Socioeconomic Status and Trends, R6-RPM-TP-03-2011, 2011.

employment in the tri-state area of California, Oregon, and Washington; population increased by 15 percent and employment grew 18 percent, representing a total of 3.8 million jobs gained.¹⁴ During the following decade, however, population in the tri-state area continued to grow but job growth slowed, with total employment increasing only three percent between 2000 and 2010.¹⁵ As of 2009, the timber industry accounted for approximately two percent of employment overall in the counties where revised critical habitat is proposed. On a county-by-county basis employment in the timber industry ranges from zero to 24 percent of total county employment.

16. In addition to employment opportunities, counties in our study area are dependent on several Federal land payment programs that compensate county governments for the tax-exempt status of Federal public lands within their boundaries. The payments, which have undergone significant reforms over the past century, have at times constituted significant portions of county and school budgets. The future of the two largest sources of payments in recent years, Payments in Lieu of Taxes (PILT) and the Secure Rural Schools and Community Self-Determination Act (SRS), are both uncertain. The remaining programs, the U.S. Forest Service (USFS) 25% Fund and the U.S. Bureau of Land Management Oregon and California Land Grant (O&C) Revenue Sharing Payment are permanently authorized; however, the payments from these programs are closely linked to the amount of timber harvested from Federal lands.

ANALYTIC APPROACH

17. This analysis estimates the *incremental* impacts resulting from the designation of critical habitat. Specifically, the U.S. Office of Management and Budget's (OMB) guidelines for best practices concerning the conduct of economic analysis of Federal regulations direct agencies to measure the costs of a regulatory action against a baseline, which it defines as the "best assessment of the way the world would look absent the proposed action."¹⁶ Significant debate has occurred regarding whether assessing the impact of critical habitat designations using this baseline approach is appropriate, with several courts issuing divergent opinions.
18. In order to address these court opinions and provide the most complete information to decision-makers, this economic analysis both: (1) describes the baseline protections afforded the NSO absent critical habitat; and (2) quantifies the potential incremental impacts precipitated specifically by the designation. The most challenging part of this analysis involves isolating the new requirements imposed on regulated entities as a result of the designation.
19. The baseline for this analysis is the existing state of regulation, prior to the designation of critical habitat, which provides protection to the species under the Act, as well as under

¹⁴ Routman, K. 2007. Forest Communities and the Northwest Forest Plan: What Socioeconomic Monitoring Can Tell Us. *Science Findings* (95). Pacific Northwest Research Station, USDA Forest Service.

¹⁵ U.S. Bureau of Economic Analysis, "Interactive Data: Regional Data: GDP & Personal Income: Annual State Personal Income and Employment," as viewed at <http://www.bea.gov/iTable/iTable.cfm?ReqID=70&step=1> on September 30, 2012.

¹⁶ OMB, "Circular A-4," September 17, 2003, available at <http://www.whitehouse.gov/omb/circulars/a004/a-4.pdf>.

other Federal, State and local laws and guidelines. To characterize the “world without critical habitat,” our baseline for this analysis, we also attempt to forecast these conditions into the future over the time frame of our analysis, recognizing that such projections are subject to uncertainty.

20. The NSO is already subject to a variety of Federal, State, and local protections throughout most of its range, due to its threatened status under the ESA and regardless of the designation of critical habitat. On Federal lands, these protections include the standards and guidelines of the NWFP and the protections provided by sections 7, 9, and 10 of the Act. Most State lands within the proposed designation are either covered under a Habitat Conservation Plan (HCP) or are composed of State Parks or State Fish and Wildlife lands. Many of these lands have State regulations or guidelines in place that provide habitat protection for NSO, regardless of critical habitat. Finally, most private lands within the proposed designation are subject to existing or proposed HCPs, Safe Harbor Agreements (SHAs), or conservation easements.
21. Next, the most challenging part of this analysis involves isolating the new requirements imposed on regulated entities as a result of the designation of critical habitat given the considerable baseline protection already provided this species. When critical habitat is designated, section 7 of the Act requires Federal agencies to ensure that their actions will not result in the destruction or adverse modification of critical habitat. Agencies engage in consultation with the Service whenever activities they undertake, authorize, permit, or fund may affect designated critical habitat. The administrative costs of this process, and the additional impacts of implementing project modifications necessary to avoid adverse modification, are the direct compliance costs of the designation. Quantifying the related effect on owl population is not possible with the current modeling.
22. The Service is the best source of information concerning potential direct incremental regulatory impacts, which result from the conduct of consultations under section 7 of the Act. It describes its likely recommendations in a memorandum drafted to support this analysis, titled “Incremental Effects Memorandum for the Economic Analysis of the Proposed Rule to Revise Critical Habitat for the Northern Spotted Owl.”¹⁷ This memorandum is provided in Appendix B of this report.
23. In addition to the direct implementation of the regulation, the informational nature of critical habitat designation may also influence State and local regulators or private entities. For example, State agencies responsible for the management of State timberlands may choose to impose greater restrictions on those lands overlapping Federal critical habitat, or State permitting agencies may request additional protective measures prior to the issuance of permits for harvests on private lands. In addition, because critical habitat for NSO has not previously been designated on private lands, private landowners may be concerned about additional restrictions resulting from Federal or State oversight or third-party lawsuits. Regardless of whether such restrictions are ultimately realized,

¹⁷ U.S. Fish and Wildlife Service, “Incremental Effects Memorandum for the Economic Analysis of the Proposed Rule to Revise Critical Habitat for the Northern Spotted Owl,” March 23, 2012.

the regulatory uncertainty created by the rule may incentivize private landowners to alter current management practices.

24. Such outcomes are unintended consequences of the regulation; however, these outcomes may result in real costs or benefits. To better understand the potential for such indirect effects, we conducted extensive interviews with State regulators, private landowners, and industry representatives. These conversations are documented throughout the report, and a complete list of the sources contacted is provided in Appendix C.
25. Once we established the potential changes in economic behavior potentially resulting from the direct and indirect implementation of the rule, we use available market and other data to quantify, and monetize where possible, incremental effects. We also consider the distribution of these impacts across sensitive subpopulations and the effect of these changes on employment in the region. Finally, we qualitatively discuss the potential benefits of the regulation.
26. The general approach described above is similar to the approach followed in the 2008 Economic Analysis supporting the 2008 designation of critical habitat for the NSO. However, key differences exist. These differences are summarized in Exhibit ES-2.

ANALYSIS RESULTS

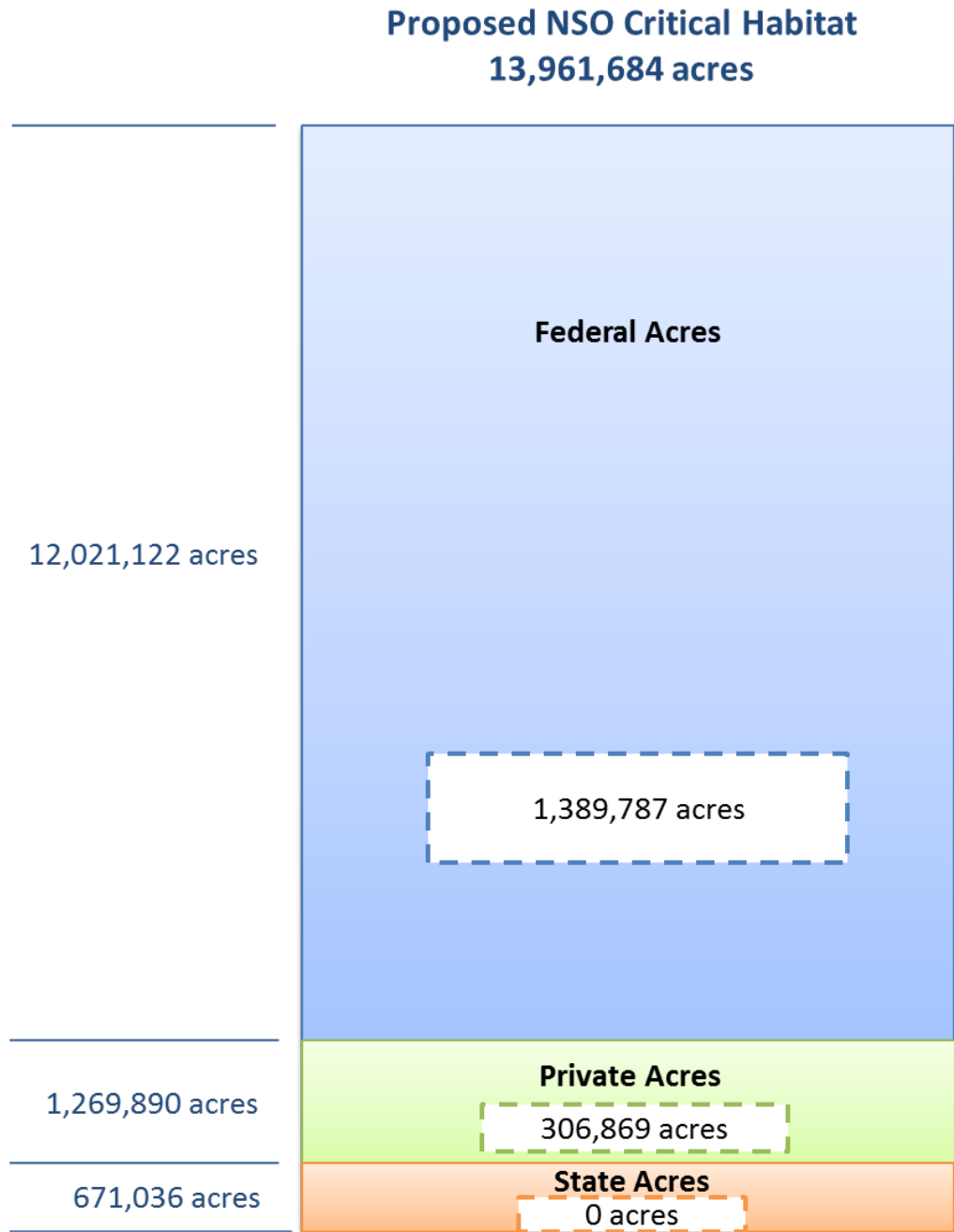
27. Based on our discussion with relevant Federal and State regulators and private stakeholders, we conclude that only a fraction of the overall proposed revised designation will result in more than incremental, minor administrative costs. Exhibit ES-3 highlights these findings. Specifically, of the 13,961,684 acres proposed for designation, we consider potential incremental changes in timber harvest practices on 1,389,787 acres of USFS and BLM land, or approximately 10 percent of the total acres proposed. In addition, potential exists for the owners of 306,869 acres of private land to experience incremental changes in harvests (approximately 2 percent of total acres proposed). No incremental changes in harvests are expected on State lands.
28. Exhibit ES-4 summarizes our measures of potential incremental impacts within these areas of focus by economic activity and land ownership type. With respect to Federal lands, consultations with Federal land managers, the Service, and other experts indicate varying opinions regarding potential critical habitat effects on timber management practices, and noted the difficulty and limitations of deriving precise measures of positive or negative incremental change. Therefore, we contemplate three alternative scenarios, which are described in greater detail below and in Chapter 4. These scenarios include: (1) administrative costs only; (2) potential positive incremental impacts to timber harvest on Federal lands; and (3) potential negative incremental impacts to timber harvest on Federal lands. Furthermore, we present a potential low impact and high impact outcome for each of the three scenarios. In addition, the exhibit presents our qualitative conclusions concerning potential timber harvest impacts to private lands, and notes the conclusion that zero timber harvest impacts are likely to occur on State lands. Finally, the exhibit notes the potential incremental administrative effects related to linear projects. We discuss each of these impact categories in further detail below. More detailed results by critical habitat unit and subunit are presented in Chapters 4, 5, and 7.

29. In the proposed rule, the Service has identified areas for possible exclusion from the final designation of critical habitat. Exhibit ES-5 summarizes the four regulatory alternatives and how the measures of potential incremental impacts vary across each of these possible outcomes. The exhibit discusses the annualized costs and benefits of the proposed regulatory alternatives.

EXHIBIT ES-2. DIFFERENCES IN ANALYTICAL APPROACH BETWEEN THE 2008 AND CURRENT (2012) ECONOMIC ANALYSES

- The 2012 Economic Analysis distinguishes the *incremental* costs of designation from *baseline* costs, and quantifies specific potential effects to timber harvest practices and volume along with administrative costs. As discussed in detail in this report, the annualized incremental impacts under the negative impact scenario range from a loss of approximately \$2.65 to \$6.48 million, while the positive impact scenario ranges from a gain of approximately \$900,000 to \$2.9 million. The analysis also contemplates an “administrative cost only” scenario, with annualized losses of \$196,000 to \$335,000.
 - In contrast, in its evaluation of the incremental costs of the designation, the 2008 Economic Analysis did not identify any incremental effects beyond administrative costs related to the consultation process. On an annualized basis, these losses totaled \$132,000 to \$202,000 (similar to the range of administrative costs estimated in this 2012 analysis).
- This 2012 Economic Analysis characterizes all potential future NSO conservation as either baseline (i.e., expected to occur absent the designation of critical habitat) or incremental (i.e., expected to occur as a result of critical habitat designation). The Service provided guidance on distinguishing the incremental costs of the designation, as described in Appendix B of this report. The analysis only quantifies incremental impacts because these are the costs, or benefits, that would be avoided if the Secretary of the DOI chooses to exclude certain areas from the final designation. Where we include quantitative or qualitative information about the historical impacts of northern spotted owl conservation, this information is intended only to provide context for potential future incremental impacts.
 - The 2008 Economic Analysis provided a comprehensive quantitative assessment of baseline impacts related to NSO conservation and recovery, inclusive of all effects resulting from the species’ listing in 1990. For the pre-designation period (1990 - 2007), the annualized estimate of these baseline impacts totaled \$563 to \$600 million. For the post-designation period, annualized baseline impacts (i.e., those impacts expected to occur regardless of whether critical habitat is designated) were estimated to be approximately \$602 million.
- This analysis considers and estimates the impacts of the rule as currently proposed and as if the existing 2008 critical habitat designation does not exist. Those areas already designated as critical habitat under the 2008 designation are subject to re-examination by the Secretary. Thus, future costs that may result from their designation should be considered. As a result, costs incurred as a result of the 2008 designation are not separately documented in this analysis.

EXHIBIT ES-3. PROPOSED ACRES WHERE INCREMENTAL CHANGES IN TIMBER HARVESTS ARE POSSIBLE



Key:

Denotes acres that may experience incremental changes in timber harvests.

Note: Totals may not sum due to rounding.

EXHIBIT ES-4. SUMMARY OF ANNUALIZED POTENTIAL INCREMENTAL IMPACTS OF CRITICAL HABITAT DESIGNATION FOR THE NSO (\$2011)

LAND OWNER	ANNUALIZED POTENTIAL INCREMENTAL IMPACTS	ADMINISTRATIVE COSTS ONLY SCENARIO		POSITIVE IMPACT SCENARIO ^a		NEGATIVE IMPACT SCENARIO	
		LOW	HIGH	LOW	HIGH	LOW	HIGH
Federal	Potential Change in Timber Harvest Volume (MMBF)	0		+12.28		-24.56	
	Potential Change in the Value of Timber Harvest	\$0	\$0	+\$1,230,000	+\$3,070,000	-\$2,460,000	-\$6,140,000
	Administrative Costs	-\$185,000	-\$316,000	-\$185,000	-\$316,000	-\$185,000	-\$316,000
State	Potential Change in the Value of Timber Harvest	0		0		0	
Private	Potential Change in the Value of Timber Harvest	Possible negative impacts associated with regulatory uncertainty	Possible negative impacts associated with regulatory uncertainty and new regulation in the State of Washington	Possible negative impacts associated with regulatory uncertainty	Possible negative impacts associated with regulatory uncertainty and new regulation in the State of Washington	Possible negative impacts associated with regulatory uncertainty	Possible negative impacts associated with regulatory uncertainty and new regulation in the State of Washington
Linear Projects	Administrative Costs	-\$10,800	-\$19,500	-\$10,800	-\$19,500	-\$10,800	-\$19,500
TOTAL		-\$196,000	-\$335,000	+\$893,000	+\$2,870,000	-\$2,650,000	-\$6,480,000

Notes:

^a Under the Positive Impact Scenario, to illustrate a full range of potential outcomes, the low impact "total" is the low impact change to timber harvest net the high impact administrative costs for Federal timber management and linear projects, representing a worst case scenario; conversely, the high impact "total" is the high impact change to timber harvest net the low impact administrative costs, representing a best case scenario.

All dollar estimates are rounded to three significant digits and may not sum due to rounding.

**EXHIBIT ES-5. PROPOSED CRITICAL HABITAT FOR THE NORTHERN SPOTTED OWL:
MONETIZED AND NON-QUANTIFIED COSTS AND BENEFITS OF THE PROPOSED REGULATORY ALTERNATIVES**

REGULATORY ALTERNATIVE	ANNUALIZED COSTS	ANNUALIZED BENEFITS
Possible Outcome 1: No exclusions	<ul style="list-style-type: none"> • Potential change in timber harvest from Federal lands ranging from -\$6.1 million to +\$3.1 million • \$185,000 to \$316,000 in administrative costs on USFS and BLM lands • \$10,800 to \$19,500 in administrative costs for linear projects • Minor administrative burden associated with re-initiating consultation on HCPs and SHAs • Potential impacts to some private landowners due to regulatory uncertainty or new regulation in the State of Washington 	<ul style="list-style-type: none"> • Increased probability of the conservation of the northern spotted owl resulting from changes in timber harvests on Federal lands • Potential ancillary benefits resulting from changes in timber harvests on Federal lands; as discussed in Chapter 8, these may include: reduced wildfire threats, reduced impacts of droughts, reduced property damage due to wildfire or drought, aesthetic improvements, water quality improvements, carbon capture and sequestration, and educational benefits
Possible Outcome 2: <ol style="list-style-type: none"> Excludes private lands with conservation agreements (HCPs, SHAs, or other formal agreements) Excludes State lands with conservation agreements (HCPs, SHAs, or other formal agreements) 	<ul style="list-style-type: none"> • Potential change in timber harvest from Federal lands ranging from -\$6.1 million to +\$3.1 million • \$185,000 to \$316,000 in administrative costs on USFS and BLM lands • \$10,800 to \$19,500 in administrative costs for linear projects • Potential impacts to some private landowners due to regulatory uncertainty or new regulation in the State of Washington 	<ul style="list-style-type: none"> • Increased probability of the conservation of the northern spotted owl resulting from changes in timber harvests on Federal lands • Potential ancillary benefits resulting from changes in timber harvests on Federal lands; as discussed in Chapter 8, these may include: reduced wildfire threats, reduced impacts of droughts, reduced property damage due to wildfire or drought, aesthetic improvements, water quality improvements, carbon capture and sequestration, and educational benefits

REGULATORY ALTERNATIVE	ANNUALIZED COSTS	ANNUALIZED BENEFITS
Possible Outcome 3: <ul style="list-style-type: none"> a) Excludes private lands with conservation agreements (HCPs, SHAs, or other formal agreements) b) Excludes State lands with conservation agreements (HCPs, SHAs, or other formal agreements) c) Excludes State park lands d) Excludes Congressionally reserved natural areas 	<ul style="list-style-type: none"> • Potential change in timber harvest from Federal lands ranging from -\$6.1 million to +\$3.1 million • \$185,000 to \$316,000 in administrative costs on USFS and BLM lands • \$10,800 to \$19,500 in administrative costs for linear projects • Potential impacts to some private landowners due to regulatory uncertainty or new regulation in the State of Washington 	<ul style="list-style-type: none"> • Increased probability of the conservation of the northern spotted owl resulting from changes in timber harvests on Federal lands • Potential ancillary benefits resulting from changes in timber harvests on Federal lands; as discussed in Chapter 8, these may include: reduced wildfire threats, reduced impacts of droughts, reduced property damage due to wildfire or drought, aesthetic improvements, water quality improvements, carbon capture and sequestration, and educational benefits
Possible Outcome 4: <ul style="list-style-type: none"> a) Excludes private lands with conservation agreements (HCPs, SHAs, or other formal agreements) b) Excludes State lands with conservation agreements (HCPs, SHAs, or other formal agreements) c) Excludes State park lands d) Excludes Congressionally reserved natural areas e) Excludes all additional private lands without formal conservation agreements f) Excludes all additional State lands without formal conservation agreements 	<ul style="list-style-type: none"> • Potential change in timber harvest from Federal lands ranging from -\$6.1 million to +\$3.1 million • \$185,000 to \$316,000 in administrative costs on USFS and BLM lands • \$10,800 to \$19,500 in administrative costs for linear projects 	<ul style="list-style-type: none"> • Increased probability of the conservation of the northern spotted owl resulting from changes in timber harvests on Federal lands • Potential ancillary benefits resulting from changes in timber harvests on Federal lands; as discussed in Chapter 8, these may include: reduced wildfire threats, reduced impacts of droughts, reduced property damage due to wildfire or drought, aesthetic improvements, water quality improvements, carbon capture and sequestration, and educational benefits

Timber Harvest Impacts - Federal Lands

30. The majority of direct economic impacts on Federal lands are expected to result from changes in timber harvest. Therefore, the analysis focuses on identifying where potential changes to timber harvest may occur, and then estimating which critical habitat subunits may experience the highest relative degree of impacts. As noted, we find that approximately 1,389,787 acres on Federal lands are the primary areas where potential impacts to timber harvest may occur. Specifically, these areas include matrix lands with predominantly younger forest stands and matrix lands with NSO habitat that are likely to be unoccupied.¹⁸
31. To conduct this assessment, we employed a two-pronged approach:
 - **Acreage-Based Approach.** We use acres of Federal lands with potential impacts to rank subunits by the relative magnitude of potential changes to timber harvest. Each subunit is assigned a score on a scale of 0 to 100, with 100 being the highest level of potential impacts, based on total acres of Federal lands with potential impacts to timber harvest (i.e., matrix lands unoccupied by the NSO). Then, we rank each subunit on a relative basis. We also identify subunits that have proportionally greater areas of younger forests that are considered essential to NSO conservation.
 - **Harvest Volume Approach.** First, for areas within each subunit that may experience incremental changes to timber harvest (as identified above), we estimate future timber harvest volumes absent critical habitat. Second, we scale these projected volumes under various potential scenarios, and derive an estimate of resulting changes in projected timber harvest volumes. Finally, these changes in harvest volumes are monetized based upon representative stumpage values.
32. We note that critical habitat's regulatory impact is limited to the ESA section 7 requirement that Federal agencies avoid "destruction or adverse modification" of critical habitat after consultation with the Service. As noted, consultations with Federal land managers, the Service, and other experts indicate varying opinions regarding potential critical habitat effects, and noted the difficulty and limitations of deriving precise measures of positive or negative incremental change. For example, Federal land managers have expressed concern about critical habitat representing a potential constraint on their timber management preferences across the designation. Service representatives suggest that there is potential for an increase in harvest levels compared to recent Federal matrix timber harvest in some areas (although at levels below what was originally envisioned for these lands under the NWFP in 1994). Finally, the relevant parties also contemplate that no material changes may result from critical habitat concerns relative to the baseline, given the long and established history of existing management plans and conservation efforts related to the NSO.

¹⁸ With respect to the term "unoccupied", we are explicitly referring to those areas not currently occupied by territorial or nesting owls.

33. To capture a range of potential outcomes, this analysis presents three scenarios. The first scenario contemplates that minimal or no changes to current timber management practices will occur; thus, the incremental costs of the designation will be predominantly administrative. The majority of NSO consultations under section 7 of the Act occur between the Service and BLM and/or USFS. On Federal lands managed by these agencies, the vast majority of consultations on proposed projects affecting the NSO concern timber sales or timber management projects. The potential additional administrative costs due to critical habitat designation on Federal lands range from \$185,000 to \$316,000 on an annualized basis.
34. The second scenario posits that action agencies may choose to implement management practices yielding an increase in timber harvest relative to the baseline. Under this scenario, we consider the potential effect related to the implementation of ecological forestry prescriptions consistent with the Revised Recovery Plan and the Standards and Guidelines of the NFWP. Such an outcome would not likely result in harvest levels lower than the first scenario, and it may result in a net increase in harvest in some areas. To illustrate the magnitude of this potential effect, we scale baseline harvest projections up by 10 percent.
35. The third scenario considers that action agencies may choose to adopt a more restrictive harvest posture in response to critical habitat designation, leading to a decline in harvest volumes relative to the baseline. That is, they will conclude that some of their timber harvest activities would be incompatible with the goals of critical habitat, and they will decide to reduce or not plan timber harvest in some portion of the incremental matrix forests that are within proposed critical habitat. If BLM or USFS does reduce planned harvest due to critical habitat, it will likely be in those portions of the matrix that they believe have greater value to NSO recovery and should not be subject to timber management. To illustrate the potential magnitude of this potential effect, we scale baseline harvest projections down by 20 percent.
36. Furthermore, Chapter 4 provides sensitivity analyses based on several comments submitted during the public comment period providing information to inform certain alternative assumptions concerning the baseline timber harvest projection. The economic analysis uses a baseline harvest projection of approximately 122.80 MMBF per year. In the sensitivity analyses contemplated, the baseline timber harvest projection increases by up to an additional 27.99 MMBF per year. Therefore, the range of incremental impacts to Federal timber harvest widens from a potential increase in stumpage value of \$3.58 million (under Scenario 2) to a potential decrease of \$7.86 million (under Scenario 3) per year. This represents an annualized increase of \$0.7 million (under Scenario 2) and an annualized decrease of \$1.4 million (under Scenario 3) relative to the economic analysis presented above.
37. As discussed in further detail in Chapter 4, the results should be interpreted with care. These outcomes, variations on them, or combinations of them, are dependent on future policy decisions by the Federal agencies and other uncertain factors, including the approaches undertaken by the land management agencies and the cooperative section 7 processes between the Forest Service or BLM and the Service. There is considerable

uncertainty regarding the timber management prescriptions that land managers may implement as a result of the proposed revised critical habitat designation. Any actual impacts would depend on the nature and location of the proposed project and future management decisions by the land managing agencies consistent with their land use plans and the legal authorities under which they operate. Therefore, our assessment of the economic effects is limited by this uncertainty.

Timber Harvest Impacts - Private Lands

38. The Service is considering designating critical habitat on 1,269,890 acres of private land in Washington and California. No private land in Oregon is proposed for designation.¹⁹ Of these acres, activities on 873,621 (69 percent) are subject to existing or proposed habitat conservation plans (HCPs) or Safe Harbor Agreements (SHAs). Thus, incremental changes in timber management practices on these acres are unlikely. Some minor administrative costs may be incurred to re-initiate section 7 consultation with the Service to consider the potential for the plans or agreements to adversely modify critical habitat. In addition, 89,400 acres (7 percent) are subject to existing conservation agreements; no incremental impacts are anticipated.
39. A Federal nexus compelling consultation with the Service under section 7 of the Act is unlikely for activities on the remaining 306,869 private acres (24 percent); thus, regulation of these private acres via section 7 of the Act is unlikely. However, indirect incremental impacts may result from the informational nature of the designation and associated regulatory uncertainty. Specifically, by highlighting areas on a map (e.g., the proposed critical habitat designation) that may require additional protection, State and local regulators and private landowners are provided with additional information as they make decisions regarding future uses of these areas. Based on our assessment, areas where this additional information could result in land use changes include 117,628 acres in Washington and 189,241 acres in California.
40. For purposes of this analysis, we assume that faced with regulatory uncertainty, private landowners in both States may harvest their timber sooner than they otherwise would (if the stands presently provide suitable habitat for the species) or shorten their harvest rotations to prevent the stands from becoming suitable habitat. Such changes may negatively affect the net present value of these acres. In addition, under our high-end impact scenario, we assume the Washington Forest Practices Board redefines “critical habitat state” to include suitable owl habitat within existing Spotted Owl Special Emphasis Areas (SOSEAs) overlapping Federally-designated critical habitat, diminishing the likelihood that these stands will be harvested.
41. We lack information regarding the probability that individual landowners will change their harvest practices, and potential regulatory changes in Washington are speculative.

¹⁹ A public comment submitted by Green Crow, a private timberland owner in Oregon, showed that two tracts in Oregon, thought to be owned by the State and included in the proposed designation, had been purchased by the company in 2010 (see public comment submitted by Green Crow on July 2, 2012). These private acres are not included in the final designation.

Because the necessary data are not readily available, quantification of potential reductions in timber harvests from private lands and/or incremental reductions in land values is not possible at this time. Therefore, we undertake an analysis of the potential relative magnitude of impacts across the proposed private acres. This provides decision-makers with information about the specific geographic areas within proposed subunits most susceptible to incremental impacts.

42. Private lands in Washington potentially affected if the Forest Practices Board redefines “critical habitat state” are found in the following subunits: ECN 3, ECN 4, ECN 5, ECN 6, WCC 1, WCC 3, and NCO1. Even if such a regulatory change does not occur, landowners in these subunits could alter harvest practices as a result of regulatory uncertainty. Additional subunits with potentially affected acres are located in California and include ICC 6, RDC 1, RDC 2, RDC 4, and RDC 5. In these areas, impacts could occur as a result of regulatory uncertainty.

Timber Harvest Impacts - State Lands

43. Of the 671,036 acres of State lands proposed for designation as critical habitat, 225,013 (34 percent) are already protected by an approved HCP; 164,776 acres (25 percent) are State park lands where timber harvests are not anticipated; and 1,752 acres (less than one percent) are lands managed by the Washington DFW which is preparing an HCP. The remaining 279,495 acres (42 percent) are State forests managed by the Oregon Department of Forestry and CAL FIRE, which have stated that existing regulations provide protection for the NSO.²⁰ These agencies do not intend to alter timber management practices in response to the designation of critical habitat. Thus, we conclude that timber harvests on State lands are unlikely to be affected by the designation of critical habitat for the NSO.

Distributional Timber Harvest Impacts to the Regional Economy and Employment

44. Timber activity is a source of employment and governmental revenue within the area of proposed critical habitat designation. The illustrated changes in timber harvest volume summarized above may also manifest in distributional effects to the regional economy. We consider the potential employment effects using established relationships between harvest volume and jobs, as identified in available literature.
45. In general, estimates of the number of jobs associated with each MMBF of harvest vary depending on the type of harvest and degree of primary and secondary manufacturing considered.²¹ A recent report published by the Pacific Northwest Research Station of the USFS states that in Oregon there were 9.4 direct jobs per MMBF of timber harvested in

²⁰ Totals may not sum due to rounding.

²¹ In addition to direct timber-related employment (e.g., loggers, mills), many indirect jobs result from timber harvesting. There are very few recent estimates of indirect jobs created per MMBF of harvest, and estimates vary widely based on the definitions of “direct” versus “indirect” jobs. For example, as discussed in Chapter 6, per MMBF measures inclusive of indirect jobs range as high as 17. Above we cite the number of direct jobs associated with changes in harvest levels.

2010, and 9.9 direct jobs per MMBF in Washington, for a weighted average of 9.61.²² Other studies focusing on specific geographic regions or earlier time periods estimate a broader range of jobs multipliers, suggesting any change in the number of direct jobs resulting from variation in timber harvest volumes in a specific geographic location could be smaller or larger depending on the specific characteristics of the industry in that affected region.²³ Thus, increases or decreases in timber harvests from Federal or private lands could result in positive or negative changes in jobs, respectively.

46. Note that the “jobs per unit of timber volume” relationships identified here are static in nature, and would not necessarily be representative of the marginal change in employment associated with the incremental change in timber harvest potentially resulting from critical habitat designation. Furthermore, many additional factors contribute to changes in timber industry employment, which are discussed in greater detail in chapter 6 of this report. Thus, this analysis does not explicitly derive an employment effect related to the proposed rule. Finally, it is important to recognize that the scope of the analysis is limited to the incremental effects of critical habitat related to and within the geographic area of the proposed designation for the NSO. The analysis does not consider potential changes in timber activities on lands outside the proposed critical habitat designation. As such, this analysis cannot evaluate the potential effects related to the timber industry as a whole.

Road Construction and Linear Projects

47. Activity related to road and bridge construction and maintenance, and installation and maintenance of power transmission lines and other utility pipelines can affect NSO habitat. As described in detail in Chapter 7, based on certain factors concerning existing baseline protections, the nature and scale of these projects, and their number and density, this analysis does not anticipate incremental impacts to linear project activities beyond administrative costs due to the designation of critical habitat. These estimated administrative costs, on an annualized basis, range from \$10,800 to \$19,500, assuming a seven percent discount rate.

²² Warren, Debra. 2011. *Production, Prices, Employment, and Trade in Northwest Forest Industries, All Quarters 2010*. USDA. http://www.fs.fed.us/pnw/pubs/pnw_rb260.pdf. Note that on page 1 of the report, the USFS states these averages are based on 2007 data; however, we believe this to be a typographical error.

²³ The study by Warren (2011) calculates the reported jobs multipliers for 2010 based on data on total timber harvested and total timber-related jobs in that year. Applying the same methodology and using the historical data provided by USFS in its report, the jobs multiplier has been as high as 12.8 for Washington (2009) and 15.6 for Oregon (2001). A study of the region by Lippke and Mason (2005) provides estimates for the direct and total employment for forest products activity based on a model developed by Richard Conway in 1996. The report estimates 12.34 jobs in the logging, sawn wood, primary wood, secondary wood, and primary paper industries per MMBF harvested. (Lippke, B.R. and L.C. Mason. *Implications of Working Forest Impacts on Jobs and Local Economies*. October 24, 2005. Accessed at <https://digital.lib.washington.edu/researchworks/bitstream/handle/1773/2235/tp4.pdf?sequence=1> on April 6, 2012). In contrast to these multi-State studies, the Oregon Forest Research Institute estimates 17.4 jobs per MMBF in Oregon based on data provided by the Oregon Department of Employment and the Oregon Department of Forestry (Email communication with Michael Haske, U.S. Bureau of Land Management, May 24, 2012.). Adding jobs created through induced effects (e.g., non-timber-related industries supporting workers in the timber industry) would further increase these multipliers.

Benefits

48. With regard to the benefits of the designation, in its guidance for implementing Executive Order 12866, OMB acknowledges that it may not be feasible to monetize, or even quantify, the benefits of environmental regulations due to either an absence of defensible, relevant studies or a lack of resources on the implementing agency's part to conduct new research.²⁴ The Service believes that the direct benefits of critical habitat are best expressed in biological terms that can be weighed against the expected cost impacts of the rulemaking. Thus, we include a qualitative discussion of the potential benefits of this proposed rule in this report and summarize available literature describing the potential benefits of NSO conservation.

²⁴ U.S. Office of Management and Budget, "Circular A-4," September 17, 2003, available at <http://www.whitehouse.gov/omb/circulars/a004/a-4.pdf>.

CHAPTER 1 | INTRODUCTION

49. The purpose of this report is to identify and analyze the potential economic impacts of the designation of critical habitat for the northern spotted owl (*Strix occidentalis caurina*) (hereafter, “NSO” or “species”) in the United States.
50. Section 4(b)(2) of the Endangered Species Act (the Act) directs the Secretary of the Interior to designate critical habitat

“...on the basis of the best scientific data available and after taking into consideration the economic impact, and any other relevant impact, of specifying any particular area as critical habitat. The Secretary may exclude any area from critical habitat if he determines that the benefits of such exclusion outweigh the benefits of specifying such area as part of the critical habitat, unless he determines, based on the best scientific and commercial data available, that the failure to designate such area as critical habitat will result in the extinction of the species concerned.”²⁵

The information presented in this report is intended to assist the Secretary in determining whether the benefits of excluding particular areas from the designation outweigh the benefits of including those areas in the designation. In addition, this information allows the Service to address the requirements of Executive Orders 12866, “Regulatory Review and Planning,” and 13563, “Improving Regulation and Regulatory Review;” the Regulatory Flexibility Act (RFA), as amended by the Small Business Regulatory Enforcement Fairness Act (SBREFA, 5 U.S.C. 601-612); the Unfunded Mandates Reform Act (UMRA; P.L.104-4); Executive Order 13132, “Federalism;” and Executive Order 13211, “Actions Concerning Regulations that Significantly Affect Energy Supply, Distribution, or Use.”

51. This chapter provides an overview of the proposed critical habitat for the NSO. It includes a summary of past Federal actions that relate to the current proposal, a description of the area proposed for designation, and a discussion of the economic activities potentially affecting the species. We conclude with a summary of the organization of the remainder of this report.
52. The information contained in this chapter provides context for the analysis. All official definitions and proposed critical habitat boundaries are provided in the Proposed Rule.²⁶

²⁵ 16 U.S.C. §1533(b)(2).

²⁶ 2012 Proposed Critical Habitat Rule, 77 FR 14062.

1.1 PREVIOUS FEDERAL ACTIONS

53. Below, we summarize key milestones in the Federal regulatory history for the NSO.

- **Listing:** The U.S. Fish and Wildlife Service (Service) published a rule listing the NSO as threatened on June 26, 1990.²⁷
- **Original critical habitat designation:** The Service published a final rule designating 6,887,000 acres of critical habitat for the NSO on January 15, 1992.²⁸
- **2004 five-year review:** The Service completed a five-year status review of the NSO on November 15, 2004 as part of a settlement agreement with the timber industry. At that time, the Service concluded that the NSO should remain listed as a threatened species under the Endangered Species Act (Act). An amended settlement agreement called for the Service to revise critical habitat.
- **Revised critical habitat:** In 2008, the Service finalized a revised designation of 5,337,839 acres as critical habitat, which was based on the Service's 2007 Draft Recovery Plan and 2008 Recovery Plan for the Northern Spotted Owl. published that same year.²⁹ Both the 2008 critical habitat designation and the 2008 recovery plan were challenged in court.³⁰ In addition, on December 15, 2008, the Inspector General of the Department of the Interior issued a report entitled "Investigative Report of the Endangered Species Act and the Conflict between Science and Policy," which concluded that the integrity of the agency decision making process for the NSO recovery plan was potentially jeopardized by improper political influence.
- **2008 critical habitat remanded:** On October 12, 2010, the Court remanded the 2008 critical habitat designation, which had been based on the 2008 Recovery Plan, and adopted the Service's proposed schedule to submit a new proposed revised critical habitat rule for public comment to the Federal Register by November 15, 2011, and a final revised rule by November 15, 2012. The Court later extended the deadline for the proposed rule to February 28, 2012; the deadline for the final rule remains unchanged.
- **Current proposed rule revising critical habitat:** In response to the Court's order, the Service published the current proposed rule revising the critical habitat designation on March 8, 2012.³¹ This economic analysis will inform the final critical habitat designation for the species.³²

²⁷ 1990 Final Listing Rule, 55 FR 26114.

²⁸ 1992 Final Critical Habitat Rule, 57 FR 1796.

²⁹ 2008 Final Critical Habitat Rule, 73 FR 47325.

³⁰ *Carpenters' Industrial Council v. Salazar*, Case No. 1:08-cv-01409-EGS (D.DC)

³¹ 2012 Proposed critical Habitat Rule, 77 FR 14104.

³² On May 8, 2012, the Service made available for public comment a draft of this report (the "draft economic analysis" or "DEA") (2012 Proposed Rule; Extension of Public Comment Period; Announcement of Public Meetings and Public Hearing, 77

1.2 PROPOSED CRITICAL HABITAT DESIGNATION

54. The proposed critical habitat designation includes 11 units and 63 subunits in California, Oregon, and Washington. Together, the units total approximately 13,961,684 acres.³³ Approximately 3,988,776 acres of the proposed critical habitat are located in California, 5,116,835 acres in Oregon, and 4,856,074 acres in Washington.
55. Approximately 12,021,123 acres (86.1 percent) of the proposed critical habitat are Federally-managed by the United States Forest Service (USFS), Bureau of Land Management (BLM), National Park Service (NPS) and Department of Defense (DOD). Approximately 670,671 (4.8 percent) acres of proposed critical habitat are managed by State agencies and 1,269,890 acres (9.1 percent) are privately owned. Exhibit 1-1 provides a breakdown of the lands proposed as critical habitat by ownership, and Exhibits 1-2 through 1-4 depict the proposed designation in Washington, Oregon, and California. Socioeconomic conditions within the region proposed for critical habitat designation are discussed in Chapter 3.

EXHIBIT 1-1. LAND OWNERSHIP WITHIN NORTHERN SPOTTED OWL PROPOSED CRITICAL HABITAT

TYPE	LAND AREA (ACRES) ^{1, 2}	PERCENT TOTAL AREA (ACRES) ²
US Forest Service	9,524,623	68.2%
Bureau of Land Management	1,483,607	10.6%
National Park Service	998,580	7.2%
Other Federal (DOD)	14,313	0.1%
State	670,671	4.8%
Private	1,269,890	9.1%
TOTAL	13,961,684	100%
Notes: 1. Acreage numbers throughout this report may differ slightly from those provided in the Proposed Rule due to minor boundary adjustments included within the GIS data used to inform the Economic Analysis. 2. Totals may not sum due to rounding.		

FR 27010.) This final economic analysis (FEA) updates the DEA, incorporating new information received during the public comment period. As it is intended to provide information to the Secretary about the potential benefits of including versus excluding areas from the final designation, it continues to analyze all areas considered for designation.

³³ GIS data provided by the Service, March 8, 2012. Acreage numbers throughout this report may differ slightly from those provided in the Proposed Rule due to minor boundary adjustments included within the GIS data used to inform the Economic Analysis.

EXHIBIT 1-2. OVERVIEW OF NORTHERN SPOTTED OWL PROPOSED CRITICAL HABITAT IN WASHINGTON

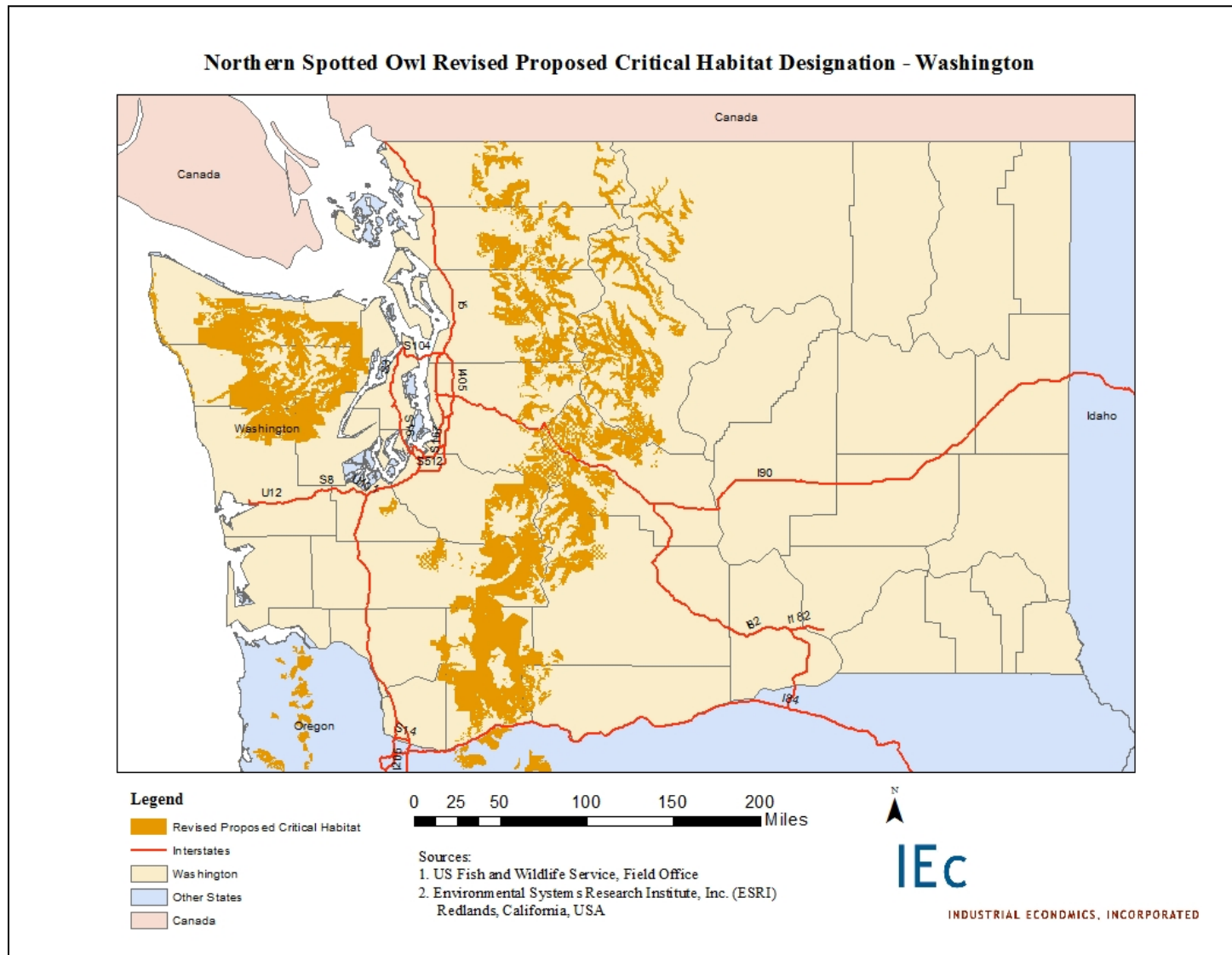


EXHIBIT 1-3. OVERVIEW OF NORTHERN SPOTTED OWL PROPOSED CRITICAL HABITAT IN OREGON

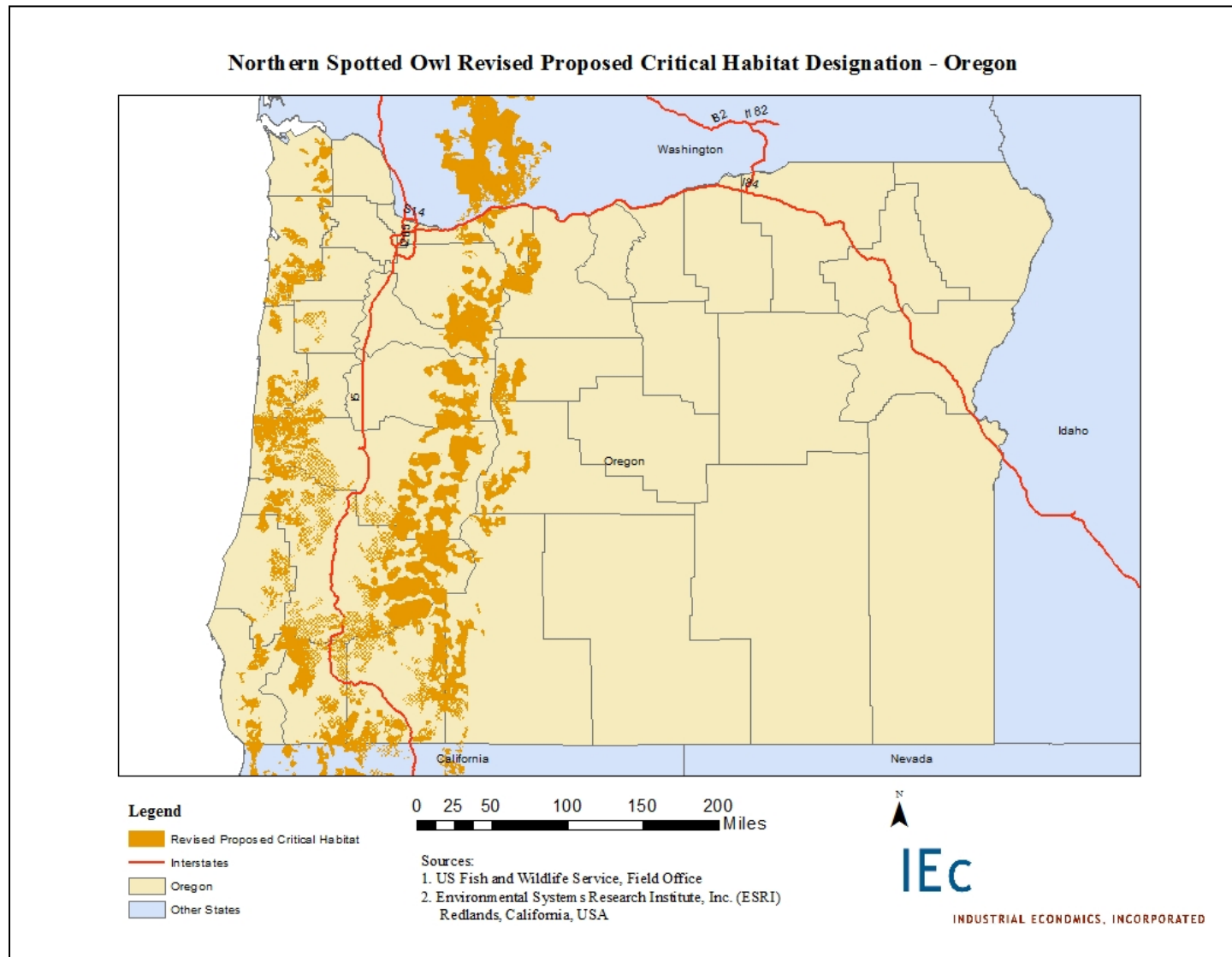
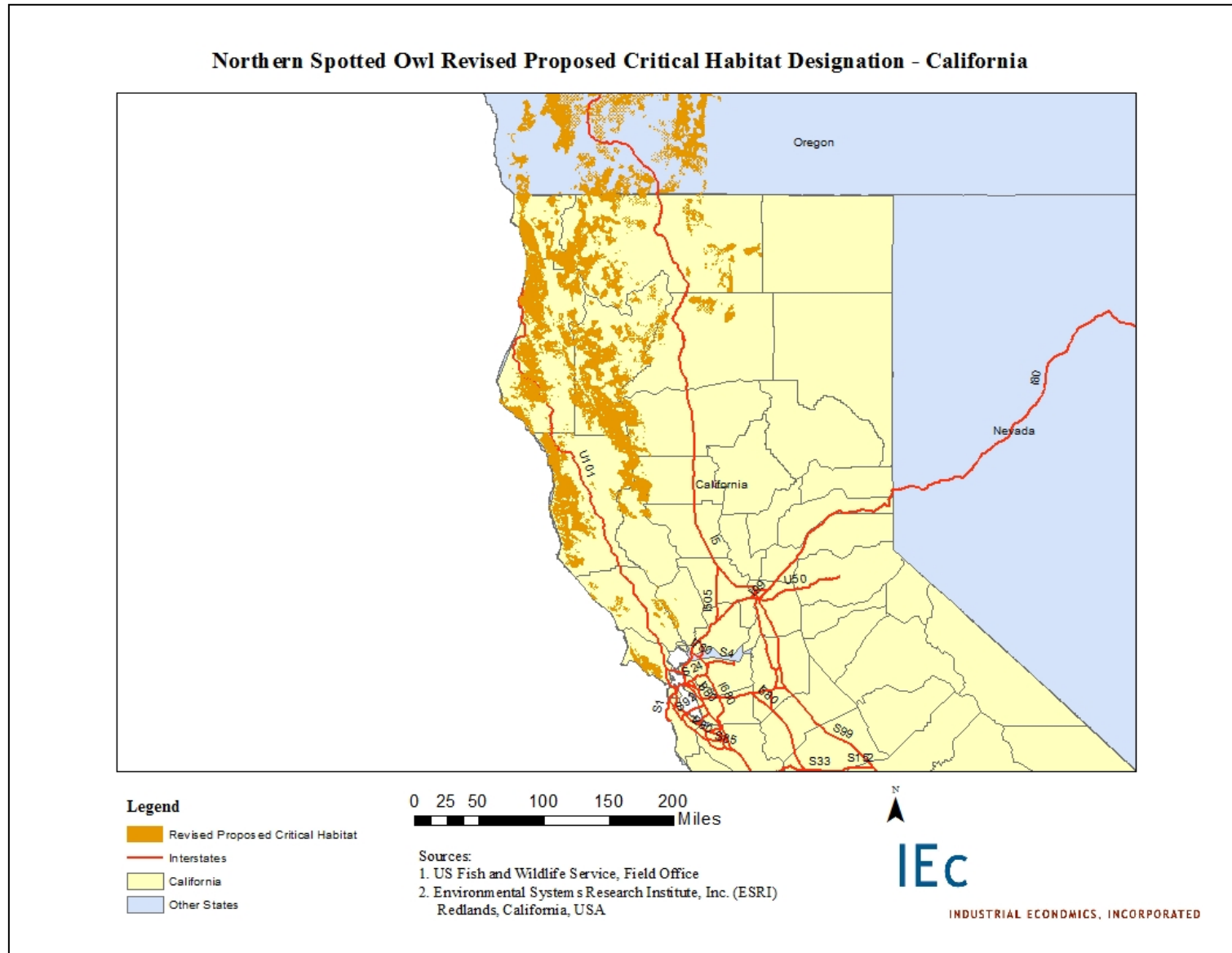


EXHIBIT 1-4. OVERVIEW OF NORTHERN SPOTTED OWL PROPOSED CRITICAL HABITAT IN CALIFORNIA



1.3 ECONOMIC ACTIVITIES CONSIDERED IN THIS ANALYSIS

56. The following economic activities potentially affect the NSO and its habitat within the boundaries of proposed critical habitat. These activities were identified through review of the proposed rule, consultation history, and existing conservation plans.

- **Timber Management:** Timber harvest has contributed to NSO habitat loss, degradation, and fragmentation and was the main basis for the original listing of the NSO in 1990.³⁴ Timber management activities represent the primary land use within proposed critical habitat. Thus, timber management is the central focus of our analysis, discussed in detail in Chapters 3 through 5.
- **Wildfire Management:** NSO habitat is particularly vulnerable to wildfire in drier forest systems, which have experienced recent wildfire losses that have exceeded the range of historical variability.³⁵ Some habitat losses resulting from increased wildfire frequency, intensity, and size can be attributed to excessive fuel buildup resulting from many decades of fire suppression. Fire management activities that benefit the NSO may include modified fuel reduction and fire suppression practices. These activities are discussed along with timber management activities in Chapters 3.
- **Road Construction and other Linear Projects:** Construction and maintenance of linear projects such as roads, natural gas pipelines, and electric power transmission lines can negatively impact the NSO and its critical habitat through direct habitat loss related to removal of hazard trees and noise disturbance related to blasting actions.³⁶ These activities are discussed in Chapter 6.
- **Other Forest and Species Management:** The presence of the barred owl in NSO habitat is considered one of the most significant threats currently facing the NSO.³⁷ In areas where these species co-exist, the NSO faces competition for habitat, nest sites and prey; the two species may hybridize; and the barred owl may occasionally prey on the NSO. Management programs to control the barred owl may possibly include direct removal of the species. Forest management activities recommended to benefit the NSO may include minimization of blowdowns and windthrow events through maintenance of large, contiguous blocks of older forest. Opportunity costs associated with barred owl management are not quantified in this report.³⁸

³⁴ 1990 Final Listing Rule, 55 FR 26114; 2012 Proposed Critical Habitat Rule, 77 FR 14062.

³⁵ Entrix, “Final Economic Analysis of Critical Habitat Designation for the Northern Spotted Owl,” prepared for the U.S. Fish and Wildlife Service, July 15, 2008.

³⁶ *Ibid.*

³⁷ 2012 Proposed Critical Habitat Rule, 77 FR 14062.

³⁸ Certain other economic activities were noted in public comments regarding the draft Economic Analysis, including impacts to the regional ski industry and livestock grazing on public and private lands. The Service notes in its response to these comments that ski area development actions generally tend not to conflict with spotted owl and critical habitat conservation needs, and thus they do not anticipate any significant regulatory burden associated with the designation of these lands as critical habitat. In addition, the Service notes that the rule does not prescribe limitations on grazing. Based on these

1.4 ORGANIZATION OF THE REPORT

57. The remainder of this report proceeds through seven additional Chapters.
- **Chapter 2** provides a detailed discussion of the framework for the economic analysis;
 - **Chapter 3** discusses the socioeconomic context in the region and characterizes the area's timber industry;
 - **Chapter 4** estimates impacts to timber production resulting from the designation of Federal lands;
 - **Chapter 5** estimates the impacts to timber production resulting from the designation of State and private lands;
 - **Chapter 6** synthesizes the results of Chapters 3 and 4 and considers the regional effects of changes in timber harvests on local communities and employment;
 - **Chapter 7** describes the potential incremental economic impacts to other activities, such as the construction and maintenance of linear projects; and
 - **Chapter 8** describes the potential benefits of the proposed critical habitat designation.
58. In addition, the report includes four appendices:
- **Appendix A** addresses additional statutory requirements, including consideration of small entities under RFA/SBREFA, unfunded mandates under UMRA, the potential for federalism concerns; and impacts on the supply, distribution, and use of energy in the U.S.;
 - **Appendix B** provides the Service's Incremental Effects memorandum to IEc describing potential changes in conservation recommendations for these species due to critical habitat designation;
 - **Appendix C** provides a detailed list of the entities contacted during our data collection efforts; and
 - **Appendix D** provides monetized estimates assuming a discount rate of three percent and the undiscounted stream of impacts.

representations and additional review, we have not added an explicit analysis of these activities in the final Economic Analysis.

CHAPTER 2 | FRAMEWORK FOR THE ANALYSIS

59. The purpose of this report is to estimate the economic impact of critical habitat designation to protect the Federally-listed northern spotted owl and its habitat. This analysis examines the impacts of restricting or modifying specific land uses or activities for the benefit of the species and its habitat within the areas considered for the proposed revised critical habitat designation.³⁹ This analysis employs "without critical habitat" and "with critical habitat" scenarios. The "without critical habitat" scenario represents the baseline for the analysis, considering protections afforded the NSO absent critical habitat designation; for example, under the Federal listing and other Federal, State, and local regulations. The "with critical habitat" scenario describes the incremental impacts associated specifically with the designation of critical habitat for the species. The incremental conservation efforts and associated impacts are those not expected to occur absent the designation of critical habitat for the NSO. This document uses the term "conservation efforts" to describe a variety of measures that may be suggested or required by the Service to address impacts to critical habitat during informal or formal consultations under section 7 of the Endangered Species Act ("ESA" or "Act").
60. According to section 4(b)(2) of the ESA, the Service must consider the economic impacts, impacts to national security, and other relevant impacts of designating any particular area as critical habitat. An area may be excluded from designation as critical habitat if the benefits of exclusion (i.e., the impacts that would be avoided if an area were excluded from the designation) outweigh the benefits of designation so long as exclusion of the area will not result in extinction of the species. Such an exclusion is made at the discretion of the Secretary of the U.S. Department of the Interior (DOI). **The purpose of the economic analysis is to provide information to assist the Secretary in determining whether the benefits of excluding particular areas from the designation outweigh the benefits of including those areas in the designation.**⁴⁰ In addition, this information allows the Service to address the requirements of Executive Orders 12866, 13563, 13132, and 13211; the Unfunded Mandates Reform Act (UMRA); and the Regulatory Flexibility Act (RFA), as amended by the Small Business Regulatory Enforcement Fairness Act (SBREFA).⁴¹

³⁹ 2012 Critical Habitat Rule, 77 FR 14062.

⁴⁰ 16 U.S.C. §1533(b)(2).

⁴¹ Executive Order 12866, Regulatory Planning and Review, September 30, 1993; Executive Order 13563, Improving Regulation and Regulatory Review, January 18, 2011; Executive Order 13211, Actions Concerning Regulations That Significantly Affect Energy Supply, Distribution, or Use, May 18, 2001; Executive Order 13132, Federalism, August 4, 1999; 2 U.S.C. 1531 *et seq*; 5 U.S.C. §§601 *et seq*; and Pub Law No. 104-121.

61. This Chapter describes the framework for this analysis. We first provide background on the case law that led to the selection of the framework applied in this report. Next, the Chapter describes in economic terms the general categories of economic effects that are the focus of the impact analysis, including a discussion of both efficiency and distributional effects. This Chapter then defines the analytic framework used to measure these impacts in the context of critical habitat regulation and the consideration of benefits. It concludes with a description of the information sources relied upon in the analysis and notes on the presentation of the results.

2.1 BACKGROUND

62. This analysis examines the impacts of restricting or modifying specific land uses or activities for the benefit of the species and its habitat within the proposed critical habitat area. The U.S. Office of Management and Budget's (OMB) guidelines for conducting economic analysis of regulations direct Federal agencies to measure the costs of a regulatory action against a baseline, which it defines as the "best assessment of the way the world would look absent the proposed action."⁴² In other words, the baseline includes the existing regulatory and socio-economic burden imposed on landowners, managers, or other resource users potentially affected by the designation of critical habitat. Impacts that are incremental to that baseline (i.e., occurring over and above existing constraints) are attributable to the proposed regulation. Significant debate has occurred regarding whether assessing the impacts of the Service's proposed regulations using this baseline approach is appropriate in the context of critical habitat designations.
63. In 2001, the U.S. Court of Appeals for the Tenth Circuit instructed the Service to conduct a full analysis of all of the economic impacts of proposed critical habitat, regardless of whether those impacts are attributable co-extensively to other causes.⁴³ Specifically, the court stated,

“The statutory language is plain in requiring some kind of consideration of economic impact in the CHD [critical habitat designation] phase. Although 50 C.F.R. 402.02 is not at issue here, the regulation's definition of the jeopardy standard as fully encompassing the adverse modification standard renders any purported economic analysis done utilizing the baseline approach virtually meaningless. We are compelled by the canons of statutory interpretation to give some effect to the congressional directive that economic impacts be considered at the time of critical habitat designation.... Because economic analysis done using the FWS's [Fish and Wildlife Service's] baseline model is rendered essentially without meaning by 50 C.F.R. § 402.02, we conclude Congress intended that the FWS conduct a full analysis of all of the economic impacts of a critical habitat designation, regardless of whether those impacts are

⁴² OMB, "Circular A-4," September 17, 2003, available at www.whitehouse.gov/sites/default/files/omb/assets/omb/circulars/a004/a-4.pdf.

⁴³ *New Mexico Cattle Growers Assn v. United States Fish and Wildlife Service*, 248 F.3d 1277 (10th Cir. 2001).

attributable co-extensively to other causes. Thus, we hold the baseline approach to economic analysis is not in accord with the language or intent of the ESA [Endangered Species Act].”⁴⁴

64. Since that decision, however, courts in other cases have held that an incremental analysis of impacts stemming solely from the critical habitat rulemaking is proper.⁴⁵ For example, in the March 2006 ruling that the August 2004 critical habitat rule for the Peirson's milk-vetch was arbitrary and capricious, the United States District Court for the Northern District of California stated,

“The Court is not persuaded by the reasoning of *New Mexico Cattle Growers*, and instead agrees with the reasoning and holding of *Cape Hatteras Access Preservation Alliance v. U.S. Dep’t of the Interior*, 344 F. Supp 2d 108 (D.D.C. 2004). That case also involved a challenge to the Service’s baseline approach and the court held that the baseline approach was both consistent with the language and purpose of the ESA and that it was a reasonable method for assessing the actual costs of a particular critical habitat designation *Id* at 130. ‘To find the true cost of a designation, the world with the designation must be compared to the world without it.’”⁴⁶

65. More recently, in 2010, the U.S. Court of Appeals for the Ninth Circuit came to similar conclusions during its reviews of critical habitat designations for the Mexican spotted owl and 15 vernal pool species.⁴⁷ In order to address the divergent opinions of the courts and provide the most complete information to decision-makers, this economic analysis will employ “without critical habitat” and “with critical habitat” scenarios:

- The “**without critical habitat**” scenario represents the **baseline** for the analysis, considering protections already accorded the NSO. The baseline for this analysis is the state of regulation, absent designation of critical habitat, that provides protection to the species under the Act, as well as under other Federal, State and local laws and conservation plans. The baseline includes sections 7, 9, and 10 of the Act to the extent that they are expected to apply absent the designation of critical habitat for the species. The analysis will qualitatively describe how baseline conservation for the NSO is currently implemented across the proposed designation in order to provide context for the incremental analysis.

⁴⁴ *Ibid*.

⁴⁵ In explanation of their differing conclusion, later decisions note that in *New Mexico Cattle Growers*, the U.S. Tenth Circuit Court of Appeals relied on a Service regulation that defined “destruction and adverse modification” in the context of section 7 consultation as effectively identical to the standard for “jeopardy.” Courts had since found that this definition of “adverse modification” was too narrow. For more details, see the discussion of *Gifford Pinchot Task Force v. United States Fish and Wildlife Service* provided later in this section.

⁴⁶ *Center for Biological Diversity v. United States Bureau of Land Management*, 422 F. Supp.2d 1115 (N.D. Cal. 2006).

⁴⁷ *Home Builders Association of Northern California v. United States Fish and Wildlife Service*, 616 F.3d 983 (9th Cir. 2010), cert. denied, 179 L. Ed 2d 301, 2011 U.S. Lexis 1392, 79 U.S.L.W. 3475 (2011); *Arizona Cattle Growers v. Salazar*, 606 F. 3d 1160 (9th Cir. 2010), cert. denied, 179 L. Ed. 2d 300, 2011 U.S. Lexis 1362, 79 U.S.L.W. 3475 (2011).

- The "**with critical habitat**" scenario describes and monetizes the **incremental** impacts due specifically to the designation of critical habitat for the species. The incremental NSO conservation efforts and associated impacts are those not expected to occur absent the designation of critical habitat. This report focuses on the incremental analysis.

66. Incremental effects of critical habitat designation are determined using the Service's December 9, 2004 interim guidance on "Application of the 'Destruction or Adverse Modification' Standard Under Section 7(a)(2) of the Endangered Species Act" and information from the Service regarding what potential consultations and project modifications may be imposed as a result of critical habitat designation over and above those associated with the listing.⁴⁸ Specifically, in *Gifford Pinchot Task Force v. United States Fish and Wildlife Service*, the U.S. Court of Appeals for the Ninth Circuit invalidated the Service's regulation defining destruction or adverse modification of critical habitat, and the Service no longer relies on this regulatory definition when analyzing whether an action is likely to destroy or adversely modify critical habitat.⁴⁹ Under the statutory provisions of the Act, the Service determines destruction or adverse modification on the basis of whether, with implementation of the proposed Federal action, the affected critical habitat would remain functional to serve its intended conservation role for the species.
67. A detailed description of the methodology used to define baseline and incremental impacts is provided in Appendix B.

2.2 CATEGORIES OF POTENTIAL ECONOMIC EFFECTS OF SPECIES CONSERVATION

68. This economic analysis considers both the economic efficiency and distributional effects that may result from efforts to protect the NSO and its habitat (hereinafter referred to collectively as "NSO conservation efforts"). Economic efficiency effects generally reflect "opportunity costs" associated with the commitment of resources required to accomplish species and habitat conservation. For example, if the set of activities that may take place on a parcel of land is limited as a result of the designation or the presence of the species, and thus the market value of the land is reduced, this reduction in value represents one measure of opportunity cost or change in economic efficiency. Similarly, the costs incurred by a Federal action agency to consult with the Service under section 7 represent opportunity costs of NSO conservation efforts.
69. This analysis also addresses the distribution of impacts associated with the designation, including an assessment of any local or regional impacts of habitat conservation and the potential effects of conservation efforts on small entities and the energy industry. This information may be used by decision-makers to assess whether the effects of species conservation efforts unduly burden a particular group or economic sector. For example,

⁴⁸ Director, U.S. Fish and Wildlife Service, Memorandum to Regional Directors and Manager of the California-Nevada Operations Office, Subject: Application of the "Destruction or Adverse Modification" Standard under Section 7(a)(2) of the Endangered Species Act, dated December 9, 2004.

⁴⁹ *Gifford Pinchot Task Force v. United States Fish and Wildlife Service*, No. 03-35279 (9th Circuit 2004).

while conservation efforts may have a small impact relative to the national economy, individuals employed in a particular sector of the regional economy may experience relatively greater impacts. The differences between economic efficiency effects and distributional effects, as well as their application in this analysis, are discussed in greater detail below.

2.2.1. ECONOMIC EFFICIENCY EFFECTS

70. At the guidance of OMB and in compliance with Executive Order 12866 "Regulatory Planning and Review," Federal agencies measure changes in economic efficiency in order to understand how society, as a whole, will be affected by a regulatory action. In the context of regulations that protect NSO habitat, these efficiency effects represent the opportunity cost of resources used or benefits foregone by society as a result of the regulations. Economists generally characterize opportunity costs in terms of changes in producer and consumer surpluses in affected markets.⁵⁰
71. In some instances, compliance costs may provide a reasonable approximation for the efficiency effects associated with a regulatory action. For example, a Federal land manager may enter into a consultation with the Service to ensure that a particular activity will not adversely modify critical habitat. The effort required for the consultation is an economic opportunity cost because the landowner or manager's time and effort would have been spent in an alternative activity had the parcel not been included in the designation. When compliance activity is not expected to significantly affect markets -- that is, not result in a shift in the quantity of a good or service provided at a given price, or in the quantity of a good or service demanded given a change in price -- the measurement of compliance costs can provide a reasonable estimate of the change in economic efficiency.
72. Where habitat protection measures are expected to significantly impact a market, it may be necessary to estimate changes in producer and consumer surpluses. For example, protection measures that reduce or preclude the development of large areas of land may shift the price and quantity of housing supplied in a region. In this case, changes in economic efficiency (i.e., social welfare) can be measured by considering changes in producer and consumer surplus in the market.
73. This analysis begins by measuring impacts associated with efforts undertaken to protect the NSO and its habitat. As noted above, in some cases, compliance costs can provide a reasonable estimate of changes in economic efficiency. However, if the cost of conservation efforts is expected to significantly impact markets, the analysis will consider potential changes in consumer and/or producer surplus in affected markets.

⁵⁰ For additional information on the definition of "surplus" and an explanation of consumer and producer surplus in the context of regulatory analysis, see: Gramlich, Edward M., A Guide to Benefit-Cost Analysis (2nd Ed.), Prospect Heights, Illinois: Waveland Press, Inc., 1990; and U.S. Environmental Protection Agency, Guidelines for Preparing Economic Analyses, EPA 240-R-00-003, September 2000, available at <http://yosemite.epa.gov/ee/epa/eed.nsf/webpages/Guidelines.html>.

2.2.2. DISTRIBUTIONAL AND REGIONAL ECONOMIC EFFECTS

74. Measurements of changes in economic efficiency focus on the net impact of conservation efforts, without consideration of how certain economic sectors or groups of people are affected. Thus, a discussion of efficiency effects alone may miss important distributional considerations. OMB encourages Federal agencies to consider distributional effects separately from efficiency effects.⁵¹ This analysis considers several types of distributional effects, including impacts on small entities; impacts on energy supply, distribution, and use; and regional economic impacts. It is important to note that these are fundamentally different measures of economic impact than efficiency effects, and thus cannot be added to or compared with estimates of changes in economic efficiency.

Impacts on Small Entities and Energy Supply, Distribution, and Use

75. This analysis considers how small entities, including small businesses, organizations, and governments, as defined by the RFA, might be affected by future species conservation efforts. We also consider the potential for impacts to State, local, and Tribal governments and the private sector under the UMRA. In addition, in response to Executive Order 13132, "Federalism" we consider the potential federalism implications of the proposed rule. Finally, in response to Executive Order 13211 "Actions Concerning Regulations That Significantly Affect Energy Supply, Distribution, or Use," this analysis considers the future impacts of conservation efforts on the energy industry and its customers.

Regional Economic Effects

76. Regional economic impact analysis can provide an assessment of the potential localized effects of conservation efforts. Specifically, regional economic impact analysis produces a quantitative estimate of the potential magnitude of the initial change in the regional economy resulting from a regulatory action. Regional economic impacts are commonly measured using regional input/output models. These models rely on multipliers that represent the relationship between a change in one sector of the economy (e.g., output by timber mills) and the effect of that change on economic output, income, or employment in other local industries (e.g., suppliers of goods and services to mills). These economic data provide a quantitative estimate of the magnitude of shifts of jobs and revenues in the local economy.
77. The use of regional input/output models in an analysis of the impacts of species and habitat conservation efforts can overstate the long-term impacts of a regulatory change. Most importantly, these models provide a static view of the economy of a region. That is, they measure the initial impact of a regulatory change on an economy but do not consider long-term adjustments that the economy will make in response to this change. For example, these models provide estimates of the number of jobs lost as a result of a regulatory change, but do not consider re-employment of these individuals over time or other adaptive responses by impacted businesses. In addition, the flow of goods and services across the regional boundaries defined in the model may change as a result of the regulation, compensating for a potential decrease in economic activity within the region.

⁵¹ U.S. Office of Management and Budget, "Circular A-4," September 17, 2003, available at <http://www.whitehouse.gov/sites/default/files/omb/assets/omb/circulars/a004/a-4.pdf>.

78. Despite these and other limitations, in certain circumstances regional economic impact analysis may provide useful information about the scale and scope of localized impacts. It is important to remember that measures of regional economic effects generally reflect shifts in resource use rather than efficiency losses. Thus, these types of distributional effects are reported separately from efficiency effects (i.e., not summed). In addition, measures of regional economic impact cannot be compared with estimates of efficiency effects, but should be considered as distinct measures of impact.

2.3 ANALYTIC FRAMEWORK AND SCOPE OF THE ANALYSIS

79. This analysis: 1) identifies those economic activities most likely to affect the NSO and its habitat; 2) describes the baseline regulation protection for the species; and 3) monetizes the incremental economic impacts to avoid adverse modification of the proposed critical habitat study area. This section provides a description of the methods used to separately identify baseline protections from the incremental impacts stemming from the proposed designation of critical habitat for the NSO. This evaluation of impacts in a "with critical habitat designation" versus a "without critical habitat designation" framework effectively measures the net change in economic activity associated with the proposed rulemaking.

2.3.1. BASELINE ECONOMIC IMPACTS

80. The baseline for this analysis is the existing state of regulation, prior to the designation of critical habitat, which provides protection to the species under Act, as well as under other Federal, State and local laws and guidelines. This "without critical habitat designation" scenario also considers a wide range of additional factors beyond the compliance costs of regulations that provide protection to the listed species. As recommended by OMB, the baseline incorporates, as appropriate, trends in market conditions, implementation of other regulations and policies by the Service and other government entities, and trends in other factors that have the potential to affect economic costs and benefits, such as the rate of regional economic growth in potentially affected industries.
81. Baseline protections include sections 7, 9, and 10 of the Act, and economic impacts resulting from these protections to the extent that they are expected to occur absent the designation of critical habitat for the species. This analysis describes these baseline regulations qualitatively. The primary focus is not on baseline costs, since these will not be affected by the proposed regulation. Instead, the focus of this analysis is on monetizing the incremental impacts forecast to result from the proposed critical habitat designation.
- Section 7 of the Act, absent critical habitat designation, requires Federal agencies to consult with the Service to ensure that any action authorized, funded, or carried out by that agency will not likely jeopardize the continued existence of any endangered or threatened species. Consultations under the jeopardy standard result in administrative costs, as well as impacts of conservation efforts resulting from consideration of this standard.
 - Section 9 defines the actions that are prohibited by the Act. In particular, it prohibits the "take" of endangered wildlife, where "take" means to "harass, harm,

pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct."⁵² Subsequent regulation has made prohibitions against take of endangered species under section 9 applicable to threatened species, such as the NSO, as well.⁵³ The economic impacts associated with this section manifest themselves in sections 7 and 10.

- Under section 10(a)(1)(B) of the Act, an entity (e.g., a landowner or local government) may develop a HCP for a listed animal species in order to meet the conditions for issuance of an incidental take permit in connection with a land or water use activity or project.⁵⁴ The requirements posed by the HCP may have economic impacts associated with the goal of ensuring that the effects of incidental take are adequately avoided or minimized. The development and implementation of HCPs is considered a baseline protection for the species and habitat unless the HCP is determined to be precipitated by the designation of critical habitat, or the designation influences stipulated conservation efforts under HCPs.

Enforcement actions taken in response to violations of the Act are not included in this analysis.

82. The protection of listed species and habitat is not limited to the Act. Other Federal agencies, as well as State and local governments, may also seek to protect the natural resources under their jurisdiction. If compliance with State forest practices laws, for example, protects habitat for the species, such protective efforts are considered to be baseline protections and costs associated with these efforts are categorized accordingly. Of note, however, is that such efforts may not be considered baseline in the case that they would not have been triggered absent the designation of critical habitat. In these cases, they are considered incremental impacts and are discussed below.

2.3.2. INCREMENTAL ECONOMIC IMPACTS

83. This analysis quantifies the potential incremental impacts of this rulemaking. The focus of the incremental analysis is to determine the impacts on land uses and activities from the designation of critical habitat that are above and beyond those impacts resulting from existing required or voluntary conservation efforts being undertaken due to other Federal, State, and local regulations or guidelines.
84. When critical habitat is designated, section 7 requires Federal agencies to ensure that their actions will not result in the destruction or adverse modification of critical habitat (in addition to considering whether the actions are likely to jeopardize the continued existence of the species). The added administrative costs of including consideration of critical habitat in section 7 consultations, and the additional impacts of implementing conservation efforts (i.e., reasonable and prudent alternatives) resulting from the

⁵² 16 U.S.C. 1532.

⁵³ 16 U.S.C. 1538(a)(1)(G); 50 C.F.R. 17.31(a).

⁵⁴ U.S. Fish and Wildlife Service, "Endangered Species and Habitat Conservation Planning," August 6, 2002, accessed at <http://endangered.fws.gov/hcp/>.

protection of critical habitat are the direct compliance costs of designating critical habitat. These costs are not in the baseline and are considered incremental impacts of the rulemaking.

85. To inform the economic analysis, the Service has provided a memorandum describing its expected approach to conservation for the NSO following critical habitat designation.⁵⁵ Specifically, this memorandum provides information on how the Service intends to address projects that might lead to adverse modification of critical habitat as distinct from projects that pose jeopardy to the species. The Service's memorandum is provided in Appendix B. Based on the information provided in Appendix B, the incremental effects of designating critical habitat for NSO are dependent on the effect of a proposed action on NSO habitat, the location of the proposed action relative to a land-use allocation, the occupancy status, and the design of the proposed action.⁵⁶

Direct Impacts

86. The direct, incremental impacts of critical habitat designation stem from the consideration of the potential for destruction or adverse modification of critical habitat during section 7 consultations. The two categories of direct, incremental impacts of critical habitat designation are: 1) the administrative costs of conducting section 7 consultation; and 2) implementation of any conservation efforts required by the Service through section 7 consultation to avoid potential destruction or adverse modification of critical habitat.
87. Section 7(a)(2) of the Act requires Federal agencies to consult with the Service whenever activities that they undertake, authorize, permit, or fund may affect a listed species or designated critical habitat. In some cases, consultations will involve the Service and another Federal agency only, such as the Corps. Often, they will also include a third party involved in projects that involve a permitted entity, such as the recipient of a Clean Water Act section 404 permit.
88. During a consultation, the Service, the Action agency, and the entity applying for Federal funding or permitting (if applicable) communicate in an effort to minimize potential adverse effects to the species and/or to the proposed critical habitat. Communication between these parties may occur via written letters, phone calls, in-person meetings, or any combination of these. The duration and complexity of these interactions depends on a number of variables, including the type of consultation, the species, the activity of concern, and the potential effects to the species and designated critical habitat associated with the proposed activity, the Federal agency, and whether there is a private applicant involved.
89. Section 7 consultations with the Service may be either informal or formal. *Informal consultations* consist of discussions between the Service, the Action agency, and the applicant concerning an action that may affect a listed species or its designated critical habitat, and are designed to identify and resolve potential concerns at an early stage in the

⁵⁵ U.S. Fish and Wildlife Service to Industrial Economics, Inc. "Incremental Effects Memorandum for the Economic Analysis of the Proposed Rule to Revise Critical Habitat for the Northern Spotted Owl," May 2, 2012.

⁵⁶ *Ibid.*

planning process. By contrast, a *formal consultation* is required if the Action agency or the Service determines that its proposed action may or will adversely affect the listed species or designated critical habitat in ways that cannot be resolved through informal consultation. The formal consultation process results in the Service's determination in its Biological Opinion of whether the action is likely to jeopardize a species or adversely modify critical habitat, and if so, reasonable and prudent alternatives to avoid jeopardy or adverse modification. If the action is not likely to result in jeopardy or adverse modification of critical habitat, the Service specifies the amount or extent of incidental take of the species, the reasonable and prudent measures necessary or appropriate to minimize such impact and the terms and conditions necessary to implement the reasonable and prudent measures. Regardless of the type of consultation or proposed project, section 7 consultations can require substantial administrative effort on the part of all participants.

Administrative Section 7 Consultation Costs

90. Parties involved in section 7 consultations include the Service, a Federal "action agency," and in some cases, a private entity involved in the project or land use activity. The action agency (i.e., the Federal nexus necessitating the consultation) serves as the liaison with the Service. While consultations are required for activities that involve a Federal nexus and may affect a species regardless of whether critical habitat is designated, the designation may increase the effort for consultations in the case that the project or activity in question may adversely modify critical habitat. Administrative efforts for consultation may therefore result in both baseline and incremental impacts.
91. In general, three different scenarios associated with the designation of critical habitat may trigger incremental administrative consultation costs:
 1. **Additional effort to address adverse modification in a new consultation -** New consultations taking place after critical habitat designation may require additional effort to address critical habitat issues above and beyond the listing issues. In this case, the additional administrative effort required to consider critical habitat is considered an incremental impact of the designation. (Incremental impacts related to incremental conservation efforts are discussed later in this section.)
 2. **Re-initiation of consultation to address adverse modification -** Consultations that have already been completed on a project or activity may require re-initiation to address critical habitat. In this case, the costs of re-initiating the consultation, including all associated administrative costs and costs associated with measures to address impacts to critical habitat are considered incremental impacts of the designation.
 3. **Incremental consultation resulting entirely from critical habitat designation -** Critical habitat designation may trigger additional consultations that may not occur absent the designation. These incremental consultations may address adverse modification alone (e.g., consultations triggered in critical habitat areas that are not occupied by the species) or may address adverse modification and

jeopardy (e.g., consultations resulting from the new information about the potential presence of the species provided by the designation). All administrative costs and costs of conservation efforts associated with incremental consultations are considered incremental impacts of the designation.

92. The administrative costs of these consultations vary depending on the specifics of the project. One way to address this variability is to show a range of possible costs of consultation, as it may not be possible to predict the precise outcome of each future consultation in terms of level of effort. The Service provides estimates of the level of effort associated with section 7 consultations in the Incremental Effects Memorandum included in Appendix B.

Section 7 Conservation Effort Impacts

93. Section 7 consultation considering critical habitat may also result in additional conservation effort recommendations specifically addressing potential destruction or adverse modification of critical habitat. For forecast consultations considering jeopardy and adverse modification, and for re-initiations of past consultations to consider critical habitat, the economic impacts of conservation efforts undertaken to avoid adverse modification are considered incremental impacts of critical habitat designation. For consultations that are forecast to occur specifically because of the designation (incremental consultations), impacts of all associated conservation efforts are assumed to be incremental impacts of the designation. This is summarized below.

1. **Additional effort to address adverse modification in a new consultation -**
Only project modifications above and beyond what would be requested to avoid or minimize jeopardy are considered incremental.
2. **Re-initiation of consultation to address adverse modification -** Only project modifications above and beyond what was requested to avoid or minimize jeopardy are considered incremental.
3. **Incremental consultation resulting entirely from critical habitat designation**
Impacts of all project modifications are considered incremental.

Indirect Impacts

94. The designation of critical habitat may, under certain circumstances, affect actions that do not have a Federal nexus and thus are not subject to the provisions of section 7 under the Act. Indirect impacts are those unintended changes in economic behavior that may occur outside of the Act, through other Federal, State, or local actions, and that are caused by the designation of critical habitat. This section identifies common types of indirect impacts that may be associated with the designation of critical habitat. Importantly, these types of impacts are not always considered incremental. In the case that these types of conservation efforts and economic effects are expected to occur regardless of critical habitat designation, they are appropriately considered baseline impacts in this analysis.

Habitat Conservation Plans

95. Under section 10 of the Act, landowners seeking an incidental take permit must develop an HCP to counterbalance the potential harmful effects that an otherwise lawful activity may have on a species. As such, the purpose of the habitat conservation planning process is to ensure that the effects of incidental take are adequately avoided or minimized. Thus, HCPs are developed to meet the requirements of section 10 of the Act and avoid unauthorized take of listed species. Several existing and proposed HCPs include the NSO as a covered species.⁵⁷
96. Application for an incidental take permit and completion of an HCP are not required or necessarily recommended by a critical habitat designation. However, in certain situations the new information provided by the proposed critical habitat rule may prompt a landowner to apply for an incidental take permit. For example, a landowner may have been previously unaware of the potential presence of the species on his or her property, and expeditious completion of an HCP may offer the landowner regulatory relief in the form of exclusion from the final critical habitat designation. In this case, the effort involved in creating the HCP and undertaking associated conservation efforts are considered an incremental effect of designation. No specific plans to prepare new HCPs in response to this proposed designation were identified for the NSO.

Other State and Local Laws

97. Under certain circumstances, critical habitat designation may provide new information to a community about the sensitive ecological nature of a geographic region, potentially triggering additional economic impacts under other State or local laws. In cases where these impacts would not have been triggered absent critical habitat designation, they are considered indirect, incremental impacts of the designation.
98. The California Environmental Quality Act (CEQA), for example, requires that lead agencies, public agencies responsible for project approval, consider the environmental effects of proposed projects that are considered discretionary in nature and not categorically or statutorily exempt. In some instances, critical habitat designation may trigger CEQA-related requirements. This is most likely to occur in areas where the critical habitat designation provides clearer information on the importance of particular areas as habitat for a listed species. In addition, applicants who were “categorically exempt” from preparing an EIR under CEQA may no longer be exempt once critical habitat is designated. In cases where the designation triggers the CEQA significance test or results in a reduction of categorically exempt activities, associated impacts are considered to be an indirect, incremental effect of the designation.

Additional Indirect Impacts

99. In addition to the indirect effects of compliance with other laws or triggered by the designation, project proponents, land managers and landowners may face additional indirect impacts, including the following:

⁵⁷ 2012 Proposed Critical Habitat Rule, 76 FR 14134

- **Time Delays** - Both public and private entities may experience incremental time delays for projects and other activities due to requirements associated with the need to reinitiate the section 7 consultation process and/or compliance with other laws triggered by the designation. To the extent that delays result from the designation, they are considered indirect, incremental impacts of the designation.
- **Regulatory Uncertainty** - The Service conducts each section 7 consultation on a case-by-case basis and issues a biological opinion on formal consultations based on species-specific and site-specific information. As a result, government agencies and affiliated private parties who consult with the Service under section 7 may face uncertainty concerning whether project modifications will be recommended by the Service and what the nature of these modifications will be. This uncertainty may diminish as consultations are completed and additional information becomes available on the effects of critical habitat on specific activities. Where information suggests that this type of regulatory uncertainty stemming from the designation may affect a project or economic behavior, associated impacts are considered indirect, incremental impacts of the designation.
- **Stigma** - In some cases, the public may perceive that critical habitat designation may result in limitations on private property uses above and beyond those associated with anticipated project modifications and regulatory uncertainty described above. Public attitudes about the limits or restrictions that critical habitat may impose can cause real economic effects to property owners, regardless of whether such limits are actually imposed. All else equal, a property that is designated as critical habitat may have a lower market value than an identical property that is not within the boundaries of critical habitat due to perceived limitations or restrictions.⁵⁸ As the public becomes aware of the true regulatory burden imposed by critical habitat, the impact of the designation on property markets may decrease. To the extent that potential stigma effects on markets are probable and identifiable, these impacts are considered indirect, incremental impacts of the designation.

Indirect impacts may also result from critical habitat providing new information regarding where project proponents should consult regarding potential impacts on the species or habitat. As described in Appendix B, critical habitat designation for the NSO is not likely to provide new information about the presence of the species for the 63 subunits considered occupied by the NSO. The one unoccupied unit (NSO-3) is Federally managed by the Department of Defense, which currently does not consult on

⁵⁸ Several studies have attempted to estimate the impact of perceptions about the effect of critical habitat designation on land values and economic activity. Examples include Auffhammer, M., M. Oren, and D. Sunding. 2009. "Economic Impacts of Critical habitat Designation: Evidence from the Market for Vacant Land." Workshop Paper, The University of Arizona, Program on Economics, Law, and the Environment, available at <http://ele.arizona.edu/files/ELFsunding1-30-09.pdf>; List, J.A., M. Margolis, and D. E. Osgood. 2006. "Is the Endangered Species Act Endangering Species?" National Bureau of Economic Research Working Paper Series, Working Paper 12777, available at <http://www.nber.org/papers/w12777>; and Lueck, Dean and Jeffrey A. Michael, April 2003, "Preemptive Habitat Destruction Under the Endangered Species Act," *Journal of Law and Economics*, 46: 27-60.

proposed actions relative to effects on the spotted owl.⁵⁹ Therefore, indirect impacts may result in this subunit and are addressed in Chapter 4.

2.3.3. BENEFITS

100. Under Executive Order 12866, OMB directs Federal agencies to provide an assessment of both the social costs and benefits of proposed regulatory actions.⁶⁰ OMB's Circular A-4 distinguishes two types of economic benefits: *direct benefits and ancillary benefits*. Ancillary benefits are defined as favorable impacts of a rulemaking that are typically unrelated, or secondary, to the statutory purpose of the rulemaking.⁶¹
101. In the context of critical habitat, the primary purpose of the rulemaking (i.e., the direct benefit) is the potential to enhance conservation of the species. The published economics literature has documented that social welfare benefits can result from the conservation and recovery of endangered and threatened species. In its guidance for implementing Executive Order 12866, OMB acknowledges that it may not be feasible to monetize, or even quantify, the benefits of environmental regulations due to either an absence of defensible, relevant studies or a lack of resources on the implementing agency's part to conduct new research.⁶² Rather than rely on economic measures, the Service believes that the direct benefits of the proposed rule are best expressed in biological terms that can be weighed against the expected cost impacts of the rulemaking.
102. Critical habitat designation may also generate ancillary benefits. Critical habitat aids in the conservation of species specifically by protecting the primary constituent elements on which the species depends. To this end, critical habitat designation can result in maintenance of particular environmental conditions that may generate other social benefits aside from the preservation of the species. That is, management actions undertaken to conserve a species or habitat may have coincident, positive social welfare implications, such as increased recreational opportunities in a region. While they are not the primary purpose of critical habitat, these ancillary benefits may result in gains in employment, output, or income that may offset the direct, negative impacts to a region's economy resulting from actions to conserve a species or its habitat. The potential ancillary benefits of critical habitat designation are described qualitatively in Chapter 8 of this report.

2.3.4. GEOGRAPHIC SCOPE

103. The geographic scope of the analysis includes the areas proposed for critical habitat designation. The analysis focuses on activities within or affecting these areas, and presents impacts at the lowest level of resolution feasible, given available data. Where possible, impacts are reported for each subunit identified in the proposed rule.

⁵⁹ U.S. Fish and Wildlife Service to Industrial Economics, Inc. "Incremental Effects Memorandum for the Economic Analysis of the Proposed Rule to Revise Critical Habitat for the Northern Spotted Owl," March 21, 2012.

⁶⁰ Executive Order 12866, Regulatory Planning and Review, September 30, 1993.

⁶¹ U.S. Office of Management and Budget, "Circular A-4," September 17, 2003, available at <http://www.whitehouse.gov/sites/default/files/omb/assets/omb/circulars/a004/a-4.pdf>

⁶² *Ibid.*

2.3.5. ANALYTIC TIMEFRAME

104. Ideally, the time frame of this analysis would be based on the expected time period over which the critical habitat regulation is expected to be in place. Specifically, the analysis would forecast impacts of implementing this rule through species recovery (i.e., when the rule is no longer required). Recent guidance from OMB indicates that “if a regulation has no predetermined sunset provision, the agency will need to choose the endpoint of its analysis on the basis of a judgment about the foreseeable future.”⁶³ The “foreseeable future” for this analysis includes, but is not limited to, activities that are currently authorized, permitted, or funded, or for which proposed plans are currently available to the public. Forecasted impacts will be based on the planning periods for potentially affected projects and will look out over a 20-year time horizon. OMB supports this time frame stating that “for most agencies, a standard time period of analysis is ten to 20 years, and rarely exceeds 50 years.”⁶⁴ The timeframe for this analysis varies depending on the economic activity under consideration. Impacts to Federal timberlands are generally considered over a 20-year time period. We qualitatively discuss the potential for permanent changes in the value of private timberlands. Linear projects are forecast over a range of time periods based on data availability.

2.4 SOURCES OF INFORMATION

105. The primary sources of information for this report are communications with, and data provided by, personnel from the Service (in particular, the Incremental Effects Memorandum provided by the Service, included as Appendix B), personnel from other Federal agencies, State governments and timber industry representatives. See Appendix C for a complete list of entities contacted during stakeholder outreach. In addition, this analysis relies upon the Service’s section 7 consultation record and existing habitat management and conservation plans that consider the NSO. Finally, this analysis relies on relevant information and data from the economic analysis prepared in support of the 2008 proposed critical habitat rule.⁶⁵ A complete list of references is provided at the end of this document.

2.5 PRESENTATION OF RESULTS

106. Impacts are described in present value and annualized terms applying discount rates of three and seven percent throughout the body of the report. Appendix D provides additional detail for the present and annualized value of impacts in each unit applying these discount rates.⁶⁶ Additionally, Appendix D presents undiscounted annual impact values by activity and subunit. Present value and annualized impacts are calculated according to the methods described in Exhibit 2-1.

⁶³ The U.S. Office of Management and Budget, February 7, 2011. “Regulatory Impact Analysis: Frequently Asked Questions (FAQs).” Accessed on May 3, 2011 by http://www.whitehouse.gov/sites/default/files/omb/circulars/a004/a-4_FAQ.pdf.

⁶⁴ *Ibid.*

⁶⁵ Entrix, “Final Economic Analysis of Critical Habitat Designation for the Northern Spotted Owl,” prepared for the U.S. Fish and Wildlife Service, July 15, 2008.

⁶⁶ The U.S. Office of Management and Budget (OMB) requires Federal agencies to report results using discount rates of three and seven percent (see OMB, Circular A-4, 2003).

EXHIBIT 2-1. CALCULATING PRESENT VALUE AND ANNUALIZED IMPACT

This analysis compares economic impacts incurred in different time periods in present value terms. The present value represents the value of a payment or stream of payments in common dollar terms. That is, it is the sum of a series of past or future cash flows expressed in today's dollars. Translation of economic impacts of past or future costs to present value terms requires the following: a) past or projected future costs of critical habitat designation; and b) the specific years in which these impacts have been or are expected to be incurred. With these data, the present value of the past or future stream of impacts (PV_c) from year t to T is measured in 2011 dollars according to the following standard formula:^a

$$PV_c = \sum_t^T \frac{C_t}{(1+r)^{t-2011}}$$

C_t = cost of NSO critical habitat conservation efforts in year t

r = discount rate^b

Impacts for each activity in each unit are also expressed as annualized values. Annualized values are calculated to provide comparison of impacts across activities with varying forecast periods (T). For this analysis, activities employ varying forecast periods. Annualized future impacts (APV_c) are calculated by the following standard formula:

$$APV_c = PV_c \left[\frac{r}{1 - (1+r)^{-(N)}} \right]$$

N = number of years in the forecast period

^a To derive the present value of future impacts, t is 2011 and T is the final year of the forecast.

^b To discount and annualize costs, guidance provided by the OMB specifies the use of a real rate of seven percent. In addition, OMB recommends sensitivity analysis using other discount rates such as three percent, which some economists believe better reflects the social rate of time preference. (U.S. Office of Management and Budget, Circular A-4, September 17, 2003 and U.S. Office of Management and Budget, "Draft 2003 Report to Congress on the Costs and Benefits of Federal Regulations; Notice," 68 *Federal Register* 5492, February 3, 2003.)

CHAPTER 3 | BACKGROUND

107. The timber industry has long been an economic driver in the Pacific Northwest, providing a substantial share of the economic foundation for many rural communities. Over the past 20 years, the industry has undergone significant changes that have manifested in reduced timber-related jobs and revenues. The drivers of change are many and varied; some are politically contentious and high-profile, such as the controversies over forest management practices and protective measures for endangered species (including the NSO, marbled murrelets, and Pacific salmon), and others are complex and variable, such as globalization of the timber market and modernization of the industry. This chapter provides an overview of recent trends in the timber industry, with a focus on the past 20 years, in terms of timber harvest, employment, and revenues. It also provides a brief overview of some of the major forces driving changes in industry trends.

3.1 TIMBER INDUSTRY TRENDS

108. In general, timber harvests and employment within the timber industry have decreased within the study area over the last 20 years. As discussed more fully below, many variables have contributed to the decline in timber industry employment, including the decline in the availability of Federal timber, mechanization, transfer of capital investment away from the region, closure of less efficient mills, and fluctuating demand for wood products. It is important to view changes in timber industry employment in the Pacific Northwest within the greater context of regional market conditions. Between 1990 and 2000, timber industry employment in the NWFP area declined significantly, by approximately 30,000 jobs. Meanwhile, there were substantial increases in both population and total employment in the tri-state area of California, Oregon, and Washington; population increased by 15 percent and employment grew 18 percent, representing a total of 3.8 million jobs gained.⁶⁷ During the following decade, however, population in the tri-state area continued to grow while job growth slowed, with total employment increasing only three percent between 2000 and 2010.⁶⁸

3.1.1 REGULATORY BACKGROUND

109. After the NSO was designated as a threatened species in 1990, a series of lawsuits over Federal timber sales led to the 1991 court injunction that halted the majority of timber sales occurring on Federal lands within the range of the NSO. In response to the lawsuits, President Clinton convened a forest conference in 1993 and issued a mandate for Federal

⁶⁷ Routman, K. 2007. Forest Communities and the Northwest Forest Plan: What Socioeconomic Monitoring Can Tell Us. *Science Findings* (95). Pacific Northwest Research Station, USDA Forest Service.

⁶⁸ U.S. Bureau of Economic Analysis, "Interactive Data: Regional Data: GDP & Personal Income: Annual State Personal Income and Employment," as viewed at <http://www.bea.gov/iTable/iTable.cfm?ReqID=70&step=1> on September 30, 2012.

land-management and regulatory agencies to develop a plan to resolve the conflict. The resulting NWFP was adopted in 1994. It amended existing management plans for 19 National Forests and seven BLM districts in California, Oregon, and Washington.⁶⁹ One of the main goals of the plan was to produce predictable levels of timber and non-timber resources in order to provide stability to local and regional economies.⁷⁰

110. Exhibit 3-1 shows the areas covered by the NWFP and how these areas fall within the larger study area.⁷¹ Most of the proposed designation is subject to the plan. Areas in blue, which are proposed for designation but not covered by the plan, are largely State and private lands.

3.1.2 HARVEST TRENDS

111. In this section, we present data on trends in timber harvests from 1990 through 2010. The volume of timber harvested in the 56 counties where critical habitat is proposed has decreased sharply in the past 20 years. In 1990, harvests from all counties overlapping the study area totaled 12,368,023 mbf. Harvests from these same counties totaled 6,034,956 mbf in 2010, representing a 51 percent decrease in production.^{72,73,74,75} Exhibits 3-2 through 3-4 provide annual timber harvest data within the study area for 2010, as well as the proportion of timber harvested on public lands, and the percent decrease from 1990 harvest levels (for both public and private lands).
112. In addition to an overall decrease in harvests over the last 20 years, the relative contribution of Federal and private lands to those totals has shifted, as shown in Exhibit 3-5. In 1990, harvests from public lands within the 56 counties where critical habitat is proposed accounted for 32 percent of all timber harvested in that region.^{76,77,78} Ten years

⁶⁹ Charnley, S, EM Donoghue, and C Moseley. 2008. "Forest Management Policy and Community Well-Being in the Pacific Northwest." *Journal of Forestry* (December 2008). Accessed at http://www.fs.fed.us/pnw/pubs/journals/pnw_2008_chnley001.pdf on April 6, 2012.

⁷⁰ The NWFP established land use designations that included a network of connected reserves to conserve the species of concern. The reserve network was embedded in a matrix of "working" forests; all lands outside reserves and withdrawn areas were available for regularly scheduled timber harvests.

⁷¹ The NWFP covers 26,887,086 acres, 14,801,009 of which are not included as part of the 2012 proposed critical habitat. An additional 1,876,756 acres of the proposed critical habitat are not included in the NWFP.

⁷² California State Board of Equalization, "California Timber Harvest By County: Year 2010 Quarter 1 to 4." Accessed at <http://www.boe.ca.gov/proptaxes/pdf/ytr362010.pdf> March 2012.

⁷³ California State Board of Equalization, "California Timber Harvest By County: 1994-2009." Accessed at <http://www.boe.ca.gov/proptaxes/pdf/yr3694to09.pdf> March 2012.

⁷⁴ Oregon Department of Forestry, "Oregon Annual Timber Reports." Accessed at http://www.oregon.gov/ODF/STATE_FORESTS/FRP/annual_reports.shtml March 2012.

⁷⁵ Washington State Department of Natural Resources, "Washington State Timber Harvest." Accessed at http://www.dnr.wa.gov/BusinessPermits/Topics/EconomicReports/Pages/obe_washington_timber_harvest_reports.aspx March 2012.

⁷⁶ California State Board of Equalization, 2009

⁷⁷ Oregon Department of Forestry. 2012

⁷⁸ Washington State Department of Natural Resources, 2012

later, in 2000, harvests from public lands accounted for only 14 percent. In 2010, the proportion of timber harvested from public lands had risen back up to 24 percent. However, this rise in the proportional share of timber from public lands appears to be driven more by a decrease in harvests on private lands, rather than large increase in harvests on public lands. These trends are particularly important given that private timberlands are approximately nine percent of the total acreage of proposed critical habitat.⁷⁹

113. Timber harvests between 2000 and 2010 did not keep pace with NWFP projections. The plan predicted that harvests from public lands within the NWFP area would be over 800 million board feet (MMBF) annually from 1999 to present.⁸⁰ Predicted harvests have not been met within the NWFP area, in part due to controversy over harvesting mature and old-growth stands, which were expected to be the primary harvest component in the first few decades of the NWFP.^{81,82,83}

⁷⁹ 2012 Proposed Critical Habitat Rule, 77 FR 14062.

⁸⁰ Phillips, R.H. 2006. Jobs and income associated with resource and recreation outputs. P. 37-51 in *Northwest Forest Plan: The first ten years (1994-2003): Socioeconomic monitoring results. Volume III: Rural communities and economies*, Charnley, S. (tech. coord.). US For. Serv. Gen. Tech. Rep. PNW-GTR-649, Pacific Northwest Res. Stn., Portland, OR. 206 p.

⁸¹ Exhibit 3-5 illustrates timber production on public lands within the proposed critical habitat counties and is not limited to the public lands within the NWFP area. While harvest from the proposed critical habitat counties was greater than 800 MMBP in each year, this was not true for the public lands within the NWFP area.

⁸² Charnley, Susan. 2006. The Northwest Forest Plan as a Model for Broad-Scale Ecosystem Management: a Social Perspective. U.S. Department of Agriculture Forest Service, Pacific Northwest Research Station. Portland, OR.

⁸³ Routman, K. 2007. Forest Communities and the Northwest Forest Plan: What Socioeconomic Monitoring Can Tell Us. *Science Findings* (95). Pacific Northwest Research Station, USDA Forest Service.

EXHIBIT 3-1. NORTHWEST FOREST PLAN AREA AND PROPOSED CRITICAL HABITAT STUDY AREA

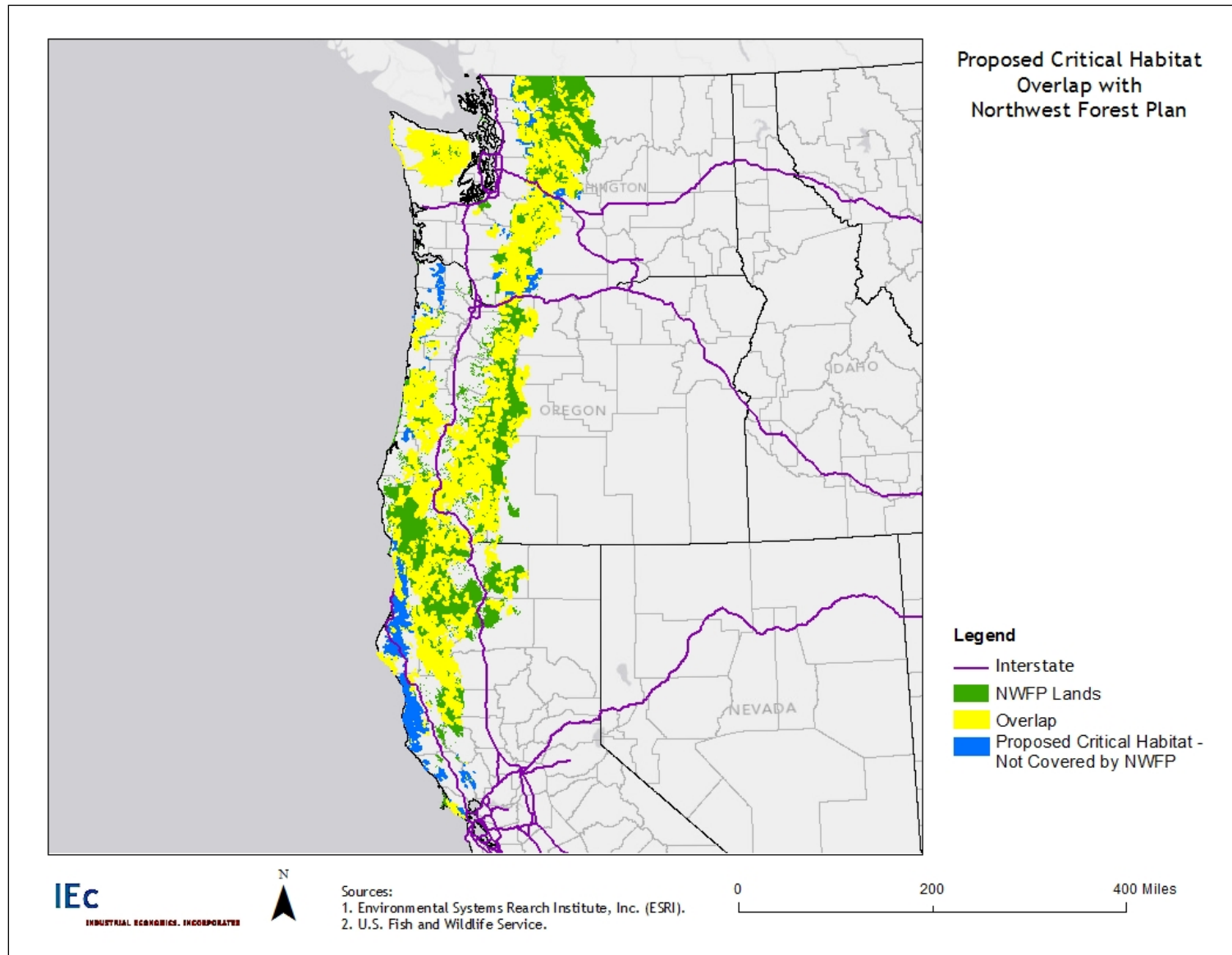


EXHIBIT 3-2. CHANGES IN TIMBER PRODUCTION LEVELS, CALIFORNIA

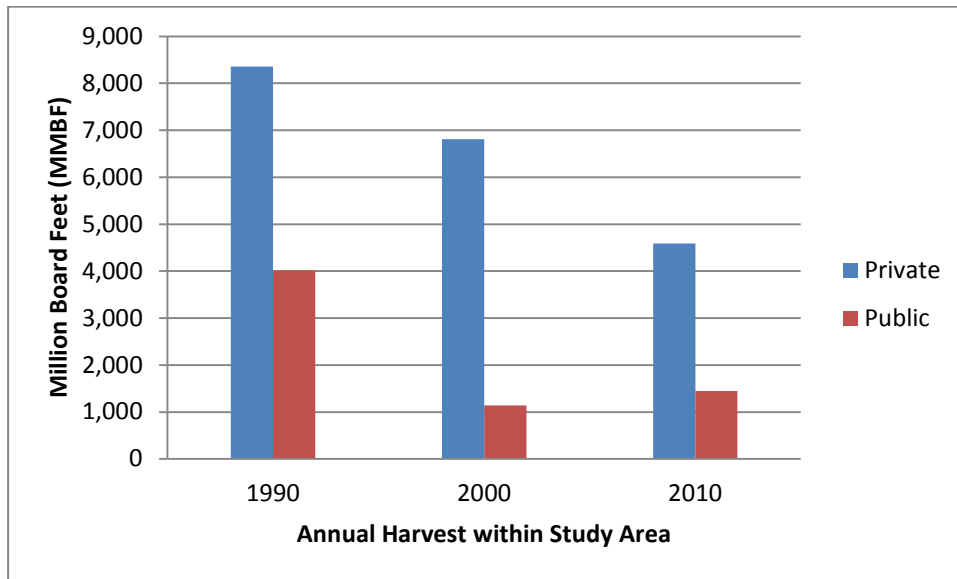
COUNTY	TOTAL TIMBER HARVEST 2010 (MBF)	PERCENT HARVESTED FROM PUBLIC LANDS*	PERCENT CHANGE IN PRODUCTION (PUBLIC AND PRIVATE LAND) 1990-2010
California Total	1,160,588	12	-71
PRODUCTION WITHIN THE STUDY AREA COUNTIES			
Colusa	0	0	-100
Del Norte	6,680	0	-96
Glenn	0	0	-100
Humboldt	218,651	0	-65
Lake	3,552	69	-73
Marin	0	0	-100
Mendocino	94,724	0	-77
Napa	0	0	-100
Shasta	151,116	4	-12
Siskiyou	188,750	11	-53
Sonoma	8,902	0	-84
Tehama	53,934	0	-60
Trinity	36,363	1	-84
Study Area	762,672	4	-66
<p>* Data includes harvests from State and County Lands, in addition to Federal lands. Source: California State Board of Equalization, "California Timber Harvest By County: Year 2010 Quarter 1 to 4." Accessed at http://www.boe.ca.gov/proptaxes/pdf/ytr362010.pdf March 2012. California State Board of Equalization, "California Timber Harvest By County: 1994-2009." Accessed at http://www.boe.ca.gov/proptaxes/pdf/yr3694to09.pdf March 2012.</p>			

EXHIBIT 3-3. CHANGES IN TIMBER PRODUCTION LEVELS, OREGON

COUNTY	TOTAL TIMBER HARVEST 2010 (MBF)	PERCENT HARVESTED FROM PUBLIC LANDS*	PERCENT CHANGE IN PRODUCTION (PUBLIC AND PRIVATE LAND) 1990-2010
Oregon Total	3,226,550	22	-48
PRODUCTION WITHIN THE STUDY AREA COUNTIES			
Benton	91,368	20	-27
Clackamas	97,223	18	-49
Clatsop	282,866	27	113
Colombia	123,027	6	-34
Coos	233,586	21	-43
Curry	64,657	6	-47
Deschutes	19,339	74	-82
Douglas	435,923	14	-56
Hood River	11,083	43	-64
Jackson	87,826	19	-68
Jefferson	8,338	8	-87
Josephine	17,688	28	-78
Klamath	94,347	47	-75
Lane	455,146	25	-49
Lincoln	121,445	17	-59
Linn	219,462	11	-22
Marion	52,376	31	-28
Multnomah	13,916	6	-61
Polk	95,649	7	-19
Tillamook	192,361	48	38
Wasco	66,213	10	-48
Washington	132,549	34	78
Yamhill	98,232	13	9
Study Area	3,014,620	22	-42
<p>* Data includes harvests from USFS and BLM lands.</p> <p>Source: Oregon Department of Forestry, "Oregon Annual Timber Reports." Accessed at http://www.oregon.gov/ODF/STATE_FORESTS/FRP/annual_reports.shtml March 2012.</p>			

EXHIBIT 3-4. CHANGES IN TIMBER PRODUCTION LEVELS, WASHINGTON

COUNTY	TOTAL TIMBER HARVEST 2010 (MBF)	PERCENT HARVESTED FROM PUBLIC LANDS*	PERCENT CHANGE IN PRODUCTION (PUBLIC AND PRIVATE LAND) 1990-2010
Washington Total	2,739,185	33	-53
PRODUCTION WITHIN THE STUDY AREA COUNTIES			
Chelan	10,234	71	-89
Clallam	163,439	35	-54
Clark	97,006	78	-24
Cowlitz	209,846	36	-54
Grays Harbor	332,514	27	-44
Jefferson	105,356	30	-50
King	89,809	19	-70
Kitsap	23,671	30	-34
Kittitas	8,597	48	-95
Klickitat	81,259	5	-36
Lewis	360,722	19	-32
Mason	104,168	21	-65
Okanogan	25,934	94	-75
Pierce	147,549	20	-28
Skagit	118,487	47	-59
Skamania	58,841	28	-75
Snohomish	125,405	57	-62
Thurston	112,311	59	-23
Whatcom	69,201	36	-61
Yakima	13,315	63	-91
Study Area	2,257,664	34	-54
<p>* Data includes harvests from USFS, BLM, and other Federal (i.e., military) lands. Source: Washington State Department of Natural Resources, "Washington State Timber Harvest." Accessed at http://www.dnr.wa.gov/BusinessPermits/Topics/EconomicReports/Pages/obe_washington_timber_harvest_reports.aspx March 2012.</p>			

EXHIBIT 3-5. PUBLIC AND PRIVATE HARVEST DATA FOR THE STUDY AREA IN 1990, 2000, 2010

Source: California State Board of Equalization, "California Timber Harvest By County: Year 2010 Quarter 1 to 4." Accessed at <http://www.boe.ca.gov/proptaxes/pdf/ytr362010.pdf> March 2012. California State Board of Equalization, "California Timber Harvest By County: 1994-2009." Accessed at <http://www.boe.ca.gov/proptaxes/pdf/yr3694to09.pdf> March 2012. Oregon Department of Forestry, "Oregon Annual Timber Reports." Accessed at http://www.oregon.gov/ODF/STATE_FORESTS/FRP/annual_reports.shtml March 2012. Washington State Department of Natural Resources, "Washington State Timber Harvest." Accessed at http://www.dnr.wa.gov/BusinessPermits/Topics/EconomicReports/Pages/obe_washington_timber_harvest_reports.aspx March 2012.

3.1.3 EMPLOYMENT TRENDS

114. Employment in the Pacific Northwest timber industry has also declined over the past 20 years. Between 1989 and 2009, timber-related employment in the study area decreased by approximately 52 percent.⁸⁴ In 1989, five percent of all employees in the 56 counties with proposed critical habitat were employed by the timber industry. In 2009, however, the industry accounted for only two percent of employment. During this time period, all but five of the 56 counties in the study area experienced declines in timber industry employment.⁸⁵ At the State level, California experienced the greatest decrease in timber industry employment between 1989 and 2009; a total of 60,624 jobs were lost, representing a decrease of approximately 55 percent. At the county level, counties experiencing the greatest decreases in employment were Del Norte, Humboldt, and

⁸⁴ Timber industry data is taken from the North American Industry Classification System (NAICS) codes 113 "Forestry and Logging," 321 "Wood Product Manufacturing," and 322 "Paper Manufacturing," 1153 "Support Activities for Forestry," 325191 "Gum and Wood Chemical Manufacturing," 337129 "Wood Television, Radio, and Sewing Machine Cabinet Manufacturing," and 337211 "Wood Office Furniture Manufacturing."

⁸⁵ The following counties did not experience declining employment: Napa and Tehama Counties, CA, and Clatsop and Tillamook Counties, OR.

Trinity Counties, CA, and Okanogan and Thurston Counties, WA. Timber industry employment increased as a share of total employment in Clatsop, Jefferson, and Tillamook Counties, OR.

115. Exhibits 3-6 through 3-8 provide detailed data on the change in employment and payroll in the timber industry in the 56 counties where critical habitat is proposed. These exhibits demonstrate the change in employment between 1989 and 2009, the most recent year for which these data are readily available. For each county, we list the proposed subunits overlapping that county. Next, we present the number of individuals employed in 1989, 1999, and 2009, as well as the percentage of all jobs in the county accounted for by the timber industry. Then, we calculate the percentage change in the number of jobs between 1989 and 2009. Negative changes indicate employment decreased over the period.
116. For each county, Exhibits 3-6 through 3-8 provide the annual payroll paid by the timber industry and the proportion of total payroll in the county accounted for by the industry. The exhibits also provide the degree to which payroll has increased or declined over the past 20 years. The final column of each exhibit provides the county-wide average unemployment rate for 2010. This information provides context for the timber industry employment reductions, highlighting those counties for which available jobs are already limited.

EXHIBIT 3-6. TIMBER INDUSTRY EMPLOYMENT CHANGE, CALIFORNIA

CALIFORNIA		ANNUAL INDUSTRY EMPLOYMENT /PERCENT OF TOTAL EMPLOYMENT				ANNUAL INDUSTRY PAYROLL (\$1000) /PERCENT OF TOTAL PAYROLL				UNEMPLOYMENT RATE
COUNTY	INCLUDED SUBUNITS	1989	1999	2009	PERCENT GROWTH (1989-2009)	1989	1999	2009	PERCENT GROWTH (1989- 2009)	2010
California Total		110,450/1	81,932/1	49,826/0	-55	\$4,696,686/1	\$3,463,796/1	\$1,985,147/0	-58	12
EMPLOYMENT AND PAYROLL WITHIN THE STUDY AREA COUNTIES										
Colusa	ICC-4	10/0	0/0	10/0	0	\$475/1	\$0/0	\$306/0	-36	20
Del Norte	KLW-4,5,6,7; RDC-1	519/13	129/3	19/0	-96	\$27,125 /24	\$5,547/7	\$807/0	-97	13
Glenn	ICC-4	43/10	19/0	19/0	-56	\$1,228/1	\$832/1	\$807/0	-34	16
Humboldt	ICC-1,2; KLW-6,7,9; RDC-1,2	4,982 /16	4,298 /12	1,373/4	-72	\$249,697 /25	\$189,212 /23	\$52,284/5	-79	12
Lake	ICC-5	56/1	19/0	29/0	-49	\$1,534/1	\$832/0	\$807/0	-47	18
Marin	RDC-5	214/0	73/0	79/0	-63	\$11,022/0	\$3,371/0	\$2,740/0	-75	8
Mendocino	ICC-3,4,5; RDC-2,3	2,626 /13	2,187/9	870/4	-67	\$153,531 /24	\$104,031 /18	\$35,457/5	-77	11
Napa	ICC-6	193/1	256/1	302/1	57	\$7,041/1	\$1,951,315 /1	\$11,883/1	69	10
Shasta	ICC-1,7,8	2,753/7	1,645/4	933/2	-66	\$140,758 /10	\$83,793/8	\$50,665/3	-64	16
Siskiyou	ECS-3; ICC-8; KLE-6,7; KLW-4,5,6,7,8	1,596/18	664/7	508/6	-68	\$66,891/28	\$32,254 /17	\$19,993/8	-70	18
Sonoma	ICC-6; RDC-3,4	1,927/2	1,522/1	662/0	-66	\$81,551/2	\$59,257/1	\$26,801/0	-67	11
Tehama	ICC-1,3	1,492/17	1,847 /16	1,878 /16	26	\$77,161/30	\$362,617 /30	\$64,875 /17	-16	16
Trinity	ICC-1,2,3,7; KLW-8,9; RDC-1	627/34	234/16	184/12	-71	\$24,773/44	\$38,684 /32	\$5,779/14	-77	19
Study Area		17,034/5	12,890/3	6,862/2	-60	\$842,786/6	\$582,795 /4	\$273,203 /2	-68	11

Note: Totals may not sum due to rounding. Includes data from SIC 08, 24, 2517, 2521, 26, and 2861 (1989 data) and NAICS 113, 1153, 321, 322, 325191, 337129, and 337211 (1999 and 2009 data). In some cases, US Census Bureau supplied an estimate; in these cases, the median value was used. In some cases, the US Census Bureau withheld payroll data to protect the privacy of establishments; State-wide average industry income was used.

Sources: U.S. Census Bureau, CenStats, County Business Patterns, <http://censtats.census.gov/>, accessed March 2012.

U.S. Department of Labor, Bureau of Labor Statistics, Employment & Unemployment, Local Area Unemployment Statistics. Accessed March 2012. Average unemployment 2010.

EXHIBIT 3-7. TIMBER INDUSTRY EMPLOYMENT CHANGE, OREGON

OREGON		ANNUAL INDUSTRY EMPLOYMENT /PERCENT OF TOTAL EMPLOYMENT				ANNUAL INDUSTRY PAYROLL (\$1000) /PERCENT OF TOTAL PAYROLL				UNEMPLOYMENT RATE
COUNTY	INCLUDED SUBUNITS	1989	1999	2009	PERCENT GROWTH (1989-2009)	1989	1999	2009	PERCENT GROWTH (1989-2009)	2010
Oregon Total		81,195/7	55,568/4	56,963/4	-30	\$3,656,829/9	\$2,495,141/6	\$1,397,301/3	-62	11
EMPLOYMENT AND PAYROLL WITHIN THE STUDY AREA COUNTIES										
Benton	OCR-1,2	1,705/6	1,695/6	619/3	-64	\$74,909/8	\$76,150/9	\$24,178/2	-68	7
Clackamas	WCS-1,2,3	3,902/5	2,416/2	1,404/1	-64	\$194,741/7	\$119,022/4	\$60,850/1	-69	10
Clatsop	NCO-4	816/6	609/6	2,319/17	184	\$33,352/7	\$25,171/11	\$127,295/31	282	9
Colombia	NCO-4	1,261/14	2,601/29	712/10	-44	\$52,811/15	\$150,961/53	\$29,392/14	-44	12
Coos	KLW-1,2,3; OCR-5,6	2,759/14	1,881/11	1,292/8	-53	\$111,498/18	\$81,859/21	\$47,983/10	-57	13
Curry	KLW-1,2,3; RDC-1	929/17	911/19	444/9	-52	\$39,853/27	\$36,892/37	\$16,101/12	-60	13
Deschutes	ECN-8,9	3,526/12	2,267/5	1,164/2	-67	\$125,721/14	\$79,129/8	\$35,497/2	-72	14
Douglas	ECS-1; KLE-1,2,3,4; KLW-1; OCR-3,4,5,6; WCS-4,5,6	8,768/26	6,185/20	4,690/17	-47	\$375,099/34	\$277,347/37	\$174,159/20	-54	15
Hood River	ECN-7; WCS-1	532/7	289/4	183/2	-66	\$24,048/12	\$10,327/7	\$6,622/3	-73	8
Jackson	ECS-1,2; KLE-1,3,4,5,6; KLW-4	5,920/11	3,393/6	2,432/4	-59	\$251,408/15	\$139,656/9	\$88,546/4	-65	13
Jefferson	ECN-8	1,001/20	1,809/42	780/24	-22	\$44,053/29	\$75,987/69	\$28,648/28	-35	14
Josephine	KLE-2,3; KLW-1,2,3,4,5	2,265/13	1,051/6	783/4	-65	\$90,036/17	\$42,436/11	\$25,553/5	-72	14
Klamath	ECN-9; ECS-1,2; KLE-4; WCS-6	3,779/19	2,002/12	1,876/11	-50	\$168,893/27	\$85,944/20	\$71,348/13	-58	13
Lane	OCR-2,3,4; WCS-3,4,5,6	12,203/11	8,052/7	5,372/5	-56	\$535,709/15	\$364,050/12	\$216,955/6	-60	11
Lincoln	NCO-5; OCR-1,2	637/5	993/7	569/4	-11	\$21,276/6	\$59,001/21	\$29,689/8	40	11
Linn	WCS-3	5,688/18	4,922/15	2,386/7	-58	\$276,701/24	\$251,603/28	\$113,274/10	-59	13

OREGON		ANNUAL INDUSTRY EMPLOYMENT /PERCENT OF TOTAL EMPLOYMENT				ANNUAL INDUSTRY PAYROLL (\$1000) /PERCENT OF TOTAL PAYROLL				UNEMPLOYMENT RATE
COUNTY	INCLUDED SUBUNITS	1989	1999	2009	PERCENT GROWTH (1989-2009)	1989	1999	2009	PERCENT GROWTH (1989-2009)	2010
Marion	WCS-2,3	4,046 /4	2,668 /3	1,935 /2	-52	\$162,855 /5	\$104,329 /5	\$64,343/2	-61	11
Multnomah	WCS-1	4,109 /1	2,387 /1	1,360 /0	-67	\$226,266 /2	\$124,333 /1	\$57,471/0	-75	10
Polk	NCO-5; OCR-1	1,221 /12	1,519 /12	752/6	-38	\$44,134 /15	\$48,455 /17	\$17,470/6	-60	9
Tillamook	NCO-4,5	465/8	736 /11	653 /10	40	\$16,584 /11	\$28,996 /21	\$21,960 /12	32	10
Wasco	ECN-7; WCS-2	327/4	193/3	151/2	-54	\$13,819/6	\$6,360/4	\$4,517/2	-67	9
Washington	NCO-4	2,455 /2	2,255 /1	1,711 /1	-30	\$106,726 /2	\$95,006/1	\$68,049/1	-36	9
Yamhill	NCO-5	1,742 /9	1,783 /7	1,182 /4	-32	\$72,562 /11	\$94,310 /16	\$50,047/6	-31	11
Study Area		70,054 /6	52,617 /5	34,763 /3	-50	\$3,063,054/ 8	\$2,377,324 /6	\$1,379,947 /3	-55	11

Note: Totals may not sum due to rounding. Includes data from SIC 08, 24, 2517, 2521, 26, and 2861 (1989 data) and NAICS 113, 1153, 321, 322, 325191, 337129, and 337211 (1999 and 2009 data). In some cases, US Census Bureau supplied an estimate; in these cases, the median value was used. In some cases, the US Census Bureau withheld payroll data to protect the privacy of establishments; State-wide average industry income was used.

Sources: U.S. Census Bureau, CenStats, County Business Patterns, <http://censtats.census.gov/>, accessed March 2012.

U.S. Department of Labor, Bureau of Labor Statistics, Employment & Unemployment, Local Area Unemployment Statistics. Accessed March 2012. Average unemployment 2010.

EXHIBIT 3-8. TIMBER INDUSTRY EMPLOYMENT CHANGE, WASHINGTON

WASHINGTON		ANNUAL INDUSTRY EMPLOYMENT /PERCENT OF TOTAL EMPLOYMENT				ANNUAL INDUSTRY PAYROLL (\$1000) /PERCENT OF TOTAL PAYROLL				UNEMPLOYMENT
COUNTY	INCLUDED SUBUNITS	1989	1999	2009	PERCENT GROWTH (1989-2009)	1989	1999	2009	PERCENT GROWTH (1989-2009)	2010
Washington Total		56,130/3	45,101/2	27,575/1	-51	\$2,630,498/4	\$2,218,449/3	\$1,356,597/1	-48	10
EMPLOYMENT AND PAYROLL WITHIN THE STUDY AREA COUNTIES										
Chelan	ECN-2,3	429/2	373/2	258/1	-40	\$17,015/3	\$15,630/3	\$13,779/2	-19	9
Clallam	NCO-1,2	2,385 /19	1,465 /9	900/5	-62	\$114,030 /31	\$65,756 /19	\$41,695/8	-63	10
Clark	WCC-3	4,897 /8	3,398 /4	2,318 /2	-53	\$232,180 /11	\$177,811 /7	\$139,870 /3	-40	14
Cowlitz	WCC-2	7,219 /27	6,518 /20	3,312 /11	-54	\$381,920 /37	\$372,367 /38	\$180,001 /15	-53	13
Grays Harbor	NCO-1,2,3	4,806 /28	4,067 /23	2,210 /14	-54	\$237,288 /40	\$201,980 /44	\$99,816 /19	-58	13
Jefferson	NCO-1,2	550 /16	523/8	403/6	-27	\$27,922 /28	\$30,617 /23	\$25,708 /13	-8	10
King	WCC-1; WCN-2	6,147 /1	5,392 /1	2,406 /0	-61	\$278,982 /1	\$225,597 /1	\$114,713 /0	-59	9
Kitsap	NCO-2	285/1	91/0	104/0	-64	\$11,368/1	\$4,512/0	\$13,966/1	23	8
Kittitas	ECN-4,5; WCC-1	251/5	138/2	129/1	-49	\$11,325/9	\$5,839/4	\$2,854/1	-75	9
Klickitat	ECN-6	729 /25	549 /16	255/7	-65	\$31,964 /32	\$23,737 /24	\$10,352/7	-68	11
Lewis	WCC-1,2	2,814 /18	3,076 /16	2,331 /12	-17	\$110,740 /21	\$116,529 /24	\$87,907 /15	-21	14
Mason	NCO-1,2	1,421 /23	1,191 /14	977/10	-31	\$64,592 /32	\$56,448 /29	\$41,325 /14	-36	11
Okanogan	ECN-1	1,071 /17	643/8	120/1	-89	\$46,170 /27	\$26,120 /15	\$4,463/2	-90	10
Pierce	WCC-1,2	5,433 /4	4,631 /2	2,878 /1	-47	\$246,007 /5	\$215,637 /4	\$130,050 /2	-47	10
Skagit	ECN-1; WCN-1	953/5	657/2	914/2	-4	\$38,493/6	\$30,766 /3	\$39,341/3	2	10
Skamania	ECN-6; WCC-2,3	604 /58	200 /17	184 /14	-70	\$27,150 /76	\$10,961 /42	\$7,166/21	-74	13

WASHINGTON		ANNUAL INDUSTRY EMPLOYMENT /PERCENT OF TOTAL EMPLOYMENT				ANNUAL INDUSTRY PAYROLL (\$1000) /PERCENT OF TOTAL PAYROLL				UNEMPLOYMENT
COUNTY	INCLUDED SUBUNITS	1989	1999	2009	PERCENT GROWTH (1989-2009)	1989	1999	2009	PERCENT GROWTH (1989-2009)	2010
Snohomish	WCN-1, 2	5,433 /4	3,656 /2	2,318 /1	-58	\$262,829 /5	\$176,278 /23	\$114,392 /1	-57	10
Thurston	NCO-3; WCC-1	1,894 /5	1,008 /2	547/1	-71	\$75,377/7	\$51,758/4	\$27,198/1	-64	8
Whatcom	ECN-1; WCN-1	2,000 /5	2,037 /4	1,209 /2	-40	\$87,369/7	\$99,614/7	\$47,837/2	-45	9
Yakima	ECN-5, 6; WCC-1, 2, 3	2,052 /4	1,981 /3	990/2	-52	\$94,345/7	\$79,284/5	\$41,369 /1	-56	10
Study Area		51,388 /4	41,589 /2	24,760 /2	-52	\$2,397,066/4	\$1,987,239 /3	\$1,185,811 /1	-51	10

Note: Totals may not sum due to rounding. Includes data from SIC 08, 24, 2517, 2521, 26, and 2861 (1989 data) and NAICS 113, 1153, 321, 322, 325191, 337129, and 337211 (1999 and 2009 data). In some cases, US Census Bureau supplied an estimate; in these cases, the median value was used. In some cases, the US Census Bureau withheld payroll data to protect the privacy of establishments; State-wide average industry income was used.

Sources: U.S. Census Bureau, CenStats, County Business Patterns, <http://censtats.census.gov/>, accessed March 2012.

U.S. Department of Labor, Bureau of Labor Statistics, Employment & Unemployment, Local Area Unemployment Statistics. Accessed March 2012. Average Unemployment 2010.

117. In 2009, jobs in the timber industry accounted for more than 10 percent of total employment in the following counties in the study area: Tehama and Trinity Counties, CA; Clatsop, Douglas, Jefferson, Klamath, and Tillamook Counties, OR; and Cowlitz, Grays Harbor, Lewis, and Skamania Counties, WA.⁸⁶
118. Between 1989 and 2009, total timber industry payroll in the study area fell by \$3.5 billion (approximately 55 percent).⁸⁷ Timber industry payroll as a share of the total payroll also fell within the study area counties, decreasing from six percent in 1989 to two percent in 2009. The greatest decrease in timber industry annual payroll within the study area was in Oregon, where annual timber industry payroll fell by \$1.7 billion in the counties within the study area (approximately 62 percent) between 1989 and 2009. In these counties, the timber industry's share of the total payroll decreased from eight to three percent.
119. The greatest decreases in industry payroll on the county level took place in Del Norte, Humboldt, Marin, Mendocino, and Trinity Counties, CA, and Okanogan County, WA. Total payroll grew over this period in Napa County, CA, Clatsop, Lincoln, and Tillamook Counties, OR, and Kitsap and Skagit Counties, WA. The timber industry's share of the total payroll increased in Clatsop, Lincoln, and Tillamook Counties, OR.
120. In general, the decrease in employment in the timber industry has had a greater impact on nonmetropolitan counties because they are less economically diverse and more strongly tied to the wood products industry. A report on NWFP monitoring initiatives revealed that forest products manufacturing employment accounts for roughly ten percent of total employment in nonmetropolitan counties and only one percent in metropolitan counties.⁸⁸
121. Many communities have adapted to changes in the timber industry by diversifying their economies to include more services-oriented industries—a shift that has been made throughout the country. In addition, the region has been successful in attracting businesses, commuters, and amenity-seekers.⁸⁹ Overall the population of the communities in the NWFP study area increased by 21 percent between 1990 and 2000, higher than the nation as a whole, which grew by 13 percent.⁹⁰
122. More recently, unemployment rates have risen nationwide due to the economic downturn, making it difficult to isolate the socioeconomic effects of changes in the timber industry.

⁸⁶ Timber industry data is taken from the North American Industry Classification System (NAICS) codes 113 "Forestry and Logging," 321 "Wood Product Manufacturing," and 322 "Paper Manufacturing," 1153 "Support Activities for Forestry," 325191 "Gum and Wood Chemical Manufacturing," 337129 "Wood Television, Radio, and Sewing Machine Cabinet Manufacturing," and 337211 "Wood Office Furniture Manufacturing."

⁸⁷ Data from Data from U.S. Census Bureau, CenStats, County Business Patterns, <http://censtats.census.gov/>, accessed March 2012.

⁸⁸ Davis, Ray; Falxa, Gary; Grinspoon, Elisabeth; Harris, Gary; Lanigan, Steven; Moeur, Melinda; Mohoric, Shawne. 2011. Northwest Forest Plan- The First 15 Years (1994-2008) : Summary of Key Monitoring Findings. Tech. Paper R6-RPM-TP-03-2011. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Region.

⁸⁹ Routman, K. 2007. Forest Communities and the Northwest Forest Plan: What Socioeconomic Monitoring Can Tell Us. *Science Findings* (95). Pacific Northwest Research Station, USDA Forest Service.

⁹⁰ Routman, K. 2007. Forest Communities and the Northwest Forest Plan: What Socioeconomic Monitoring Can Tell Us. *Science Findings* (95). Pacific Northwest Research Station, USDA Forest Service.

Exhibits 3-6 through 3-8 provide information on the unemployment rates in the counties containing critical habitat in 2010. This information provides context for the timber industry employment effects described in the Exhibits.

Additional Background Information on Historical and Current Socioeconomic Conditions

In response to the Service's Notice of Availability (NOA) of the May 29, 2012 draft of this report and request for public comment, the Sierra Institute for Community and Environment and Spatial Informatics Group provided additional, potentially-relevant data. Funding for the effort was provided by the National Forest Counties and Schools Coalition.

Their report includes detailed discussion and data concerning a variety of socioeconomic characteristics for communities potentially affected by the designation, including: number of mills and mill closures; employment patterns; revenue sharing payments to counties; family income; poverty levels; home ownership; health outcomes and factors; and enrollment in programs such as School Free and Reduced-price Meals (FRPM). The authors include retrospective data beginning in 1990, generally documenting adverse changes in many of these factors over a twenty-year period. The report does not forecast future socioeconomic conditions or make predictions about potential changes in these factors if critical habitat is designated.

We note that the authors state, "The limited time associated with the review period did not allow direct evaluation of the connection between land management restrictions and NSO management to specific job losses and decline in natural resource and timber industry sectors." (page 168) It also notes, "Other reasons for mill closure also include, but are not limited to, industry closing older, less efficient mills, closure of mills that handled only larger trees coupled with less old-growth timber available, and shipping raw logs and cants out of the region for processing elsewhere." (page 31) The authors conclude "A linkage appears to exist, but additional research is needed to determine the strength of this relationship. (page 168).

The report is included in the administrative record for this rulemaking and is available for review by the Secretary as he weighs the benefits of exclusion against the benefits of including specific areas in the final designation.

Citation: Sierra Institute for Community and Environment and Spatial Informatics Group, *Response to the Economic Analysis of Critical Habitat Designation for the Northern Spotted Owl by Industrial Economics: In Response to the 2012 Critical Habitat Designation of the Spotted Owl*, August 2012.

3.2 FORCES DRIVING TIMBER INDUSTRY TRENDS

123. Multiple forces have contributed to the recent changes in the Pacific Northwest timber industry. In general, the timber industry is characterized as being highly competitive; there is a relatively low degree of concentration of production among the largest producers and there is essentially a single national price for commodity grades of lumber.⁹¹ In recent decades, competition has intensified with increased harvesting in the U.S. South and interior Canadian Provinces.^{92,93} New technologies and increased mechanization have led to mill closures; generally, less efficient mills located near Federal forests have been closed in favor of larger more advanced facilities closer to major transportation corridors or private timberlands.^{94,95} In addition, other forces such as endangered species protections, fluctuations in domestic consumption, shifts in international trade, and changes in timberland ownership, have contributed to changes in the Pacific Northwest timber industry.

3.2.1 FLUCTUATIONS IN DEMAND

124. The demand for timber is driven by demand for the final products into which wood is a material input. End uses for harvested wood have evolved over the years, moving from solid wood outputs to composite products such as particleboard and paper.⁹⁶ In addition, increasing wood-use efficiency, use of recycled fiber, and product substitutes have contributed to a reduction in timber demand.⁹⁷ In recent years, demand for softwood lumber and structural panels has been increasingly unstable due to the downturn in housing construction.⁹⁸

⁹¹ Haynes, Richard. 2008. Emergency Lessons from a Century of Experience with Pacific Northwest Timber Markets. United States Department of Agriculture, Forest Service, Pacific Northwest Research Station. General Technical Report: PNW-GTR-747. April 2008. Accessed at http://www.fs.fed.us/pnw/pubs/pnw_gtr747.pdf on April 9, 2012.

⁹² *Ibid.*

⁹³ The U.S. South now accounts for the largest regional share of U.S. timber harvest, and is expected to continue to be the largest timber-producing region of the country, accounting for half or more of total harvests (Ince, Peter, Andrew Kramp, Kenneth Skog, Henry Spelter, and David N. Wear. 2011. U.S. Forest Products Module: A Technical Document Supporting the Forest Service 2010 RPA Assessment. Research Paper FPL-RP-662. Madison WI: U.S. Department of Agriculture, Forest Service, Forest Products Laboratory.)

⁹⁴ Routman, K. 2007. Forest Communities and the Northwest Forest Plan: What Socioeconomic Monitoring Can Tell Us. Science Findings (95). Pacific Northwest Research Station, USDA Forest Service.

⁹⁵ Haynes, Richard. 2009. "Contribution of Old-Growth Timber to Regional Economies in the Pacific Northwest." *Old Growth in a New World: A Pacific Northwest Icon Reexamined*. Eds. Thomas A. Spies and Sally L. Duncan. Washington, DC: Island, 2009. 83-94.

⁹⁶ Prestemon, Jeffrey and Robert Abt. "Chapter 13: Timber Products Supply and Demand." *Southern forest resource assessment*. Wear, David, and John Greis, eds. 2002. Asheville, NC: U.S. Department of Agriculture, Forest Service, Southern Research Station.

⁹⁷ *Ibid.*

⁹⁸ Ince, Peter, Andrew Kramp, Kenneth Skog, Henry Spelter, and David N. Wear. 2011. U.S. Forest Products Module: A Technical Document Supporting the Forest Service 2010 RPA Assessment. Research Paper FPL-RP-662. Madison WI: U.S. Department of Agriculture, Forest Service, Forest Products Laboratory.

125. Since the mid-1990s, stumpage prices have been stable or declining, causing landowners to move towards forest management regimes that favor shorter rotations and threatening commitments to sustainable forest management practices.⁹⁹

3.2.2 EXPORT MARKETS

126. Over the past two decades, timber exports have fluctuated significantly. Prior to 1990, the Pacific Northwest was the dominant supplier of building materials to the Pacific Rim, particularly Japan, South Korea, and China. However, during the 1990s exports fell dramatically as the Japanese and South Korean economies collapsed. For example, exports to Japan declined about 70 percent from their 1989 peak of 2.4 billion board feet to 706,000 board feet in 2000.¹⁰⁰ In recent years, exporters have seen a sharp increase in demand from China; total timber exports from the U.S. to China more than doubled between 2009 and 2010 and more than tripled between 2010 and 2011.¹⁰¹

3.2.3 CHANGES IN OWNERSHIP

127. As of 2009, the ownership of U.S. timberland (by acres) comprises individuals (54 percent), government (28 percent), forest product firms (13 percent) and institutions (five percent).¹⁰² Recent years have seen increased institutional ownership and decreased forest product company ownership, driven in part by the increasing significance of timberland in real estate portfolios.¹⁰³ The increasing institutional investor role played by timberland investment management organizations (TIMOs) and timberland real estate investment trusts (REITs) has influenced demand for certain end uses of timber (driven by market trends), and is likely to continue to grow as an influential force in the timber market in the future.¹⁰⁴ Industry representatives note that an important effect of increasing institutional management of timberlands is that management decisions, such as when to harvest given market conditions and regulatory uncertainty, are made considering a larger portfolio of lands located across the country or continents.

3.2.4 INCREASED MECHANIZATION AND PRODUCTIVITY

128. The reductions in timber harvests since the early 1990s and increasing economic incentives for private landowners to grow smaller, more uniform trees have led to a

⁹⁹ Haynes, Richard. 2009. "Contribution of Old-Growth Timber to Regional Economies in the Pacific Northwest." *Old Growth in a New World: A Pacific Northwest Icon Reexamined*. Eds. Thomas A. Spies and Sally L. Duncan. Washington, DC: Island, 2009. 83-94.

¹⁰⁰ Daniels, Jean. 2005. The Rise and Fall of the Pacific Northwest Log Export Market. U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. PNW-GTR-624. Available at http://www.fs.fed.us/pnw/pubs/pnw_gtr624.pdf.

¹⁰¹ United States International Trade Commission. 2012. Interactive Tariff and Trade DataWeb. Accessed at dataweb.usitc.gov on March 19, 2012.

¹⁰² Newell, Graeme, and Chris Eves. "The Role of U.S. Timberland in Real Estate Portfolios." *Journal of Real Estate Portfolio Management* 15.1(2009).

¹⁰³ *Ibid.*

¹⁰⁴ *Ibid.*

number of mill closures.¹⁰⁵ In particular, mills located near Federal forests that were once dependent on the larger (and older) log mixes have been closed in favor of more advanced facilities closer to major transportation corridors or private timberlands, that can efficiently process smaller logs.^{106,107,108} According to a 2011 report by the Federal Forest Resource Coalition, a total of 347 mills closed between 1990 and 2010 in California, Oregon and Washington, 145 of which were located in Oregon.¹⁰⁹ There are currently few mills capable of efficiently processing logs larger than 24 inches in diameter; as of 2009, much of the production in the Pacific Northwest was in highly efficient mills that produce commodity lumber from 14- to 20-inch logs primarily for the domestic market and using timber from private timberlands.¹¹⁰ In addition, increasing industry productivity (a combination of worker productivity and mill productivity) means that mills do not require the amount of labor that they have in the past.^{111,112}

3.3 BACKGROUND ON FEDERAL LAND PAYMENT PROGRAMS

129. Four main Federal land payment programs compensate county governments for the tax-exempt status of Federal lands within their boundaries. The payments, which have undergone significant reforms over the past century, have at times constituted significant portions of county and school budgets.¹¹³ Only two of the programs, however, are permanently authorized and have dedicated funding sources; the other two are either set to expire or require an appropriation:

¹⁰⁵ Haynes, Richard. 2009. "Contribution of Old-Growth Timber to Regional Economies in the Pacific Northwest." *Old Growth in a New World: A Pacific Northwest Icon Reexamined*. Eds. Thomas A. Spies and Sally L. Duncan. Washington, DC: Island, 2009. 83-94.

¹⁰⁶ Routman, K. 2007. Forest Communities and the Northwest Forest Plan: What Socioeconomic Monitoring Can Tell Us. Science Findings (95). Pacific Northwest Research Station, USDA Forest Service.

¹⁰⁷ Haynes, Richard. 2008. "Emergent Lessons from a Century of Experience with Pacific Northwest Timber Markets." U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. PNW-GTR-747. Accessed at http://www.fs.fed.us/pnw/pubs/pnw_gtr747.pdf.

¹⁰⁸ Haynes, Richard. 2009. "Contribution of Old-Growth Timber to Regional Economies in the Pacific Northwest." *Old Growth in a New World: A Pacific Northwest Icon Reexamined*. Eds. Thomas A. Spies and Sally L. Duncan. Washington, DC: Island, 2009. 83-94.

¹⁰⁹ Federal Forest Resource Coalition. 2011. "Is Federal Timber Still in Demand?" Accessed at <http://www.foresthealth.org/pdf/Federal%20Timber%20Demand%20Feb%202011.pdf> on April 10, 2012.

¹¹⁰ Haynes, Richard. 2009. "Contribution of Old-Growth Timber to Regional Economies in the Pacific Northwest." *Old Growth in a New World: A Pacific Northwest Icon Reexamined*. Eds. Thomas A. Spies and Sally L. Duncan. Washington, DC: Island, 2009. 83-94.

¹¹¹ Oregon Office of Economic Analysis. 2012. Wood Products Productivity. January 26, 2012. Oregon Office of Economic Analysis: A Blog of Oregon Economic News and Analysis. Accessed at <http://oregoneconomicanalysis.wordpress.com/2012/01/26/wood-products-productivity-an-update/> on April 10, 2012.

¹¹² Headwaters Economics. 2010. The Siskiyou Region: Demographic, Economic, and Fiscal Fundamentals. Accessed at <http://headwaterseconomics.org/land/reports/the-siskiyou-region/> on April 10, 2012.

¹¹³ Headwaters Economics. December 2010. "County Payments, Jobs, and Forest Health: Ideas for Reforming the Secure Rural Schools and Community Self-Determination Act (SRS) and Payments in Lieu of Taxes (PILT)." White Paper. Accessed at http://headwaterseconomics.org/wp-content/uploads/Reform_County_Payments_WhitePaper_LowRes.pdf.

- U.S. Forest Service (USFS) 25% Fund: The USFS 25% Fund is a permanently authorized revenue sharing program wherein 25 percent of commodity receipts generated on USFS lands, mainly from timber, goes to counties as compensation for non-taxable Federal lands.^{114,115} Federal legislation mandates that payments fund county roads and schools, but leaves decisions about how to allocate the funds across counties to the States.¹¹⁶ Since 2008, the Fund has based annual revenue sharing payments on a seven-year rolling average of receipts, rather than on the current year's receipts.
- Bureau of Land Management Oregon and California Land Grant (O&C) Revenue Sharing Payment: BLM oversees a revenue sharing program for counties containing O&C lands that is similar to the USFS 25% Fund. Counties receive 50 percent of commercial receipts generated on O&C lands (based on the previous year's receipts), and payments are made directly to the county government, which can use them for any governmental purpose.¹¹⁷ This program is permanently authorized.¹¹⁸
- Secure Rural Schools and Community Self-Determination Act (SRS): Congress passed SRS in 2000 to provide optional assistance to States and counties whose payments from the USFS 25% Fund and BLM O&C Revenue Sharing Program had declined significantly. States and counties may choose to receive SRS payments instead of revenue sharing payments under the USFS 25% Fund and the BLM O&C Revenue Sharing Program. The SRS payments are based on historical revenue sharing payments under the pre-existing programs.

In 2008, when SRS was reauthorized for fiscal years 2008-2011, Congress made significant changes to the Title I funding formula. Certain States—including California, Oregon, and Washington—received transition payments in 2008 that were equal to 90 percent of those paid to States and counties under SRS in 2006. This percentage decreased in 2009 and 2010, and in 2011 the States received a “Formula Payment” based on a share of the full funding amount (the total funding allocated on a nationwide basis for SRS).¹¹⁹ As a result, total SRS payments have decreased from a high of \$623 million in FY 2008 to a low of

¹¹⁴ Headwaters Economics. December 2010. “County Payments, Jobs, and Forest Health: Ideas for Reforming the Secure Rural Schools and Community Self-Determination Act (SRS) and Payments in Lieu of Taxes (PILT).” White Paper. Accessed at http://headwaterseconomics.org/wp-content/uploads/Reform_County_Payments_WhitePaper_LowRes.pdf.

¹¹⁵ This program began in 1906 with counties receiving 10 percent of commodity receipts. In 1908 the portion of receipts was raised to the current 25 percent.

¹¹⁶ 16 USC § 500

¹¹⁷ 43 USC § 1181f

¹¹⁸ Personal communication with Bureau of Land Management, Oregon & Washington State Office, on April 9, 2012.

¹¹⁹ For more information on the Formula Payments, see U.S. Forest Service, Title I- Secure Payments for States and Counties Containing Federal Land, http://www.fs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb5253425.pdf (Accessed 4/5/2012)

\$347 million in 2011.¹²⁰ On March 14, 2012, the Senate voted to pass an amendment to extend SRS through FY 2012, but the House of Representatives has yet to act on a reauthorization. If the Act is not reauthorized, payments under this program will no longer be available to States and counties.

- Payments in Lieu of Taxes (PILT): PILT are Federal payments to county governments that help offset losses in property taxes due to nontaxable Federal lands within their boundaries.¹²¹ PILT was passed in 1976 in large part to increase and stabilize the USFS 25% Fund and the BLM O&C Revenue Sharing Program; the formula used to calculate payments is based on the amount of eligible Federally-owned land within a county and then reduced by the amount of revenue sharing payments from the previous year (including optional payments under SRS). Payments are subject to a population cap. Although it is permanently authorized, payments for PILT must be appropriated by Congress on a recurring basis. The program must receive a new appropriation for fiscal year 2013, so its future is currently uncertain.¹²²

130. Exhibit 3-9 illustrates the historical level of payments to counties from the four programs. Since 2000, with the implementation of the SRS and continuation of PILT payments, county funding has not been closely linked to actual revenues from timber sales on Federal lands. However, in the future, if funding is not appropriated to PILT, and/or SRS is not reauthorized, payments from USFS 25% Fund and the BLM O&C lands—which are tied to timber receipts from Federal lands—become relatively more important.
131. Exhibit 3-10 illustrates the dependency of counties on all forms of Federal land payments in 2009.¹²³ Federal land payments made up between 14 and 25 percent of total county and school budgets in Curry and Douglas Counties, OR and between 26 and 50 percent of the budgets in Skamania County, WA.¹²⁴

¹²⁰ http://www.fs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb5352831.pdf; <http://www.blm.gov/or/news/files/official-2011-payments.pdf>

¹²¹ 31 USC § 69

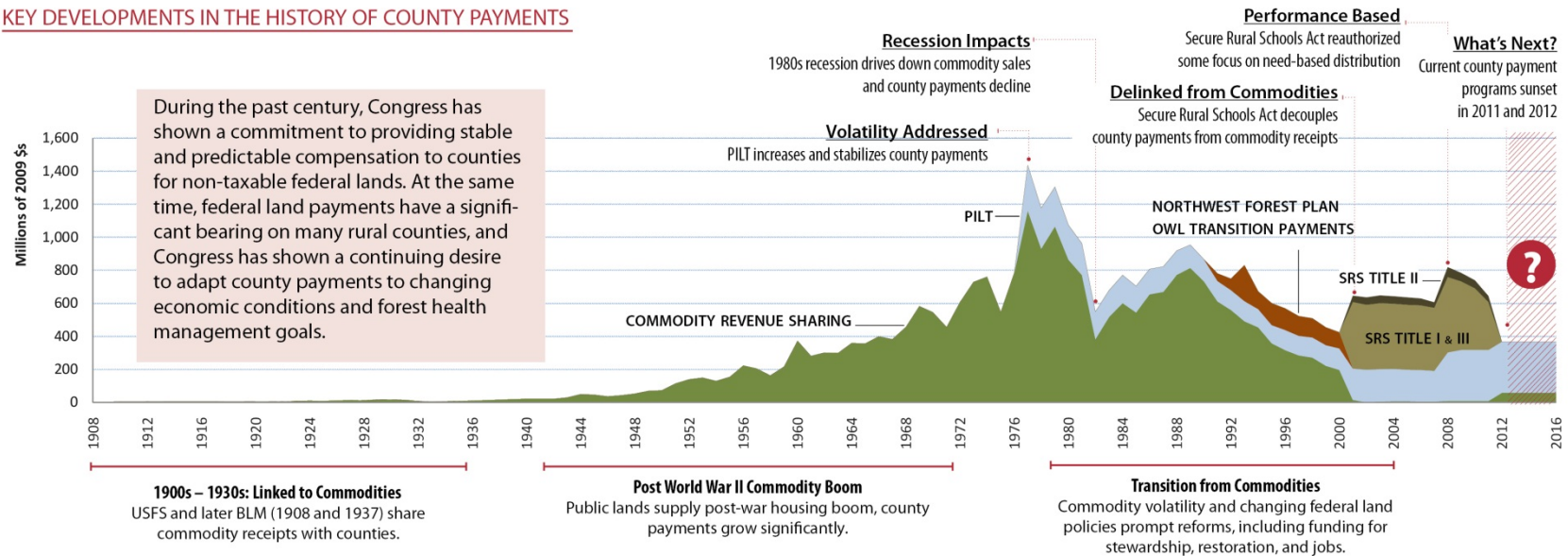
¹²² Headwaters Economics. December 2010. "County Payments, Jobs, and Forest Health: Ideas for Reforming the Secure Rural Schools and Community Self-Determination Act (SRS) and Payments in Lieu of Taxes (PILT)." White Paper. Accessed at http://headwaterseconomics.org/wphw/wp-content/uploads/Reform_County_Payments_WhitePaper_LowRes.pdf.

¹²³ Presumably most counties in the study area opt to receive SRS payments.

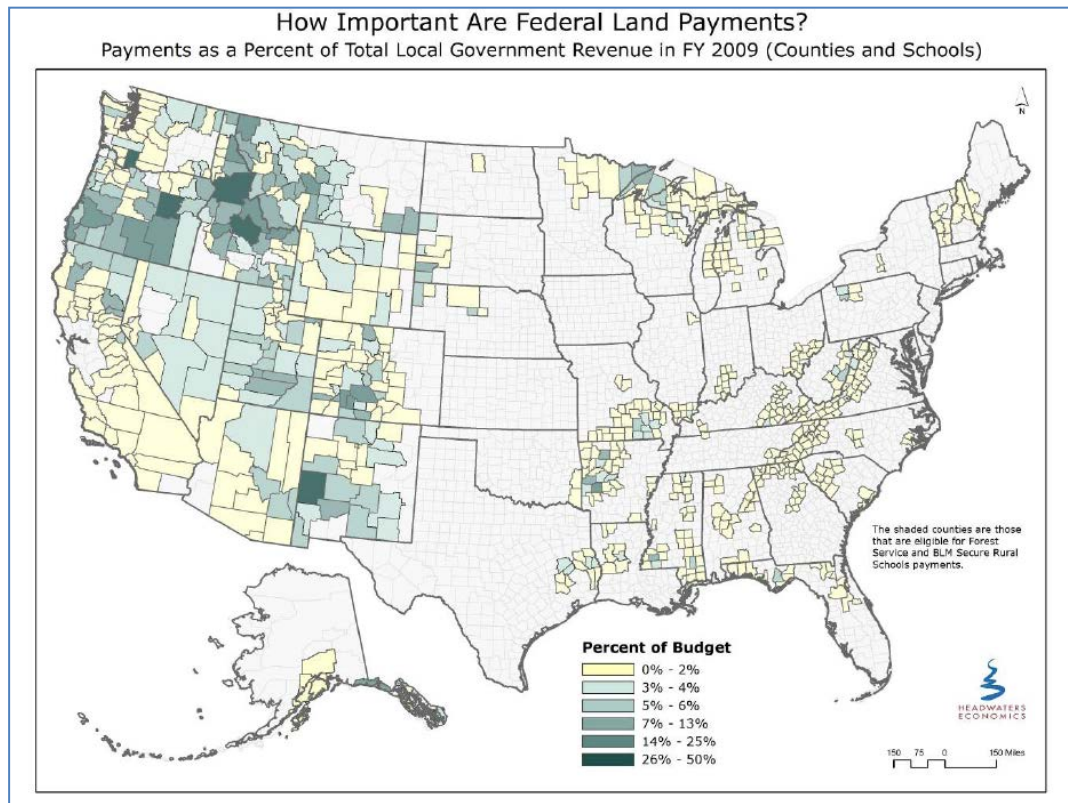
¹²⁴ Headwaters Economics. December 2010. "County Payments, Jobs, and Forest Health: Ideas for Reforming the Secure Rural Schools and Community Self-Determination Act (SRS) and Payments in Lieu of Taxes (PILT)." White Paper. Accessed at http://headwaterseconomics.org/wphw/wp-content/uploads/Reform_County_Payments_WhitePaper_LowRes.pdf.

EXHIBIT 3-9. HISTORY OF COUNTY PAYMENTS FROM FEDERAL REVENUE SHARING PROGRAMS

KEY DEVELOPMENTS IN THE HISTORY OF COUNTY PAYMENTS



Source: Headwaters Economics. December 2010. "County Payments, Jobs, and Forest Health: Ideas for Reforming the Secure Rural Schools and Community Self-Determination Act (SRS) and Payments in Lieu of Taxes (PILT)." White Paper. Accessed at http://headwaterseconomics.org/wphw/wp-content/uploads/Reform_County_Payments_WhitePaper_LowRes.pdf; permission to reproduce granted on April 3, 2012.

EXHIBIT 3-10. RELATIVE IMPORTANCE OF FEDERAL LAND PAYMENTS

Source: Headwaters Economics. December 2010. "County Payments, Jobs, and Forest Health: Ideas for Reforming the Secure Rural Schools and Community Self-Determination Act (SRS) and Payments in Lieu of Taxes (PILT)." White Paper. Accessed at http://headwaterseconomics.org/wphw/wp-content/uploads/Reform_County_Payments_WhitePaper_LowRes.pdf, permission to reproduce granted on April 9, 2012.

Note: Includes payments from the USFS 25% Fund, BLM O&C Revenue Sharing payments; PILT, and SRS.

3.4 BACKGROUND ON ECOLOGICAL FORESTRY

132. As discussed above, the Pacific Northwest timber industry has faced challenges over the past decade. Likewise, the forests themselves have undergone changes due to past management practices, shifting disturbance patterns, and climate change.¹²⁵ In an effort to address some of these challenges, land managers are contemplating a shift to ecological forestry practices.¹²⁶

¹²⁵ Johnson, N.K. and J.F. Franklin. 2009. Restoration of Federal Forests in the Pacific Northwest: Strategies and Management Implications. Unpublished manuscript. August 15, 2009. 120 pp. Accessed at http://www.cof.orst.edu/cof/fs/PDFs/JohnsonRestoration_Aug15_2009.pdf on April 5, 2012.

¹²⁶ For more information on ecological forestry, see Franklin *et al.* (2002); Drever *et al.* (2006); Johnson and Franklin (2009); and Swanson *et al.* (2011).

133. The main goal of ecological forestry-based management is to achieve ecological goals while simultaneously providing economic and social benefits.¹²⁷ In general, the approach follows the principles of natural forest stand development; it values the role of natural disturbances in initiating, developing, and maintaining forest ecosystems, and encourages active restoration of spatial heterogeneity and conservation of older stands and trees.¹²⁸ In addition, it recognizes that desirable ecological conditions are maintained through a program of active management that includes periodic timber harvest.¹²⁹
134. The Proposed Rule states that, “In general, actions that promote ecological restoration and those that apply ecological forestry principles as described in the Revised Recovery Plan (USFWS 2011, pp. III–11 to III–41)...are likely to be consistent with the conservation of the northern spotted owl and the management of its critical habitat.”^{130,131} It recommends that land managers consider managing NSO critical habitat according to the following basic management practices, which are consistent with ecological forestry and recommended in the Revised Recovery Plan:
- Conserve the older growth, high quality and occupied forest habitat as necessary to meet recovery goals;
 - Implement science-based active vegetation management to restore forest health, especially in drier forests in the eastern and southern portions of the species’ range;
 - Encourage landscape-level planning and vegetation management that allow historical ecological processes, such as characteristic fire regimes and natural forest succession, to occur on these landscapes throughout the range of the NSO. This approach has the best chance of resulting in forests that are resilient to future changes that may arise due to climate change.¹³²
135. Ideally, implementation of ecological forestry would allow Federal land managers to increase the overall amount of timber harvested from Federal lands while simultaneously improving habitat for the NSO and other listed species. Exactly how these practices would be implemented by the land management agencies is currently uncertain. Various pilot projects on BLM lands are ongoing to test alternatives and learn more about the

¹²⁷ Johnson, N.K. and J.F. Franklin. 2009. Restoration of Federal Forests in the Pacific Northwest: Strategies and Management Implications. Unpublished manuscript. August 15, 2009. 120 pp. Accessed at http://www.cof.orst.edu/cof/fs/PDFs/JohnsonRestoration_Aug15_2009.pdf on April 5, 2012.

¹²⁸ *Ibid.*

¹²⁹ *Ibid.*

¹³⁰ 2012 Proposed Critical Habitat Rule, 77 FR 14062

¹³¹ U.S. Fish and Wildlife Service. 2011. Revised Recovery Plan for the Northern Spotted Owl (*Strix occidentalis caurina*). U.S. Fish and Wildlife Service, Portland, Oregon. Xvi + 258 pp. Accessed at <http://www.fws.gov/arcata/es/birds/NSO/documents/USFWS2011RevisedRecoveryPlanNorthernSpottedOwl.pdf> on April 5, 2012.

¹³² 2012 Proposed Critical Habitat Rule, 77 FR 14062

challenges and opportunities associated with ecological forestry practices.¹³³ In addition, the land managing agencies must make decisions consistent with their land use management plans, forestry programs, and other statutory and regulatory responsibilities.¹³⁴ Thus, capturing the interface between ecological forestry and critical habitat concerns, and assessing related economic impacts, is an uncertain exercise.

¹³³ Johnson, N.K. and J.F. Franklin. 2012. Southwest Oregon Secretarial Pilot Projects on BLM Lands: Our Experience So Far and Broader Considerations for Long-term Plans. Pilot Report. February 15, 2012. Accessed at <http://www.blm.gov/or/news/files/pilot-report-feb2012.pdf> on April 6, 2012.

¹³⁴ Personal communication with U.S. Fish and Wildlife Service on April 6, 2012.

CHAPTER 4 | TIMBER IMPACTS - FEDERAL LANDS

136. This chapter provides a detailed breakdown of the proposed revised critical habitat designation within Federal lands and outlines the methodology for assessing economic impacts potentially associated with the designation. The majority of any economic impacts on Federal lands would be expected to result from potential changes in timber harvest. Therefore, the analysis focuses on identifying where potential changes to timber harvest may occur, and then estimating which critical habitat subunits may experience the highest relative magnitude of impacts.

Specifically, we undertake the following steps to estimate impacts:

- **Step 1** – First, we identify the Federal lands proposed for designation and the relevant land managers.
- **Step 2** – Next, based on the best available data, we discern discrete geographic areas within the proposed critical habitat designation that may experience incremental impacts as a result of the proposed rule.
- **Step 3** – Once we have distinguished areas that may experience incremental impacts, we evaluate the distribution of these areas across proposed critical habitat subunits.
- **Step 4** – Finally, we endeavor to quantify the relative magnitude of impacts across proposed critical habitat subunits using projected timber harvests based on data from BLM and USFS.

137. Overall, incremental impacts on most Federal lands are unlikely due to the conservation objectives and protections already in place for the NSO. Specifically, of approximately 12.0 million acres of proposed Federal lands, we find that approximately 1.4 million acres are more likely to experience incremental impacts to timber harvest relative to other lands as a result of critical habitat designation for the NSO. Identifying the nature and scope of potential changes within these 1.4 million acres is challenging. Federal agencies are legally obligated to avoid the destruction or adverse modification of critical habitat in implementing timber management practices; however, the means by which they choose to do so is uncertain.

138. To provide an illustrative bound of this uncertainty, the analysis contemplates three scenarios under Step 4, including:

- **Scenario 1 – Administrative Costs Only.** If minimal or no changes to current management practices are adopted by the action agencies as a result of critical habitat, the incremental impacts of the designation would be predominantly administrative.

- Scenario 2 – Positive Economic Impact. Action agencies may choose to implement forest management guidelines consistent with the Revised Recovery Plan for the NSO, which are cited in the proposed critical habitat rule. Under certain circumstances, these guidelines for active management measures could lead to increases in matrix timber harvest compared to harvest levels in recent years.
- Scenario 3 – Negative Economic Impact. Action agencies may choose to adopt a more restrictive harvest posture in response to critical habitat, and to meet other competing land management goals consistent with their land use plans and statutory authorities. Thus, this scenario illustrates impacts attributable to a decline in harvest volumes relative to the baseline.

139. We discuss the analytic steps and scenario development in further detail below.

4.1 STEP 1 - IDENTIFY FEDERAL LANDS PROPOSED FOR CRITICAL HABITAT DESIGNATION

140. A total of approximately 12,021,122 acres of Federal lands in Washington, Oregon, and California are proposed for designation as critical habitat for the NSO. Exhibit 4-1 provides a breakdown of lands by Federal Agency. Of these lands, USFS manages approximately 9,524,623 acres (79 percent) and BLM manages 1,483,607 acres (12 percent). The remaining Federal lands are managed by the NPS (eight percent) and Department of Defense (less than one percent).

EXHIBIT 4-1. LAND OWNERSHIP BY FEDERAL AGENCY WITHIN CRITICAL HABITAT

FEDERAL LAND CATEGORY	AREA IN PROPOSED DESIGNATION (ACRES)
WASHINGTON	
US Forest Service	3,601,400
National Park Service	835,507
Department of Defense	14,313
OREGON	
US Forest Service	3,555,417
Bureau of Land Management	1,297,525
National Park Service	35,160
CALIFORNIA	
US Forest Service	2,367,806
Bureau of Land Management	186,082
National Park Service	127,913
TOTAL	12,021,122

4.2 STEP 2 - IDENTIFY AREAS WHERE POTENTIAL INCREMENTAL IMPACTS MAY OCCUR

141. To estimate the economic impacts of critical habitat designation, we focus on those areas where conservation efforts may be implemented due to the designation, as opposed to protections that are already in place due to the listing of NSO under the Act and the NWFP. The incremental effects are measured as the difference in annual value of timber harvest in these areas with and without critical habitat designation. In the next section, we describe existing Federal land management policies, which we use as the baseline (“without critical habitat”) for the economic assessment. Then we describe a filtering approach to identify those areas where potential incremental effects may occur. Note that this section should be read in conjunction with the Incremental Effects Memo included in Appendix B, as that text provides context for the conclusions derived below.

4.2.1 EXISTING FEDERAL LAND MANAGEMENT POLICIES

142. Federal lands are managed in accordance with congressional designations, Federal agency Land and Resource Management Plans, and the agencies’ relevant statutory and regulatory authorities. Timber harvests are generally prohibited in Congressionally Reserved Areas, including NPS lands. Pursuant to their LRMPs and RMPs, reserved areas (i.e., Late Successional Reserves and Riparian Reserves) managed by USFS and BLM also do not allow large scale commercial harvest of older forest; however, silvicultural treatments, including thinning of younger trees, and salvage harvests are permitted in certain circumstances. Commercial timber harvest is currently allowed in the remaining matrix lands managed by USFS and BLM.

National Park Service and Department of Defense Lands

143. Congressionally Reserved Natural Areas, which include NPS Lands, do not allow timber harvest unless specified under the congressional designation of these land allocations. According to the Service, current management practices on these lands are more conservative than may be implemented in other areas designated as critical habitat. According to NPS, there is currently no logging and no active forest management practices on NPS lands.¹³⁵ As such, we conclude that there will be no incremental impacts on these lands within the proposed designation.
144. Joint Base Lewis-McChord in Washington (critical habitat subunit NCO-3, which is composed entirely of DOD lands) is the only critical habitat subunit in the proposed revised critical habitat that appears to be presently entirely unoccupied by the NSO. The Service has not identified any substantive changes from existing management necessary to meet the conservation goal and contribution of this subunit.¹³⁶ DOD currently does not consult on proposed actions regarding potential effects on the NSO, but would likely need to if critical habitat were designated on the base. The Service predicts the additional workload for DOD would entail two informal and two formal consultations each year to

¹³⁵ The information on NPS activities in this section was provided by Laurie Lee Jenkins of the National Park Service during a telephone interview conducted on March 21, 2012. We do note however, that a comment submitted regarding the draft Economic Analysis represented that some active forest management activities are occurring on NPS lands in Shasta county.

¹³⁶ Incremental Effects Memorandum for the Economic Analysis of the Proposed Rule to Revise Critical Habitat for the Northern Spotted Owl, received from the Service on March 21, 2012.

address the effects of forest management and military training activities on designated critical habitat. Depending on the covered activities, the Service estimates that these consultations could take up to 200 hours of staff time each for the Service and for the base annually.¹³⁷ We consider these administrative costs under Scenario 1.

145. While critical habitat is not expected to generate changes to forest management practices or to testing or training missions on NPS or DOD lands, these areas may be subject to new or increasingly complex section 7 consultations as a result of critical habitat designation. Activities that may involve section 7 consultations include the construction or maintenance of visitor facilities on NPS lands and access roads to projects or military training including the use of vehicles, explosives, and soldiers. DOD and NPS will likely experience an additional administrative burden to provide biological assessments for projects in consultations with the Service as a result of critical habitat designation.

Bureau of Land Management and US Forest Service Lands

146. All BLM and USFS lands within the proposed revised critical habitat are managed under the RMPs and LRMPs that incorporated the standards and guidelines of the NWFP. The NWFP establishes reserved areas (Late Successional Reserves and Riparian Reserves) intended to provide, in part, for recovery of the NSO and other late-successional species, and non-reserved areas (matrix lands) where programmed timber harvest is expected to occur. In June 2011, the Service issued a Revised Recovery Plan for the NSO that recommends more specific timber harvest guidelines in both areas managed for wildlife and areas managed for timber production, and also recommends additional protections for older habitat and NSO sites in non-reserved areas. The current guidelines for managing the large reserves of the NWFP may be more restrictive than the general recommendations provided by the Service in the proposed revised critical habitat designation. Therefore, reserved lands are already being managed to reduce impacts or for the benefit of the NSO, consistent with the objectives of proposed critical habitat designation. No incremental impacts, beyond limited administrative costs, are forecast here.
147. Under the NWFP, matrix lands are intended to be managed primarily for timber production. The Service's 2011 Revised Recovery Plan recommends that structurally complex stands and occupied NSO sites in all land allocations be retained to provide for NSO reproduction and to ease competition with barred owls until barred owl numbers can be reduced. According to the Revised Recovery Plan, unoccupied and non-structurally complex NSO habitat in the matrix is still expected to be managed for timber production. For these areas the Revised Recovery Plan recommends implementing ecological forestry techniques, including avoidance, to retain and develop structurally complex forests in the future to benefit the NSO, which represents a potential incremental effect of the proposed designation. As stated previously, the only legal obligation of the land managing agencies is to avoid the destruction or adverse modification of critical habitat on a project-by-project basis.

¹³⁷ Incremental Effects Memorandum for the Economic Analysis of the Proposed Rule to Revise Critical Habitat for the Northern Spotted Owl, received from the Service on March 21, 2012.

148. It is challenging to quantify those acres where management might change as a result of occupancy status because there are no complete GIS data layers depicting NSO occupancy across the range. Absent these data, we use stand complexity as a proxy for NSO occupancy. Specifically, we consider all predominantly younger forests on matrix lands to be unoccupied. In addition, the Service estimates that approximately 6.5 percent of matrix lands with NSO habitat within the proposed designation are likely to be unoccupied. Under the Revised Recovery Plan, timber management in these areas would be more flexible than areas occupied by the NSO. Therefore, we consider all areas that are likely to be unoccupied within matrix lands as areas more likely to experience changes in timber harvest as a result of critical habitat designation.
149. Under the auspices of the Revised Recovery Plan's Recovery Action 12 recommendation, critical habitat designation could shift post-fire salvage management guidelines in the matrix from extraction of timber resources to "conserving and restoring habitat elements that take a long time to develop (e.g., large trees, medium and large snags, downed wood)." ¹³⁸ Additionally, under the NWFP, Late Successional Reserves (LSRs) provide for salvage logging after fire events greater than ten acres in size that would likely be inconsistent with this recommendation. Therefore, ecological fire salvage activities contemplated as part of proposed critical habitat designation on both reserved and non-reserved lands may result in incremental economic effects. It is challenging, however, to quantify the incremental effects of such fire salvage requirements due to critical habitat designation. In particular, accurately forecasting where fires may occur and the on-the-ground response of land managers is difficult and uncertain. Thus, we do not attempt to quantify this potential incremental effect.
150. The NSO Effectiveness Monitoring Plan for the NWFP was developed in 1999 to establish formal guidelines related to monitoring activities. The purpose of the plan is to assess trends in NSO populations and habitat. Therefore, there are no incremental economic impacts due to critical habitat designation associated with surveying and monitoring activities related to NSO as no additional monitoring is planned in areas of proposed critical habitat.
151. Exhibit 4-2 describes the distribution of critical habitat across land use allocations under the proposed revised critical habitat designation. Approximately eight percent (1,012,893 acres) of proposed critical habitat occurs in Congressionally Reserved Areas. The remaining land allocations are managed by BLM and USFS. Approximately 60 percent (7,207,132 acres) occurs in LSRs. Another six percent (662,687 acres) consists of Riparian Reserves within predominantly younger forests on matrix lands. The remaining 26 percent (3,138,411 acres) occurs within matrix lands.

¹³⁸ U.S. Fish and Wildlife Service, Revised Recovery Plan for the Northern Spotted Owl, June 2011, p.49.

EXHIBIT 4-2. PROPOSED CRITICAL HABITAT DESIGNATION LAND USE ALLOCATIONS

LAND ALLOCATION	DESCRIPTION	BASELINE MANAGEMENT RECOMMENDATIONS	AREA IN PROPOSED CRITICAL HABITAT DESIGNATION	
			ACRES	PERCENT OF TOTAL
Congressionally Reserved Areas	These lands have been reserved by act of Congress for specific land allocation purposes. This category includes: National Parks and Monuments, Wilderness Areas, Wild and Scenic Rivers, National Wildlife Refuges, Department of Defense Lands, and other lands with congressional designations.	No timber harvest activities are planned unless specified under the congressional designation of such lands.	1,012,893	8.4%
Late Successional Reserves	LSRs, in combination with the other allocations and standards and guidelines, will maintain a functional, interactive, late-successional and old-growth forest ecosystem. They are designed to serve as habitat for late-successional and old-growth related species, including the NSO.	The thinning of younger forests within LSRs is allowed with the objectives of retention or development of late-successional forest characteristics. Large scale commercial harvesting of trees is generally not permitted. Salvage harvest may be allowed subject to review.	7,207,132	60.0%
Riparian Reserves ^a	Riparian Reserves are areas along streams, wetlands, ponds, lakes, and unstable or potentially unstable areas with primary conservation objectives for aquatic and riparian-dependent terrestrial resources.	Timber harvest is prohibited, including fuelwood cutting, except for salvage harvests and silvicultural practices that are in accordance with the Aquatic Conservation Strategy.	662,687 ^b	5.5%
Matrix	The matrix is the remaining Federal land outside the designated areas set forth above. It is also the area in which most timber harvest and other silvicultural activities will be conducted. However, the matrix contains non-forested areas as well as forested areas that may be technically unsuited for timber production.	Most timber harvest and other silvicultural activities would be conducted on matrix lands, according to standards and guidelines. The baseline management guidelines include pre-commercial thinning and regeneration harvest in presently unoccupied areas. ^c	3,138,411	26.1%

Notes:

^a GIS data layers of Riparian Reserves were provided by BLM and USFS for all areas within the critical habitat designation, with the exception of Mount Baker-Snoqualmie and Columbia River Gorge, for which no data are available.

^b This figure represents only Riparian Reserves within predominantly younger forests on matrix lands to avoid double-counting reserve or other protected areas, such as LSRs.

^c Note that much regeneration harvest has been contentious and is sometimes legally challenged, based on a variety of legal and social concerns.

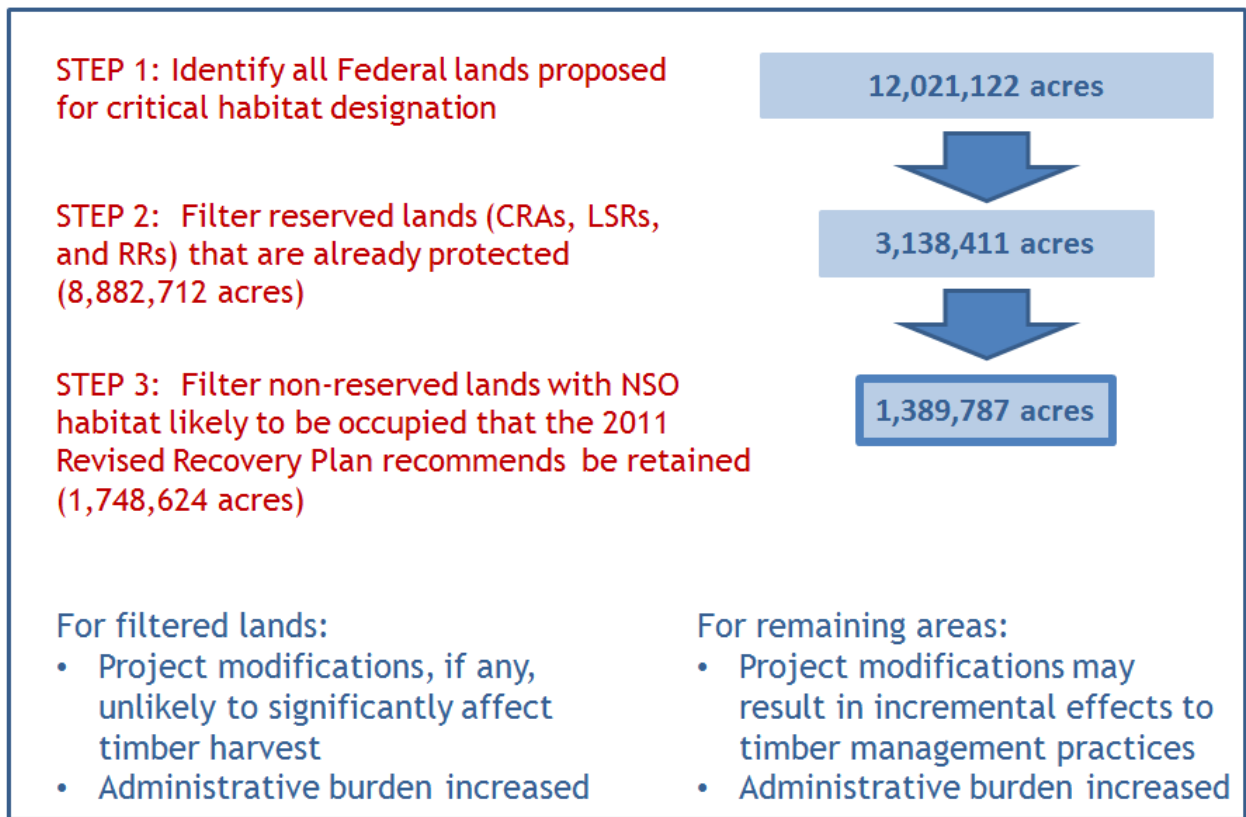
4.2.2 FILTERING APPROACH

152. This analysis identifies areas where potential incremental impacts may occur and quantifies the estimated changes in timber harvest associated with critical habitat designation. The analysis relies on a filtering approach that isolates areas that may be subject to changes in timber harvest due to critical habitat designation. To isolate potential incremental effects of the proposed designation, we identify areas where current timber harvest practices may be different under proposed critical habitat objectives and consider the total land acreage that may be affected.
153. As summarized above and described in detail in the attached Incremental Memorandum, whether an area of critical habitat may engender incremental impacts on timber management, including either increases or decreases in timber harvest, is a function of three primary variables: land allocation (i.e., reserved versus non-reserved); habitat type, and NSO occupancy or non-occupancy. We were able to identify detailed data and spatial information concerning the first two variables. Regarding the third variable, it is challenging to determine whether smaller discrete geographic areas are presently occupied, as such data were not available for the purposes of this analysis. Absent these data, we use stand complexity as a proxy for NSO occupancy.¹³⁹ Therefore, we consider all areas that are likely to be unoccupied as areas more likely to experience incremental effects to timber harvest practices.
154. Exhibit 4-3 illustrates the filtering approach employed to identify areas where potential incremental effects may occur. As shown in the exhibit, the first step in this approach is to identify all Federal lands. Approximately 12,021,122 acres of Federal land are in the proposed critical habitat designation.
155. The second step is to filter reserved Federal lands where the objectives of the allocation are consistent with proposed critical habitat objectives. For the purposes of this analysis, all Federal lands currently protected or managed under conservation objectives for the benefit of the NSO are considered to be “reserved” lands. These include Congressionally Reserved Areas, LSRs, and Riparian Reserves. Management guidelines for Congressionally Reserved Areas are considered by the Service to be more conservative than those that could be implemented under critical habitat. Furthermore, under the NWFP, BLM and USFS timber harvest practices on LSRs are consistent with proposed critical habitat objectives as these lands are currently being managed for the benefit of the NSO and other species associated with old growth. The NWFP also restricts or limits timber harvest on Riparian Reserves, consistent with proposed critical habitat objectives. Therefore, reserved lands are not likely to experience any changes in proposed timber management as a result of critical habitat designation. There are approximately 8,882,712 acres of Federal reserved lands.

¹³⁹ We note that in the absence of information to the contrary, in the section 7 consultation process the land managing agencies may rely on habitat characterization as a proxy for occupancy, assuming that structurally complex or other NSO habitat, such as that suitable for foraging, is presently occupied. The Service estimates that 6.5 percent of NSO habitat is not occupied.

156. The third step is to filter non-reserved Federal lands by habitat characterization and occupancy status. As noted, we use habitat characterization, as defined by stand complexity, as a proxy for occupancy. Thus, we filter areas of matrix lands with NSO habitat that are likely to be occupied because of the section 7 requirement that Federal agencies avoid jeopardizing the species. As stated, the Service estimates that approximately 6.5 percent of matrix lands with NSO habitat are likely to be unoccupied, while the remaining 93.5 percent are assumed to be occupied. Therefore, there are approximately 1,748,624 acres of non-reserved Federal lands with NSO habitat that are likely to be occupied.
157. The remaining lands within the critical habitat designation, approximately 1,389,787 acres or 11.6 percent of total Federal critical habitat acres, represent matrix lands likely to be unoccupied by nesting or territorial NSO. These acreages represent the focus of our assessment of potential impacts to timber harvest. For these remaining areas, project modifications associated with critical habitat designation may affect timber management practices. Additionally, these areas will be subject to ecological fire salvage requirements and increased administrative burden of section 7 consultations.
158. The filtered lands (areas noted on the left side of Exhibit 4-3), are generally already protected or managed consistent with the needs of the NSO due to the section 7 requirement to avoid jeopardy of the species. The Revised Recovery Plan recommends that occupied NSO sites in all land allocations be retained for conservation objectives.

EXHIBIT 4-3. ILLUSTRATION OF FILTERING APPROACH



4.3 STEP 3 - EVALUATE THE GEOGRAPHIC DISTRIBUTION OF AREAS WHERE POTENTIAL INCREMENTAL EFFECTS MAY OCCUR ACROSS CRITICAL HABITAT SUBUNITS

159. Having identified the areas that are the focus of our assessment of potential incremental effects, we turn to the methodology for evaluating the distribution of these areas across critical habitat subunits. We follow the approach described above to identify where potential incremental effects may occur, specifically matrix lands that are likely to be unoccupied by the NSO. These areas are relatively more likely to incur potential incremental effects, positive or negative, because they are not already subject to protection under the section 7 requirement to avoid jeopardy of the NSO. Then we consider the total area comprising potential impacts to timber harvest at the critical habitat subunit level. Finally, we use an acreage-based approach to rank subunits by the relative amount of lands that are more likely to incur potential changes to timber harvest.

4.3.1 RANKING METHODOLOGY

160. We use the following approach for ranking critical habitat subunits:

- First, we disaggregate all lands types (by owner, land allocation, and habitat suitability) within each critical habitat subunit;

- Second, we assign each subunit a score on a scale of 0 to 100, with 100 representing the subunit with the largest relative proportion of total acres of Federal lands that may experience impacts to timber harvest;¹⁴⁰
 - Third, we rank each subunit according to the composite score against all other subunits;
 - Finally, we identify four subunits (NCO-5, ORC-3, WCC-1, and WCS-6) that have proportionally greater areas of younger forests that are considered essential to NSO conservation because they can develop additional suitable habitat in the future.¹⁴¹
161. Exhibit 4-4 describes the groupings of subunits based on the relative distribution of Federal lands more likely to incur potential impacts to timber harvest. Subunits below the 40th percentile have the lowest acreages of focus. Critical habitat subunits that have larger areas of non-reserved Federal lands that are unoccupied by the NSO are likely to have relatively higher potential impacts to timber harvest.

EXHIBIT 4-4. CHARACTERIZATION OF CRITICAL HABITAT SUBUNITS BY DISTRIBUTION OF ACREAGES WHERE INCREMENTAL TIMBER HARVEST IMPACTS ARE MORE LIKELY TO OCCUR

LEVEL OF POTENTIAL IMPACTS BY SUBUNIT	RANK	ACRES OF FEDERAL LAND WITH POTENTIAL IMPACTS	COMPOSITE SCORE
Lower	Below 40th Percentile	Below 12,000 acres	0 to 13
Medium	40th to 89th Percentile	12,000 to 50,000 acres	13 to 54
Higher	90th Percentile or Above	50,000 to 100,000 acres	Above 54

¹⁴⁰ For example, we assign the critical habitat subunit with the largest number of acres of focus (ICC-1; 94,309 acres) a composite score of 100. The next subunit (KLW-7; 77,902 acres) receives a composite score of $77,902 / 94,309 * 100 = 82.6$.

¹⁴¹ The Service identifies four subunits that meet this criterion in the Incremental Effects Memorandum for the Economic Analysis of the Proposed Rule to Revise Critical Habitat for the Northern Spotted Owl, received from the Service on March 21, 2012. We recognize that factors other than acreage are important to identify where potential incremental effects are more likely to occur. However, we lack necessary data on stand age and complexity to incorporate such considerations into our ranking methodology.

162. Exhibit 4-5 provides a map of all proposed critical habitat subunits in Washington, Oregon, and California. The shading of the subunits describes the relative distribution of Federal lands more likely to experience potential impacts to timber harvest. The critical habitat subunits with highest composite scores (approximately the top ten percent) are located across all three states. Conversely, critical habitat subunits with relatively larger proportions of coastal areas, national parks, and private lands in California and Washington have fewer acres where incremental impacts may occur. One area that is an exception to this is Olympic National Forest in Washington (NCO-1 and NCO-2), which has relatively larger areas of matrix lands managed by USFS in addition to Congressionally Reserved Natural Areas where potential impacts are less likely to occur. The map also identifies four subunits that have proportionally greater areas of younger forests that are considered essential to NSO conservation.
163. Exhibit 4-6 provides a summary of all critical habitat subunits ranked by the relative distribution of Federal lands more likely to experience potential impacts to timber harvest. The exhibit shows the breakdown of land type by land owner, land allocation, and NSO habitat. Column O indicates the total acres of the critical habitat subunit with potential impacts to Federal timber harvest.¹⁴² State and private lands, Congressionally Reserved Areas, LSRs, and Riparian Reserves do not factor into the rankings. Column P reports the composite score and Column Q characterizes the relative potential impact of critical habitat designation. The critical habitat subunits with the top rankings include: ECN-3, ECN-5, ICC-1, ICC-2, K LW-1, K LW-7, and WCC-2. In addition, we identify the four subunits that have proportionally greater areas of younger forests that are considered essential to NSO conservation. These subunits do not feature prominently in the rankings because they contain relatively small areas of Federal lands with potential impacts (less than 18,000 acres per subunit).

¹⁴² In Exhibit 4-6, Column O is calculated as $0.065 \times (\text{Column D} + \text{Column G}) + \text{Column E} + \text{Column H}$.

EXHIBIT 4-5. MAP OF ACREAGE DISTRIBUTION OF UNOCCUPIED MATRIX LANDS BY SUBUNIT

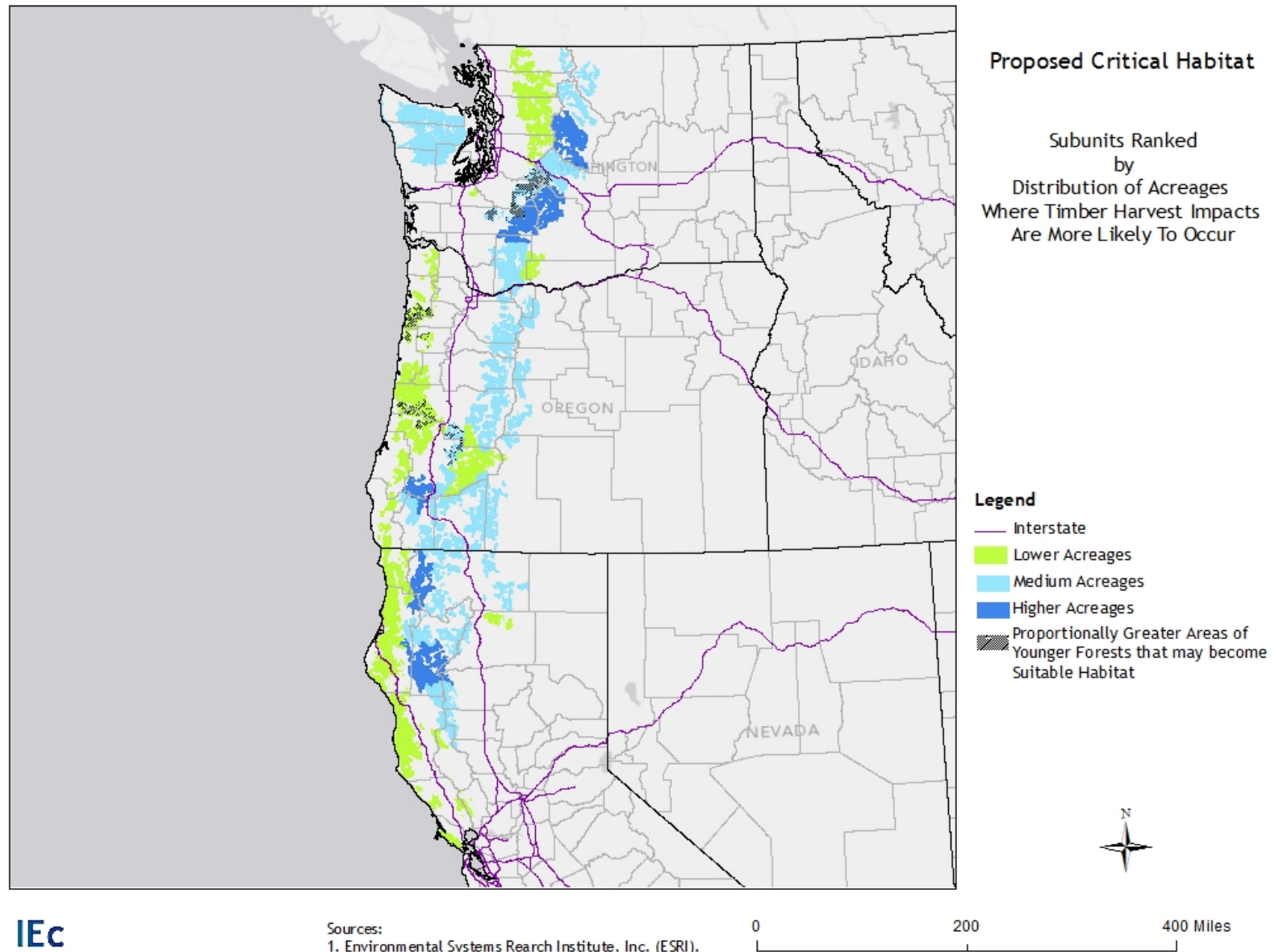


EXHIBIT 4-6. SUMMARY OF AREAS WITH POTENTIAL IMPACTS TO TIMBER HARVEST ON FEDERAL LANDS BY PROPOSED CRITICAL HABITAT SUBUNIT

RANK [A]	UNIT [B]	SUBUNIT [C]	LAND TYPE										TOTAL [N]	FEDERAL LANDS WITH POTENTIAL IMPACTS TO TIMBER HARVEST [O]	COMPOSITE SCORE (0 to 100) [P]	RELATIVE POTENTIAL IMPACT [Q]	
			USFS				BLM			NPS [J]	OTHER FEDERAL (DOD) [K]	STATE [L]					PRIVATE [M]
			MATRIX		RESERVE [F]	MATRIX											
			NSO HABITAT [D]	PRIMARILY YOUNGER FORESTS [E]		NSO HABITAT [G]	PRIMARILY YOUNGER FORESTS [H]										
1	Inner California Coast Ranges	ICC 1	90,112	87,111	173,308	349	1,317	12			61		352,271	94,309	100.0	Higher	
2	Klamath West	KLW 7	86,017	72,297	143,801	9	13						302,137	77,902	82.6	Higher	
3	East Cascades North	ECN 3	39,282	64,849	291,274						5,819	22,575	423,799	67,402	71.5	Higher	
4	Inner California Coast Ranges	ICC 2	82,014	55,662	86,579	94	41	386					224,776	61,039	64.7	Higher	
5	West Cascades Central	WCC 2	75,541	53,928	229,859				44,452			195	403,976	58,838	62.4	Higher	
6	East Cascades North	ECN 5	24,902	51,519	218,237						3,400	2,322	300,381	53,138	56.3	Higher	
7	Klamath West	KLW 1			1,484	44,144	48,785	54,423			7,236		156,073	51,655	54.8	Higher	
8	West Cascades Central	WCC 3	58,660	42,298	343,239						53,504	1,746	499,447	46,111	48.9	Medium	
9	Inner California Coast Ranges	ICC 7	10,843	17,363	104,180	14,177	25,895	2,745	5,685		257		181,144	44,884	47.6	Medium	
10	East Cascades North	ECN 9	27,646	39,546	90,932								158,124	41,343	43.8	Medium	
11	East Cascades North	ECN 4	49,360	37,814	140,724						9,781	66,812	304,490	41,022	43.5	Medium	
12	East Cascades North	ECN 7	55,845	37,007	82,096								174,949	40,637	43.1	Medium	
13	Klamath East	KLE 6	31,378	25,189	82,222	8,245	11,891	7,328			834		167,088	39,656	42.0	Medium	
14	West Cascades South	WCS 2	60,254	33,918	91,272	4	1	10,382					195,832	37,835	40.1	Medium	
15	Inner California Coast Ranges	ICC 4	22,678	36,130	114,391	5	35				77		173,316	37,639	39.9	Medium	
16	East Cascades South	ECS 3	42,798	34,841	35,321								112,960	37,623	39.9	Medium	
17	Klamath East	KLE 3	236		71	40,403	34,750	34,928			94		110,483	37,392	39.6	Medium	
18	Klamath West	KLW 9	33,305	34,154	122,679								190,138	36,319	38.5	Medium	
19	West Cascades South	WCS 3	116,898	24,859	211,836	5,721	706	13,856			183		374,060	33,535	35.6	Medium	
20	East Cascades South	ECS 1	24,569	19,708	103,587	14,782	6,851	1,890	21,129				192,517	29,117	30.9	Medium	
21	Inner California Coast Ranges	ICC 3	15,392	25,068	205,135	698	2,231	10,098			634		259,256	28,345	30.1	Medium	
22	East Cascades North	ECN 8	13,822	27,214	116,839						0		157,875	28,112	29.8	Medium	
23	Klamath West	KLW 4	21,375	23,201	48,430	7,526	1,513	52,784	274		704		155,807	26,593	28.2	Medium	

RANK [A]	UNIT [B]	SUBUNIT [C]	LAND TYPE										TOTAL [N]	FEDERAL LANDS WITH POTENTIAL IMPACTS TO TIMBER HARVEST [O]	COMPOSITE SCORE (0 to 100) [P]	RELATIVE POTENTIAL IMPACT [Q]	
			USFS				BLM			NPS [J]	OTHER FEDERAL (DOD) [K]	STATE [L]					PRIVATE [M]
			MATRIX		RESERVE [F]	MATRIX		RESERVE [I]									
			NSO HABITAT [D]	PRIMARILY YOUNGER FORESTS [E]		NSO HABITAT [G]	PRIMARILY YOUNGER FORESTS [H]										
24	Klamath West	KLW 2	18,132	18,945	34,793	126	82	76,983			1,708		150,769	20,214	21.4	Medium	
25	Klamath East	KLE 7	13,444	18,370	41,460	131	312	31					73,748	19,564	20.7	Medium	
26	Klamath East	KLE 4	66,466	14,390	212,519	40	13	54	13,758		95		307,336	18,727	19.9	Medium	
27	North Coast Olympics	NCO 1	19,417	17,342	288,203				421,093			938	746,992	18,604	19.7	Medium	
28	Klamath West	KLW 8	14,936	16,883	86,587	133	127	3					118,669	17,989	19.1	Medium	
29	West Cascades South	WCS 4	113,258	10,349	328,928	243	147	219					453,144	17,874	19.0	Medium	
30	West Cascades Central	WCC 1	14,244	16,717	225,498				79,551		3,322	45,461	384,793	17,643	18.7	Medium*	
31	West Cascades South	WCS 1	28,231	14,992	127,835	1,716	47	4,917					177,737	16,986	18.0	Medium	
32	West Cascades South	WCS 6	33		10	31,802	14,563	58,057					104,465	16,632	17.6	Medium*	
33	Klamath East	KLE 2	4,845	547	1,498	37,156	13,297	51,871			1,257		110,471	16,574	17.6	Medium	
34	East Cascades South	ECS 2	7,009	9,872	34,715	2,498	4,698	31,215			2		90,007	15,188	16.1	Medium	
35	East Cascades North	ECN 1	6,387	14,157	111,929				2,634				135,107	14,572	15.5	Medium	
36	North Coast Olympics	NCO 2	10,146	12,465	245,658				226,205				494,475	13,125	13.9	Medium	
37	East Cascades North	ECN 2	3,623	12,578	99,186				48,922				164,309	12,814	13.6	Medium	
38	Klamath East	KLE 5				23,640	11,089	4,713			40		39,482	12,626	13.4	Medium	
39	East Cascades North	ECN 6	32,762	9,649	43,781						39,475	38,098	163,766	11,778	12.5	Lower	
40	West Cascades South	WCS 5	126,401	606	243,245								370,252	8,822	9.4	Lower	
41	Oregon Coast	ORC 5	17		23,664	10,807	7,045	95,681			46,994		184,207	7,748	8.2	Lower	
42	Inner California Coast Ranges	ICC 5	3,033	7,224	33,629			3,017			334		47,237	7,421	7.9	Lower	
43	Klamath East	KLE 1	67,930	765	188,142	2,803	1,517	1,132			519		262,808	6,880	7.3	Lower	
44	Oregon Coast	ORC 6				10,862	5,892	67,611					84,365	6,598	7.0	Lower*	
45	North Coast Olympics	NCO 5	11,474	3,544	118,592	1,690	1,306	61,762			14,643		213,011	5,706	6.1	Lower	
46	Oregon Coast	ORC 3	200		60,523	13,231	4,667	114,905			4,970		198,496	5,540	5.9	Lower*	
47	Oregon Coast	ORC 2	9,060		171,959	11,000	4,151	63,697			18,646		278,513	5,455	5.8	Lower	
48	Redwood Coast	RDC 1	902	1,144	21,263	6,253	3,446	77,740	77,363		110,160	580,522	878,792	5,055	5.4	Lower	

RANK [A]	UNIT [B]	SUBUNIT [C]	LAND TYPE										TOTAL [N]	FEDERAL LANDS WITH POTENTIAL IMPACTS TO TIMBER HARVEST [O]	COMPOSITE SCORE (0 to 100) [P]	RELATIVE POTENTIAL IMPACT [Q]	
			USFS			BLM			NPS [J]	OTHER FEDERAL (DOD) [K]	STATE [L]	PRIVATE [M]					
			MATRIX		RESERVE [F]	MATRIX		RESERVE [I]									
			NSO HABITAT [D]	PRIMARILY YOUNGER FORESTS [E]		NSO HABITAT [G]	PRIMARILY YOUNGER FORESTS [H]										
49	Klamath West	KLW 3	4,027	3,692	95,815	1,519	521	4,782			837		111,193	4,573	4.8	Lower	
50	Klamath West	KLW 6	5,991	3,726	149,848								159,565	4,116	4.4	Lower	
51	Oregon Coast	ORC 4				3,711	2,980	2,614					9,305	3,221	3.4	Lower	
52	Klamath West	KLW 5	1,564	1,647	25,355	30	26						28,622	1,777	1.9	Lower	
53	West Cascades North	WCN 1	3,295	1,558	500,010				12,649		95,836		613,347	1,772	1.9	Lower	
54	Redwood Coast	RDC 2				1,173	1,355	29,493			67,758	385,099	484,878	1,432	1.5	Lower	
55	Inner California Coast Ranges	ICC 8	2,292	1,122	70,077								73,491	1,271	1.3	Lower	
56	Inner California Coast Ranges	ICC 6				167	478				10,759	40,114	51,519	489	0.5	Lower	
57	North Coast Olympics	NCO 4					230	348	8,832			122,674		132,084	363	0.4	Lower
58	West Cascades North	WCN 2	145	111	191,053						15,569		206,878	121	0.1	Lower	
59	Oregon Coast	ORC 1	771		82,316	110	14	26,068			7,297		116,576	72	0.1	Lower	
60	North Coast Olympics	NCO 3								14,313			14,313	0	0.0	Lower	
60	Redwood Coast	RDC 3									243	46,541	46,785	0	0.0	Lower	
60	Redwood Coast	RDC 4									13,421	18,075	31,497	0	0.0	Lower	
60	Redwood Coast	RDC 5							44,865		11,524	21,392	77,780	0	0.0	Lower	
	TOTAL		1,572,959	1,056,072	6,895,592	297,227	212,153	974,227	998,580	14,313	670,671	1,269,890	13,961,683	1,389,787			

Notes:

* Indicates subunits that have proportionally greater areas of younger forests that are considered essential to NSO conservation.

4.4 STEP 4 - QUANTIFY THE RELATIVE MAGNITUDE OF POTENTIAL CHANGES IN FUTURE TIMBER HARVEST VOLUMES

164. In the previous sections, we first identified the areas of critical habitat that represent the focus of our assessment of critical habitat impacts on Federal timber management practices, namely, matrix lands unoccupied by the NSO. These lands represent the areas where action agencies are more likely to consider whether to make changes to present management practices to potentially avoid the destruction or adverse modification of critical habitat. We then ranked the designation's subunits by the distribution of these acreages within their boundaries. We now turn to an illustration of potential changes in Federal timber harvest in these areas attributable to critical habitat designation.
165. To estimate these potential effects, the analysis generally proceeds as follows:
- First, for areas within each subunit that may experience incremental changes to timber harvest (as identified above), estimate future timber harvest volumes absent critical habitat. This projection represents the harvest baseline.
 - Second, scale these projected volumes based upon a measure of the potential incremental effect of critical habitat considerations. As noted, we consider three scaling scenarios that yield no change, positive change, or negative change to these projected volumes.
 - Third, monetize calculated changes in timber volume under Scenarios 2 and 3 based upon representative stumpage values.
166. We discuss each of these steps in greater detail below and present the results of the analysis.

4.4.1 FUTURE TIMBER HARVEST VOLUMES

167. To fully implement this valuation exercise across the entire range of proposed critical habitat on Federal lands would require data on projected timber harvests for the discrete areas within each subunit that may experience incremental changes to harvest practices. We were unable to develop such comprehensive projections within the timeframe of this report. In addition, for some areas, such data at this fine a scale are simply not available. The BLM Oregon State Office, however, was able to provide relevant data for areas within its jurisdiction. Thus, we use this information, and additional relevant data from USFS, to derive a forecast of baseline timber harvest absent critical habitat.
168. BLM provided detailed reporting on potential future timber management activities based on the No Action Alternative for the 2008 Final Environmental Impact Statement (FEIS) for the revision of the Western Oregon RMPs.¹⁴³ The analysis of the No Action Alternative in the 2008 FEIS represented the 1995 RMPs, as written.¹⁴⁴ This analysis provided detailed information concerning forest conditions, allocations, types of harvest, and the development of habitat for the BLM lands. Specifically, the report provided

¹⁴³ Submission provided by Chris Cadwell, BLM, Oregon State Office under report entitled, "Proposed Spotted Owl Critical Habitat - Economic Analysis Assumptions for BLM Timber Harvest Effects," April 17, 2012.

¹⁴⁴ This basis is consistent with our prior note concerning the *Pacific Rivers Council* case.

timber harvest projections for three decade increments, by land allocation type (reserve, matrix), forest conditions (NSO habitat, predominantly younger forests), and harvest type (thinning, regeneration). The harvest data were provided at the subunit level.

169. USFS also provided information on timber harvest activities. Specifically, USFS Region 6 provided actual historic timber harvest data by forest from 1995 to 2010,¹⁴⁵ and USFS Region 5 provided projected future timber harvest levels by forest based on past actual harvest levels.¹⁴⁶ For Region 6, we rely on the past five years (2006 to 2010) of actual harvest levels to be illustrative of projected future timber harvest. To allocate projected timber harvest volumes we overlay GIS data layers of national forests obtained from the Protected Areas Database of the United States with proposed critical habitat subunit maps provided by the Service.¹⁴⁷ We then use a weighted average of national forest acres by subunit to distribute harvest volumes.¹⁴⁸ Therefore, in the absence of detailed geospatial information on timber management activities, we assume that harvests are approximately evenly distributed within national forests managed by USFS. We calculate the annual average harvest yield for USFS matrix lands in subunit i (and national forest j) as:

$$Yield_i^{USFS} = \sum_{j=1}^J \left(\frac{Projected\ Harvest_j}{Acres_j} \times \frac{Acres_{i,j}}{Acres_i} \right)$$

where the first term on the right side of the equation is the projected harvest yield for forest j and the second term is the proportion of USFS lands in subunit i within forest j .

170. This derivation yields the following overall approach to determine baseline timber harvest volumes:
- For BLM lands in Oregon, we rely on projected timber harvest volume by critical habitat subunit, by habitat type within the subunit, provided by BLM.
 - For BLM matrix lands outside of Oregon, we apply the average timber harvest yield per acre projected in the first decade for Oregon BLM matrix lands (approximately 192 bd. ft./acre/year for predominantly younger forests and approximately 621 bd. ft./acre/year for NSO habitat).

¹⁴⁵ Submission provided by Tracy Beck, USFS Region 6, in a workbook entitled, "NWFP-OfficialOfferCutSoldByForest1995-2010.xls," February 24, 2012.

¹⁴⁶ Submission provided by Joe Sherlock, USFS Region 5, in a workbook entitled, "ProjectedandASQ_Volumes.xlsx," April 12, 2012.

¹⁴⁷ The Protected Areas Database of the United States (PAD-US) is a GIS database hosted by the U.S. Geological Survey Gap Analysis Program that illustrates and describes public land ownership, management and conservation lands nationally. Version 1.2 of this data set was released in April 2011. Accessed at <http://gapanalysis.usgs.gov/padus/>.

¹⁴⁸ We did not receive data on timber harvests in Lassen National Forest or Modoc National Forest, which account for approximately 22,000 acres of USFS lands within the proposed designation. Therefore, in the absence of information to the contrary, we assume USFS lands in these areas have an annual projected harvest yield equal to the average across all other national forests.

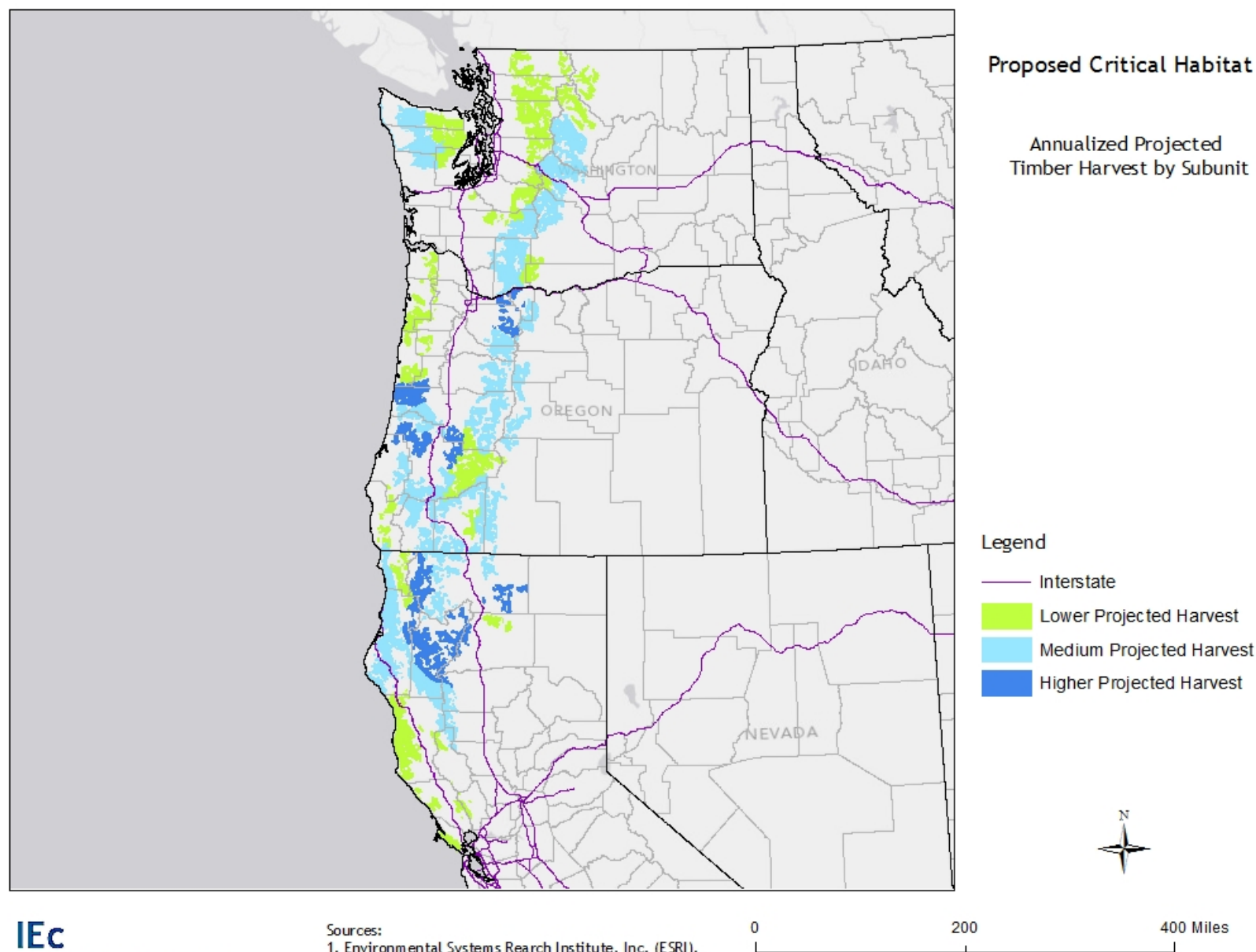
- For USFS lands, we apply the weighted-average projected timber harvest yield per acre (averaging approximately 63 bd. ft./acre/year) for each critical habitat subunit.
171. To assign an annual baseline harvest rate to the discrete areas of focus within each subunit, for BLM lands outside of Oregon and USFS lands we multiply the per acre measure of timber harvest yield projections by acres of matrix lands likely to be unoccupied to obtain a projected annualized harvest volume. As noted, for BLM lands in Oregon, we can directly use the projected timber harvest volumes for matrix lands unoccupied by the NSO, as they are identified by subunit.¹⁴⁹ Also, note that differences in projected timber harvest yields between the two agencies reflect dissimilarities in actual on-the-ground timber management practices. However, across national forests managed by USFS, annual projected timber harvest yield ranges from 14 to more than 200 bd. ft./acre/year.
172. To calculate average annual projected timber harvest volume for subunit i we use the following approach:

$$\begin{aligned}
 Volume_i = & Acres_i^{USFS} \times Yield_i^{USFS} \\
 & + Acres_i^{BLM YF} \times Yield_i^{BLMYF} \\
 & + Acres_i^{BLM Habitat} \times Yield_i^{BLM Habitat}
 \end{aligned}$$

173. Exhibit 4-7 provides a map showing the distribution of annualized projected timber harvest by critical habitat subunit. The map characterizes projected subunit-level harvests as higher (approximately 3.5 to 20 MMBF), medium (approximately 0.5 to 3.5 MMBF), and lower (less than 0.5 MMBF). The higher range comprises the top nine subunits in the proposed critical habitat designation (approximately the top 14 percent), while the lower range comprises 24 subunits (approximately the bottom 40 percent). The middle range covers the remaining 30 subunits. As the map shows, the subunits with relatively higher projected harvests are located primarily in northern California and Oregon.

¹⁴⁹ We carry through the assumption that approximately 6.5 percent of matrix lands with NSO habitat are unoccupied. Therefore, for BLM matrix lands with NSO habitat we multiply the annualized projected timber harvest by this factor to calculate the baseline harvest under the NWFP. We do not quantify potential changes to timber harvest in riparian reserves that may occur due to changes in timber management activities in adjacent matrix lands. As a result of this filtering process, where we identify discrete acres within each subunit where incremental timber harvest effects may occur, our projection of baseline timber harvest by subunit is lower than that provided by BLM in its data submission.

EXHIBIT 4-7. MAP OF DISTRIBUTION OF PROJECTED TIMBER HARVEST BY SUBUNIT



174. Exhibit 4-8 walks through the calculations by subunit. The calculations begin by restating the number of unoccupied matrix acres by subunit and land manager (Columns D, E, and F). Columns G through I present the projected baseline annual harvest yields (per acre) or actual projected volumes.¹⁵⁰ Combined, these values yield projected baseline timber harvest volume by acres within each subunit that may experience incremental effects (Column J). In total, the analysis contemplates an annualized projected baseline timber harvest of approximately 122.8 MMBF within the areas of focus.
175. We further note several important caveats related to this baseline harvest projection. First, for BLM lands in Oregon, the baseline projections discussed above comport with BLM's 1995 RMPs. Actual historical harvest volumes have been lower than plan volumes. This historical performance suggests that actual future harvest volumes, irrespective of critical habitat effects, may differ from these plan-based volumes. However, we employ these data due to their specificity at the subunit level, including explicit allocations by stand and harvest type, and habitat category. Second, our application of the BLM-based results and generalized USFS volumes to other relevant acres represents a blunt analytic instrument, and does not capture potential material differences in stand types and harvest goals. For USFS projected timber harvest volumes, in particular, we assume proportional distribution between various land allocations, which may overstate or understate the actual harvest yield from matrix lands unoccupied by the NSO. Finally, for the purposes of this analysis, we assume harvest volumes remain constant over a 20 year time horizon. However, planned harvest rotations may vary from actual timber harvest volumes from year to year. For example, the BLM Oregon State Office expects harvest volume on BLM matrix lands with predominantly younger habitat to increase by approximately 20 percent in the second decade. Potential thinning harvest yield in the matrix may also decrease over time.
176. Despite these limitations, the analytic goal was to create a baseline timber harvest projection that could serve as a reasonable basis for considering potential incremental changes related to critical habitat. When reviewing the analytic results, however, the reader should recognize that our projection of baseline timber harvest within the discrete areas of each subunit where incremental effects may occur could vary materially from future actual timber harvest in these areas.

¹⁵⁰ Note that, for BLM matrix lands in Oregon, we rely on projected volumes (rather than yields) provided by BLM. We use this approach because the GIS data layers developed by the Service do not precisely align with the BLM data layers; therefore, there is an acreage discrepancy at the subunit level. This makes it challenging to calculate a realistic projected yield for each subunit (the Service may overstate or understate the actual number of acres from which BLM makes its projections). Despite the alignment issue, the BLM data provide a reasonable representation of the projected harvest levels for each subunit. Therefore, we use projected harvest levels for Oregon and calculate an average projected yield based on the BLM data layers across all subunits in Oregon (approximately 192 bd. ft./acre/year for predominantly younger forests and approximately 621 bd. ft./acre/year for NSO habitat), which we apply to all other BLM matrix lands unoccupied by the NSO.

EXHIBIT 4-8. PROJECTED BASELINE TIMBER HARVEST BY SUBUNIT

RANK [A]	UNIT [B]	SUBUNIT [C]	FEDERAL LANDS WITH POTENTIAL IMPACTS TO TIMBER HARVEST (ACRES)			ANNUALIZED PROJECTED HARVEST YIELD (BD FT/ACRE/YEAR)			ANNUALIZED BASELINE PROJECTED HARVEST (MMBF) [J]
			USFS, UNOCCUPIED MATRIX [D]	BLM, YOUNGER FORESTS [E]	BLM, UNOCCUPIED NSO HABITAT [F]	USFS, UNOCCUPIED MATRIX [G]	BLM, YOUNGER FORESTS [H]	BLM, UNOCCUPIED NSO HABITAT [I]	
1	Inner California Coast Ranges	ICC 1	92,969	1,317	23	201.6	191.8	620.7	19.01
2	Inner California Coast Ranges	ICC 7	18,067	25,895	921	202.4	191.8	620.7	9.19
3	Klamath West	KLW 7	77,888	13	1	92.6	191.8	620.7	7.22
4	East Cascades South	ECS 3	37,623	0	0	152.4	0.0	0.0	5.73
5	Oregon Coast	ORC 2	589	4,151	715	73.6	*	*	5.54
6	Klamath West	KLW 9	36,319	0	0	129.4	0.0	0.0	4.70
7	West Cascades South	WCS 6	2	14,563	2,067	0.0	*	*	4.39
8	West Cascades South	WCS 1	16,827	47	112	62.6	*	*	3.98
9	Oregon Coast	ORC 5	1	7,045	702	73.6	*	*	3.88
10	East Cascades North	ECN 9	41,343	0	0	81.3	0.0	0.0	3.36
11	Oregon Coast	ORC 3	13	4,667	860	73.6	*	*	3.31
12	Inner California Coast Ranges	ICC 2	60,993	41	6	51.3	191.8	620.7	3.14
13	Klamath West	KLW 1	0	48,785	2,869	0.0	*	*	2.98
14	West Cascades South	WCS 3	32,457	706	372	73.1	*	*	2.86
15	Oregon Coast	ORC 6	0	5,892	706	0.0	*	*	2.59
16	East Cascades North	ECN 7	40,637	0	0	62.6	0.0	0.0	2.54
17	West Cascades South	WCS 2	37,834	1	0	62.6	*	*	2.37
18	East Cascades North	ECN 8	28,112	0	0	81.3	0.0	0.0	2.29
19	Klamath East	KLE 2	861	13,297	2,415	50.9	*	*	2.20
20	Inner California Coast Ranges	ICC 3	26,069	2,231	45	64.0	191.8	620.7	2.12
21	East Cascades North	ECN 3	67,402	0	0	30.5	0.0	0.0	2.06
22	Klamath East	KLE 7	19,244	312	9	102.8	191.8	620.7	2.04

RANK [A]	UNIT [B]	SUBUNIT [C]	FEDERAL LANDS WITH POTENTIAL IMPACTS TO TIMBER HARVEST (ACRES)			ANNUALIZED PROJECTED HARVEST YIELD (BD FT/ACRE/YEAR)			ANNUALIZED BASELINE PROJECTED HARVEST (MMBF) [J]
			USFS, UNOCCUPIED MATRIX [D]	BLM, YOUNGER FORESTS [E]	BLM, UNOCCUPIED NSO HABITAT [F]	USFS, UNOCCUPIED MATRIX [G]	BLM, YOUNGER FORESTS [H]	BLM, UNOCCUPIED NSO HABITAT [I]	
23	Klamath East	KLE 6	27,229	11,891	536	69.4	*	*	1.97
24	Klamath West	KLW 8	17,854	127	9	105.9	191.8	620.7	1.92
25	East Cascades North	ECN 5	53,138	0	0	30.5	0.0	0.0	1.62
26	Inner California Coast Ranges	ICC 4	37,604	35	0	42.6	191.8	620.7	1.61
27	Klamath West	KLW 4	24,590	1,513	489	55.8	*	*	1.44
28	West Cascades South	WCS 4	17,711	147	16	72.9	*	*	1.30
29	East Cascades North	ECN 4	41,022	0	0	30.5	0.0	0.0	1.25
30	East Cascades South	ECS 1	21,305	6,851	961	42.3	*	*	1.12
31	East Cascades South	ECS 2	10,327	4,698	162	102.8	*	*	1.11
32	Oregon Coast	ORC 4	0	2,980	241	0.0	*	*	1.07
33	Klamath West	KLW 2	20,124	82	8	50.4	*	*	1.02
34	Redwood Coast	RDC 1	1,203	3,446	406	48.4	191.8	620.7	0.97
35	West Cascades Central	WCC 2	58,838	0	0	16.5	0.0	0.0	0.97
36	Klamath East	KLE 4	18,710	13	3	50.4	*	*	0.94
37	West Cascades Central	WCC 3	46,111	0	0	16.5	0.0	0.0	0.76
38	North Coast Olympics	NCO 1	18,604	0	0	31.3	0.0	0.0	0.58
39	Klamath East	KLE 3	15	34,750	2,626	50.9	*	*	0.58
40	Klamath West	KLW 3	3,953	521	99	50.4	*	*	0.50
41	West Cascades South	WCS 5	8,822	0	0	51.1	0.0	0.0	0.45
42	East Cascades North	ECN 1	14,572	0	0	30.5	0.0	0.0	0.44
43	North Coast Olympics	NCO 2	13,125	0	0	31.3	0.0	0.0	0.41
44	Klamath East	KLE 5	0	11,089	1,537	0.0	*	*	0.41
45	East Cascades North	ECN 2	12,814	0	0	30.5	0.0	0.0	0.39
46	Klamath East	KLE 1	5,181	1,517	182	50.9	*	*	0.33

RANK [A]	UNIT [B]	SUBUNIT [C]	FEDERAL LANDS WITH POTENTIAL IMPACTS TO TIMBER HARVEST (ACRES)			ANNUALIZED PROJECTED HARVEST YIELD (BD FT/ACRE/YEAR)			ANNUALIZED BASELINE PROJECTED HARVEST (MMBF) [J]
			USFS, UNOCCUPIED MATRIX [D]	BLM, YOUNGER FORESTS [E]	BLM, UNOCCUPIED NSO HABITAT [F]	USFS, UNOCCUPIED MATRIX [G]	BLM, YOUNGER FORESTS [H]	BLM, UNOCCUPIED NSO HABITAT [I]	
47	Inner California Coast Ranges	ICC 5	7,421	0	0	42.6	0.0	0.0	0.32
48	North Coast Olympics	NCO 5	4,290	1,306	110	73.6	*	*	0.32
49	Redwood Coast	RDC 2	0	1,355	76	0.0	191.8	620.7	0.31
50	West Cascades Central	WCC 1	17,643	0	0	17.1	0.0	0.0	0.30
51	Inner California Coast Ranges	ICC 8	1,271	0	0	197.2	0.0	0.0	0.25
52	Klamath West	KLW 6	4,116	0	0	47.4	0.0	0.0	0.20
53	East Cascades North	ECN 6	11,778	0	0	16.5	0.0	0.0	0.19
54	Inner California Coast Ranges	ICC 6	0	478	11	0.0	191.8	620.7	0.10
55	Klamath West	KLW 5	1,749	26	2	44.6	*	*	0.08
56	Oregon Coast	ORC 1	50	14	7	73.6	*	*	0.03
57	West Cascades North	WCN 1	1,772	0	0	14.1	0.0	0.0	0.03
58	West Cascades North	WCN 2	121	0	0	14.1	0.0	0.0	0.00
59	North Coast Olympics	NCO 4	0	348	15	0.0	*	*	0.00
59	North Coast Olympics	NCO 3	0	0	0	0.0	0.0	0.0	0.00
59	Redwood Coast	RDC 3	0	0	0	0.0	0.0	0.0	0.00
59	Redwood Coast	RDC 4	0	0	0	0.0	0.0	0.0	0.00
59	Redwood Coast	RDC 5	0	0	0	0.0	0.0	0.0	0.00
TOTAL			1,158,314	212,153	19,320				122.80

Notes:

Totals may not sum due to rounding.

* Indicates subunits for which the BLM Oregon State Office provided timber harvest projections. The GIS data layers developed by the Service do not align with the BLM data layers; therefore, there is an acreage discrepancy at the subunit level. Despite the alignment issue, the BLM data provide a reasonable representation of the projected harvest levels. Therefore, we use projected harvest levels for Oregon and calculate an average projected harvest yield based on the BLM data layers across all subunits in Oregon, which we apply to all other BLM matrix lands.

4.4.2 INCREMENTAL CHANGES IN HARVEST VOLUMES

177. The next step involves scaling these projected baseline harvest volumes to account for incremental changes potentially resulting from critical habitat. The extent to which critical habitat may affect timber management practices is subject to considerable uncertainty. The implementation of this critical habitat proposal will occur within a complex set of additional factors, including volatility in global demand for wood products and general timber industry transformation, existing regulatory and statutory requirements, evolving approaches to timber management under the NWFP, and ongoing legal uncertainty.
178. For the past two decades, Federal land managers have worked collaboratively with the Service to consult on actions occurring within NSO critical habitat. However, the current proposed revision of critical habitat is larger than the final designations of 1992 and 2008, and we believe it is informative to consider alternative scenarios of its potential impact on Federal timber harvest. No one scenario is a precise prediction of what might happen in the future. Rather, these scenarios serve to bracket potential outcomes and thereby inform decision-makers who must make final decisions under the Endangered Species Act.
179. Consultations with Federal land managers, the Service, and other experts indicate varying opinions regarding potential critical habitat effects, and all noted the difficulty and limitations of deriving precise measures of positive or negative incremental change. For example, Federal land managers have expressed concern about critical habitat representing a potential constraint on their timber management preferences across the designation. Service representatives suggest that there is potential for an increase in harvest levels compared to recent Federal matrix timber harvest in some areas (although at levels below what was originally envisioned for these lands under the NWFP in 1994). Finally, the relevant parties also contemplate that no material changes may result from critical habitat concerns relative to the baseline, given the long and established history of existing management plans and conservation efforts related to the NSO.
180. To capture a range of potential outcomes, this analysis presents three scenarios. Scenario 1 contemplates that minimal or no changes to current timber management practices will occur, and therefore that the incremental costs of the designation will be predominantly administrative. Scenario 2 posits that action agencies may choose to implement management practices yielding an increase in timber harvest relative to the baseline. Scenario 3 considers that action agencies may choose to adopt a more restrictive harvest posture in response to critical habitat, leading to a decline in harvest volumes relative to the baseline.

181. Analytically, the potential incremental impact on timber harvest volume due to critical habitat designation for subunit i is:

$$\Delta Volume_i = S \times Volume_i^{Projected}$$

where S is the scaling factor contemplated in each scenario. We discuss each of these scenarios in further detail below.

4.4.2.1 SCENARIO 1 - ADMINISTRATIVE COSTS ONLY

182. Under the proposed revised critical habitat designation, Federal land managers may choose prescriptions to maintain timber harvest in matrix lands at levels similar to recent historical harvest. In this scenario, we assume that Federal land managers will continue to manage these matrix forests in a manner similar to practices of recent years under the 1992 and 2008 critical habitat. Federal timber harvest has been planned under the Standards and Guidelines of the NWFP, with an emphasis on thinning and some regeneration harvest. However, much of the regeneration harvest has been contentious and is sometimes legally challenged based on a variety of environmental and social concerns, whether it is critical habitat or not.¹⁵¹ In this scenario, harvest will continue to be mostly from thinning at recent historic levels. This scenario results in minimal or no changes in timber harvest from projected levels.
183. The majority of NSO consultations under section 7 of the Act occur between the Service and BLM and/or USFS. On Federal lands managed by these agencies, the vast majority of consultations on proposed projects affecting the NSO are timber sales or timber management projects. These consultations involve individual projects, batched actions, or programmatic actions for an entire program of work (e.g., road repair, habitat restoration, or timber harvest) in a single analysis. Timber-sale designs often involve several actions that require consideration during the consultation process, including: commodity extraction; habitat restoration; hazard-tree removal; building or maintenance of roads; and recreational development. Activities on Federal lands are always subject to a Federal nexus and routinely result in formal consultations to consider impacts to the NSO and its critical habitat.
184. Due to the high volume of consultations with BLM and USFS, the Service has entered into a streamlined consultation agreement with both agencies that provides for detailed discussions prior to the informal or formal consultation process.¹⁵² This pre-consultation process includes project design negotiations aimed at minimizing impacts to the NSO and its critical habitat. During this process the action agency often develops project modifications that reduce the impacts of the proposed action. Most conservation measures for the species are also likely to benefit critical habitat.

¹⁵¹ Baker, S., Seeking a Balance between Forestry and Biodiversity the Role of Variable Retention Silviculture, Forest & Wood Products Australia Limited PDG167-0910, 2011.

¹⁵² Incremental Effects Memorandum for the Economic Analysis of the Proposed Rule to Revise Critical Habitat for the Northern Spotted Owl, received from the Service on March 21, 2012.

185. Therefore, where consultation would already occur in areas assumed to be occupied by the NSO, critical habitat designation would result in very little additional staff effort to consider impacts to critical habitat.¹⁵³ In areas where consultation would have already occurred due to the presence of the species, consideration of impacts of proposed projects on critical habitat is likely to result in four to six additional person-hours per consultation across all Federal staff in addition to the baseline level of effort spent considering impacts to the NSO itself.¹⁵⁴ These administrative costs represent additional hours spent by Federal agency staff and the Service to consider critical habitat during section 7 consultation. Applying government GS-level 11 or 12 labor rates to the estimate of four to six additional hours spent per consultation results in a range of costs between \$277 to \$498 per consultation.¹⁵⁵
186. Since 1992, the Service has entered into more than 2,800 consultations related to the NSO. Of these, approximately 1,000 have considered impacts of timber management, or approximately 50 consultations annually. Exhibit 4-9 presents historical consultations by activity.

EXHIBIT 4-9. CONSULTATION AND TECHNICAL ASSISTANCE EFFORTS BY ACTIVITY, 1992-2012

ACTIVITY	CONSULTATIONS
Timber management	1,003
Transportation	596
Unspecified	331
Restoration	290
Recreation	177
Fire management/fuels reduction	156
Pipeline/power lines, etc.	69
Cell tower	38
Fire suppression/BAER	33
Land exchanges	33
Mining	18
Hydro	17
HCP	7
Scientific take permit	6
Special use permit	6
Grasshopper control	3

¹⁵³ Ibid.

¹⁵⁴ We note that the USFS, in its comments on the draft Economic Analysis, suggested that the incremental consultation time attributable to critical habitat could be substantially higher than the estimates provided here. In addition, beyond the direct cost of this incremental time, the time lost due to consultation requirements could affect its scheduled program of work on any given national forest. Although we lack sufficient information to quantify this potential effect, we note that the administrative cost impacts presented here may be understated as a result.

¹⁵⁵ All calculations use the hourly rates as calculated by the Office of Personnel Management (http://www.opm.gov/oca/12tables/html/gs_h.asp). Accessed on February 21, 2012.

ACTIVITY	CONSULTATIONS
Grazing	3
Research	3
Rock pit	3
Wastewater treatment	3
Construction	2
Dredging	2
Monitoring	2
Other	18
TOTAL	2,819
Source: (a) Information provided by the Wenatchee, Lacey, Arcata, Oregon, and Yreka Field Offices; Personal communication with U.S. Fish and Wildlife Service Biologist, October 24, 2007, as cited in the 2008 Economic Analysis prepared by Entrix, Inc.; (b) written communication with the Service on December 22, 2012.	

187. Based on this historical rate of consultation, this analysis expects 1,000 consultations to occur over the next 20 years related to timber management projects. Activities occurring on DOD lands are expected to require two formal and two informal consultations per year (outside of the forecast 1,000 consultations based on historical consultations on Federal lands), resulting in 400 additional hours spent by the Service and DOD annually to consider adverse modification of critical habitat during these consultations. Additionally, based on specific information provided by NPS on potential administrative costs associated with planned or ongoing recreation and habitat management projects on NPS lands, we forecast 16 informal consultations related to these projects in addition to the 1,000 consultations forecast based on historical consultations on Federal lands.¹⁵⁶ Based on these assumptions, over the next 20 years administrative costs associated with consultations on Federal lands related to timber management and DOD and NPS projects are expected to range from \$2.1 million to \$3.6 million in present value terms, assuming a seven percent discount rate, and from \$2.8 million to \$4.8 million, assuming a three percent discount rate (or \$185,000 to \$316,000 on an annualized basis). These costs are summarized in Exhibit 4-10. Chapter 2 contains additional information on administrative impacts and the underlying cost model.

¹⁵⁶ Written communication with Natural Resource Management Specialist, National Park Service, Pacific West Region, on April 10, 2012.

**EXHIBIT 4-10. SUMMARY OF POTENTIAL INCREMENTAL ADMINISTRATIVE IMPACTS TO FEDERAL
TIMBER MANAGEMENT (\$2011), 2012-2031**

UNIT	PRESENT VALUE (7 PERCENT)		PRESENT VALUE (3 PERCENT)		ANNUALIZED	
	LOW	HIGH	LOW	HIGH	LOW	HIGH
East Cascades North	\$162,000	\$291,000	\$219,000	\$394,000	\$14,300	\$25,700
East Cascades South	\$162,000	\$291,000	\$219,000	\$394,000	\$14,300	\$25,700
Inner California Coast Ranges	\$162,000	\$291,000	\$219,000	\$394,000	\$14,300	\$25,700
Klamath East	\$162,000	\$291,000	\$219,000	\$394,000	\$14,300	\$25,700
Klamath West	\$162,000	\$291,000	\$219,000	\$394,000	\$14,300	\$25,700
North Coast Olympics	\$476,000	\$668,000	\$644,000	\$903,000	\$42,000	\$58,900
Oregon Coast	\$162,000	\$291,000	\$219,000	\$394,000	\$14,300	\$25,700
Redwood Coast	\$162,000	\$291,000	\$219,000	\$394,000	\$14,300	\$25,700
West Cascades Central	\$162,000	\$291,000	\$219,000	\$394,000	\$14,300	\$25,700
West Cascades North	\$162,000	\$291,000	\$219,000	\$394,000	\$14,300	\$25,700
West Cascades South	\$162,000	\$291,000	\$219,000	\$394,000	\$14,300	\$25,700
TOTAL	\$2,100,000	\$3,580,000	\$2,830,000	\$4,840,000	\$185,000	\$316,000
<u>Note:</u> All estimates are rounded to three significant digits and may not sum due to rounding.						

4.4.2.2 SCENARIO 2 - POSITIVE ECONOMIC IMPACT

188. While action agencies may choose to follow the forestry management practices consistent with the Revised Recovery Plan for the NSO, those agencies are not required to do so and may opt from a wide range of management options, consistent with their land use plans and statutory authorities. That is, the agencies may choose to adopt a more permissive or more restrictive harvest posture to meet other competing land management goals. In meeting these goals, the primary legal mandate for these agencies subsequent to the designation of critical habitat is the avoidance of destruction or adverse modification of critical habitat.
189. Under this scenario, we consider the potential effect related to the implementation of ecological forestry prescriptions consistent with the Revised Recovery Plan and the Standards and Guidelines of the NFWP. The extent to which these practices will affect timber harvest volumes in targeted areas is highly uncertain, both in a negative and a positive direction. For example, ecological forestry practices are in the pilot testing stage and have not been extensively implemented within proposed critical habitat. However, given the constraints imposed on historical Federal timber harvest due to legal challenges to NFWP timber harvest, this approach may allow for some broader support for variable retention harvest and thinning to meet long-term ecosystem management and restoration

goals. Such an outcome would not likely result in harvest levels lower than Scenario 1 above, and it may result in a net increase in harvest in some areas.

190. Compared to actual timber harvest levels in recent years, the Service and available literature suggest that there is the potential for increases in timber harvest on some Federal matrix lands if the USFS and BLM apply the considerations in the proposed critical habitat rule for active management in dry, mixed, and moist forests. The best opportunity for increases in Federal timber harvest, compared to the recent status quo, involve a mix of thinning and variable retention prescriptions in younger matrix forests consistent with existing standards and guidelines of the NWFP. The proposed critical habitat rule considers these methods and provides considerations for how to apply them in a manner consistent with NSO recovery and to avoid destruction and adverse modification of critical habitat.
191. Some published literature and reports exist that outline how these forestry practices might affect timber harvest practices and volumes. Ecological forestry methods are being applied in the Pacific Northwest, in part, in an effort to better reconcile competing economic and conservation goals.¹⁵⁷ Specifically, we rely on research published by Dr. K. Norman Johnson and Dr. Jerry F. Franklin to support the analysis.¹⁵⁸ This research contemplates that implementation of ecological forest practices, as envisioned by the Franklin/Johnson Moist Forest restoration strategy, could produce about two-thirds of the per-acre timber yields anticipated by the NWFP.¹⁵⁹
192. We utilize this ratio, in combination with the ratio of historical actual harvest volumes relative to NWFP planned volumes, to derive an estimate of potential increases in harvest levels relative to the regulatory baseline. Historic timber harvest on Federal lands have equaled approximately 60 percent of the probable sale quantity (PSQ) envisioned under the NWFP.¹⁶⁰ The two-thirds timber harvest yield resulting from ecological forestry practices as envisioned by Johnson and Franklin is also based on PSQ under the NWFP. Thus, for purposes of illustrating a potential increase in timber harvest resulting from critical habitat, we scale baseline projections up by 10 percent ($0.66 \div 0.60 = 1.10$).
193. We note two important caveats to this scenario. First, the scenario contemplates the Franklin/Johnson Moist Forest restoration strategy as a rough proxy for implementing

¹⁵⁷ See, for example, Aubry, K.B., C.B. Halpern, and C.E. Peterson. 2009. "Variable-retention Harvests in the Pacific Northwest: A Review of Short-term Findings from the DEMO Study." *Forest Ecology and Management* 258 (2009): 398-408; Baker, S., Seeking a Balance between Forestry and Biodiversity the Role of Variable Retention Silviculture, Forest & Wood Products Australia Limited, PDG167-0910, 2011; Carey, A.B., Active and Passive Forest Management for Multiple Values, *Northwest Naturalist*, 87(1):18-30, 2006; North, M.P., and W.S. Keeton, Emulating Natural Disturbance Regimes: An Emerging Approach for Sustainable Forest Management, Pgs. 341-372 in LaFortezza, R, et al. eds., *Patterns and Processes in Forest Landscapes*, Springer Science+Business Media, 2008.

¹⁵⁸ Dr. K. Norman Johnson and Dr. Jerry F. Franklin, "Southwest Oregon Secretarial Pilot Projects on BLM Lands: Our Experience So Far and Broader Considerations for Long-term Plans, February 15, 2012; accessed at: <http://www.blm.gov/or/resources/forests/index.php>

¹⁵⁹ Ibid, p. 70.

¹⁶⁰ Historical harvest levels and PSQs obtained from USFS, Pacific Northwest Region, Northwest Forest Plan—The First 15 Years (1994-2008): Socioeconomic Status and Trends, R6-RPM-TP-03-2011, 2011.

ecological forestry prescriptions in matrix lands that are likely to be unoccupied by the NSO. However, management strategies in dry forests would likely be materially different. For example, dry forest guidelines would be relatively more similar to existing forest management strategies (i.e., thinning) in those areas. The data available for our analysis did not separate younger forest stands in the matrix into moist versus dry forest types. In addition, any potential variable retention regeneration harvest that might possibly be applied to such stands would most likely only be utilized if such stands were of sufficient size to be commercially viable. Our evaluation is based on a single classification of younger forest stands, and does not provide for the ability to discriminate between stands that may be commercially viable versus those that are not. Thus, the potential increases in timber volume that may be realized on younger forest stands in the matrix as presented here are likely an overestimate

4.4.2.3 SCENARIO 3 - NEGATIVE ECONOMIC IMPACT

194. In this scenario, we assume that Federal land managers will choose to reduce their timber harvest levels from recent past harvest. That is, they will conclude that some of their timber harvest activities would be incompatible with the goals of critical habitat, and they will decide to reduce or not plan timber harvest in some portion of the incremental matrix forests that are within proposed critical habitat. If BLM or USFS does reduce planned harvest due to critical habitat, it will likely be in those portions of the matrix that they believe have greater value to NSO recovery and should not be subject to timber management.
195. Accordingly, we contemplate a third scenario where harvest levels are reduced under the critical habitat regime relative to the baseline. The potential magnitude of this effect is uncertain. For purposes of illustration, we posit a hypothetical outcome where future harvest levels decrease 20 percent from projected levels. This effect likely represents a maximum upper bound of possible negative impacts. In the development of both scenarios, we have attempted to identify reasonable upper and lower bounds on timber harvest effects, to capture the full range of possible economic outcomes.

4.4.3 STUMPAGE VALUES

196. We value the incremental change in harvest volumes using representative historical prices from timber sales on Federal lands. We note that prices vary across forest, land manager, and year. Furthermore, future prices are uncertain. Exhibit 4-11 shows annual average prices from Federal timber sales on BLM and USFS managed lands between 2000 and 2011 (measured in 2011 dollars).¹⁶¹ The data aggregate sales across the entire

¹⁶¹ One public comment questioned whether stumpage prices for Federal timber sales adequately recover the total cost to taxpayers of producing the timber. The entity argues that historically, revenues from Federal timber sales have been less than the costs to Federal agencies of cost of managing the forests for sales; thus, reducing the amount of timber sold would result in a net cost savings to taxpayers. The controversy surrounding this issue is summarized in a 2004 report by the Congressional Research Service (CRS) (Gorte, R.W., *Below Cost Timber Sales: An Overview*, CRS, Order Code RL32485, July 21, 2004). That report notes, "[i]nterest group estimates of 'losses' continue to be made public with much fanfare and attendant news stories, but the estimates of financial results of [Forest Service] timber sales vary widely. This disparity is due to differences in basic approach - profit-and-loss, cash flow, or other approach - and in assumptions about relevant costs" (summary page). In particular, CRS notes differing assumptions regarding which Agency costs are relevant and how to allocate those costs to specific sales may result in different answers using the same basic accounting approach.

jurisdiction of all USFS National Forests and BLM districts within the proposed critical habitat designation; therefore, they may also include timber harvest outside of the NWFP area.

EXHIBIT 4-11. ANNUAL AVERAGE PRICES FROM FEDERAL TIMBER SALES (\$2011), 2000-2011

YEAR	BLM			USFS		
	VOLUME OF TIMBER SOLD ^a (MBF)	VALUE OF TIMBER SOLD ^a (\$2011)	AVERAGE PRICE PER MBF	VOLUME OF TIMBER SOLD ^a (MBF)	VALUE OF TIMBER SOLD ^a (\$2011)	AVERAGE PRICE PER MBF
2000	66,549	\$17,055,429	\$256	88,902	\$14,964,284	\$168
2001	56,898	\$11,824,894	\$208	146,948	\$20,165,261	\$137
2002	163,181	\$26,531,378	\$163	255,863	\$43,132,558	\$169
2003	167,914	\$26,027,522	\$155	322,736	\$51,174,255	\$159
2004	143,541	\$24,661,009	\$172	404,222	\$48,099,050	\$119
2005	215,429	\$37,860,520	\$176	468,680	\$65,652,037	\$140
2006	200,474	\$49,706,667	\$248	431,461	\$64,150,900	\$149
2007	210,709	\$29,620,893	\$141	449,286	\$46,165,885	\$103
2008	234,653	\$24,776,316	\$106	477,122	\$32,343,141	\$68
2009	213,568	\$14,507,681	\$68	450,051	\$17,669,814	\$39
2010	238,632	\$27,357,271	\$115	379,804	\$18,468,743	\$49
2011 ^b	214,970	\$19,803,293	\$92	458,142	\$41,894,554	\$91

Notes:

^a Sale quantities represent sawtimber cut and sold on Federal lands. Values are aggregated across the entire jurisdiction of all USFS National Forests and BLM Districts within the proposed critical habitat designation; therefore, they may also include timber harvest outside of the NWFP area.

^b 2011 data are unavailable for the BLM California State Office.

Sources: BLM, Public Land Statistics, Various Years, accessed at [HTTP://WWW.BLM.GOV/PUBLIC LAND STATISTICS/INDEX.HTM](http://www.blm.gov/public_land_statistics/index.htm) on May 16, 2012; USFS, Cut and Sold Reports, Various Years, accessed at [HTTP://WWW.FS.FED.US/FORESTMANAGEMENT/PRODUCTS/SOLD-HARVEST/CUT-SOLD.SHTML](http://www.fs.fed.us/forestmanagement/products/sold-harvest/cut-sold.shtml) on May 16, 2012.

CRS also notes that the U.S. Forest Service sells timber for many reasons, such as “to generate receipts, to supply wood for manufacturers, to provide employment, to expand access for motorized vehicles, to alter the composition and distribution of vegetation in the area, and more” (p. 5). The “value” of all of these positive attributes of the sales may not be captured in the stumpage price paid by the loggers or mills purchasing the timber, as many of these attributes represent market externalities. Furthermore, “the multiple outputs, environmental impacts, and differing time scales of timber sales and related activities make identifying relevant costs and comparing them with relevant revenues problematic. Two decades of debate have not resolved the dilemma, and further debate seems unlikely to result in widespread agreement” (p. 7).

Thus, whether the Federal agency costs of baseline timber sales anticipated in the absence of critical habitat, or new sales potential generated by the designation, exceed revenues is unknown. However, the fact that these sales are often conducted for multiple purposes, such as improved ecosystem services or regional employment, and those purposes may have value that is not captured in stumpage prices, suggests that our assumption that the benefits of the sales exceed costs is not unreasonable. This assumption is further supported by the fact that over the last 30 years that this debate has occurred, Congress has not halted these sales, which suggests that they are believed to have a positive value to society.

197. We apply lower (\$100/mbf) and higher (\$250/mbf) price scenarios based on this historic range of values to the incremental harvest volumes described above to monetize our results. The lower end of this range is similar to recent prices from Federal timber sales, which have been well below historical averages. The higher end of this range represents the highest prices received for Federal timber sales since 2000 (e.g., BLM timber sales in 2000 and 2006).
198. Analytically, the estimated impact in dollar terms of any potential changes to timber harvest in subunit i is:

$$\Delta Value_i = P_{stump} \times \Delta Volume_i$$

where P_{stump} is the average stumpage price, either \$100/mbf or \$250/mbf. Since volume is expressed in MMBF and price is measured in \$/mbf, we multiply this result by 1,000 to obtain a value in dollars terms.

4.5 ANALYTIC RESULTS

199. Exhibit 4-12 summarizes the results of this exercise, presenting the range of outcomes across the three scenarios. As the exhibit shows, Scenario 1 yields a negative annualized incremental economic impact of \$185,000 to \$316,000, presuming that no material change in timber management practices occurs as a result of critical habitat. Scenario 2 indicates an annualized increase, relative to baseline timber harvest projections, of approximately 12.28 MMBF. This increase in timber harvest yields a positive annualized incremental economic impact of \$914,000 to \$2.9 million, applying the low and high stumpage values, respectively (and net of incremental administrative costs). Finally, Scenario 3 yields a reduction in timber harvest of approximately 24.56 MMBF, with a negative annualized incremental economic impact of \$2.6 to \$6.5 million.

EXHIBIT 4-12. ANNUALIZED POTENTIAL INCREMENTAL IMPACTS ON FEDERAL LANDS UNDER THREE SCENARIOS

ANNUALIZED POTENTIAL INCREMENTAL IMPACTS ON FEDERAL LANDS	SCENARIO 1		SCENARIO 2 ^a		SCENARIO 3	
	LOW IMPACT	HIGH IMPACT	LOW IMPACT	HIGH IMPACT	LOW IMPACT	HIGH IMPACT
Potential Change in Timber Harvest Volume (MMBF)	0.0		+12.28		-24.56	
Potential Change in Value of Timber Harvest	\$0	\$0	+\$1,230,000	+\$3,070,000	-\$2,460,000	-\$6,140,000
Administrative Costs	-\$185,000	-\$316,000	-\$185,000	-\$316,000	-\$185,000	-\$316,000
TOTAL	-\$185,000	-\$316,000	+\$912,000	+\$2,880,000	-\$2,640,000	-\$6,460,000

Notes:

^a Under Scenario 2, to illustrate a full range of potential outcomes, the low impact "total" is the low impact change to timber harvest net the high impact administrative costs, representing a worst case scenario; conversely, the high impact "total" is the high impact change to timber harvest net the low impact administrative costs, representing a best case scenario.

All dollar estimates are rounded to three significant digits and may not sum due to rounding.

200. Exhibit 4-13 summarizes the annualized potential incremental impacts to Federal timber harvest by critical habitat subunit under Scenario 2 and Scenario 3. Note that we do not explicitly model administrative costs by subunit. As the exhibit shows, across subunits the annualized potential incremental impacts to timber harvest range from no change to a positive impact of \$475,000 under Scenario 2 (high price) or a negative impact of \$951,000 under Scenario 3 (high price). Appendix D contains additional information on potential incremental effects to Federal timber harvest and the underlying cost model.

**EXHIBIT 4-13. ANNUALIZED POTENTIAL INCREMENTAL IMPACTS TO FEDERAL TIMBER HARVEST BY
SUBUNIT UNDER POSITIVE AND NEGATIVE SCENARIOS**

RANK [A]	UNIT [B]	SUBUNIT [C]	SCENARIO 2			SCENARIO 3		
			ANNUALIZED POTENTIAL CHANGE IN TIMBER HARVEST (MMBF) [D]	ANNUALIZED POTENTIAL CHANGE IN VALUE OF TIMBER HARVEST		ANNUALIZED POTENTIAL CHANGE IN TIMBER HARVEST (MMBF) [G]	ANNUALIZED POTENTIAL CHANGE IN VALUE OF TIMBER HARVEST	
				LOW PRICE (\$100/MBF) [E]	HIGH PRICE (\$250/MBF) [F]		LOW PRICE (\$100/MBF) [H]	HIGH PRICE (\$250/MBF) [I]
1	Inner California Coast Ranges	ICC 1	1.90	\$190,000	\$475,000	-3.80	-\$380,000	-\$951,000
2	Inner California Coast Ranges	ICC 7	0.92	\$91,900	\$230,000	-1.84	-\$184,000	-\$460,000
3	Klamath West	KLW 7	0.72	\$72,200	\$180,000	-1.44	-\$144,000	-\$361,000
4	East Cascades South	ECS 3	0.57	\$57,300	\$143,000	-1.15	-\$115,000	-\$287,000
5	Oregon Coast	ORC 2	0.55	\$55,400	\$138,000	-1.11	-\$111,000	-\$277,000
6	Klamath West	KLW 9	0.47	\$47,000	\$118,000	-0.94	-\$94,000	-\$235,000
7	West Cascades South	WCS 6	0.44	\$43,900	\$110,000	-0.88	-\$87,800	-\$220,000
8	West Cascades South	WCS 1	0.40	\$39,800	\$99,500	-0.80	-\$79,600	-\$199,000
9	Oregon Coast	ORC 5	0.39	\$38,800	\$97,100	-0.78	-\$77,700	-\$194,000
10	East Cascades North	ECN 9	0.34	\$33,600	\$84,100	-0.67	-\$67,300	-\$168,000
11	Oregon Coast	ORC 3	0.33	\$33,100	\$82,700	-0.66	-\$66,200	-\$165,000
12	Inner California Coast Ranges	ICC 2	0.31	\$31,400	\$78,500	-0.63	-\$62,800	-\$157,000
13	Klamath West	KLW 1	0.30	\$29,800	\$74,600	-0.60	-\$59,700	-\$149,000
14	West Cascades South	WCS 3	0.29	\$28,600	\$71,500	-0.57	-\$57,200	-\$143,000
15	Oregon Coast	ORC 6	0.26	\$25,900	\$64,800	-0.52	-\$51,800	-\$130,000
16	East Cascades North	ECN 7	0.25	\$25,400	\$63,600	-0.51	-\$50,900	-\$127,000
17	West Cascades South	WCS 2	0.24	\$23,700	\$59,200	-0.47	-\$47,400	-\$118,000
18	East Cascades North	ECN 8	0.23	\$22,900	\$57,200	-0.46	-\$45,700	-\$114,000
19	Klamath East	KLE 2	0.22	\$22,000	\$54,900	-0.44	-\$43,900	-\$110,000
20	Inner California Coast Ranges	ICC 3	0.21	\$21,200	\$53,100	-0.42	-\$42,500	-\$106,000
21	East Cascades North	ECN 3	0.21	\$20,600	\$51,400	-0.41	-\$41,100	-\$103,000
22	Klamath East	KLE 7	0.20	\$20,400	\$51,100	-0.41	-\$40,900	-\$102,000
23	Klamath East	KLE 6	0.20	\$19,700	\$49,300	-0.39	-\$39,500	-\$98,700
24	Klamath West	KLW 8	0.19	\$19,200	\$48,000	-0.38	-\$38,400	-\$96,000
25	East Cascades North	ECN 5	0.16	\$16,200	\$40,500	-0.32	-\$32,400	-\$81,000
26	Inner California Coast Ranges	ICC 4	0.16	\$16,100	\$40,200	-0.32	-\$32,200	-\$80,400
27	Klamath West	KLW 4	0.14	\$14,400	\$36,000	-0.29	-\$28,800	-\$72,100
28	West Cascades South	WCS 4	0.13	\$13,000	\$32,400	-0.26	-\$25,900	-\$64,800
29	East Cascades North	ECN 4	0.12	\$12,500	\$31,200	-0.25	-\$25,000	-\$62,500
30	East Cascades South	ECS 1	0.11	\$11,200	\$28,000	-0.22	-\$22,400	-\$55,900
31	East Cascades South	ECS 2	0.11	\$11,100	\$27,800	-0.22	-\$22,300	-\$55,700
32	Oregon Coast	ORC 4	0.11	\$10,700	\$26,800	-0.21	-\$21,400	-\$53,600
33	Klamath West	KLW 2	0.10	\$10,200	\$25,400	-0.20	-\$20,300	-\$50,800

RANK [A]	UNIT [B]	SUBUNIT [C]	SCENARIO 2			SCENARIO 3		
			ANNUALIZED POTENTIAL CHANGE IN TIMBER HARVEST (MMBF) [D]	ANNUALIZED POTENTIAL CHANGE IN VALUE OF TIMBER HARVEST		ANNUALIZED POTENTIAL CHANGE IN TIMBER HARVEST (MMBF) [G]	ANNUALIZED POTENTIAL CHANGE IN VALUE OF TIMBER HARVEST	
				LOW PRICE (\$100/MBF) [E]	HIGH PRICE (\$250/MBF) [F]		LOW PRICE (\$100/MBF) [H]	HIGH PRICE (\$250/MBF) [I]
34	Redwood Coast	RDC 1	0.10	\$9,710	\$24,300	-0.19	-\$19,400	-\$48,600
35	West Cascades Central	WCC 2	0.10	\$9,700	\$24,200	-0.19	-\$19,400	-\$48,500
36	Klamath East	KLE 4	0.09	\$9,430	\$23,600	-0.19	-\$18,900	-\$47,200
37	West Cascades Central	WCC 3	0.08	\$7,600	\$19,000	-0.15	-\$15,200	-\$38,000
38	North Coast Olympics	NCO 1	0.06	\$5,810	\$14,500	-0.12	-\$11,600	-\$29,100
39	Klamath East	KLE 3	0.06	\$5,800	\$14,500	-0.12	-\$11,600	-\$29,000
40	Klamath West	KLW 3	0.05	\$4,970	\$12,400	-0.10	-\$9,940	-\$24,900
41	West Cascades South	WCS 5	0.05	\$4,510	\$11,300	-0.09	-\$9,020	-\$22,500
42	East Cascades North	ECN 1	0.04	\$4,450	\$11,100	-0.09	-\$8,890	-\$22,200
43	North Coast Olympics	NCO 2	0.04	\$4,100	\$10,300	-0.08	-\$8,200	-\$20,500
44	Klamath East	KLE 5	0.04	\$4,100	\$10,300	-0.08	-\$8,200	-\$20,500
45	East Cascades North	ECN 2	0.04	\$3,910	\$9,770	-0.08	-\$7,820	-\$19,500
46	Klamath East	KLE 1	0.03	\$3,280	\$8,210	-0.07	-\$6,570	-\$16,400
47	Inner California Coast Ranges	ICC 5	0.03	\$3,160	\$7,900	-0.06	-\$6,320	-\$15,800
48	North Coast Olympics	NCO 5	0.03	\$3,160	\$7,900	-0.06	-\$6,320	-\$15,800
49	Redwood Coast	RDC 2	0.03	\$3,070	\$7,680	-0.06	-\$6,140	-\$15,400
50	West Cascades Central	WCC 1	0.03	\$3,020	\$7,550	-0.06	-\$6,040	-\$15,100
51	Inner California Coast Ranges	ICC 8	0.03	\$2,510	\$6,260	-0.05	-\$5,010	-\$12,500
52	Klamath West	KLW 6	0.02	\$1,950	\$4,880	-0.04	-\$3,900	-\$9,760
53	East Cascades North	ECN 6	0.02	\$1,940	\$4,850	-0.04	-\$3,880	-\$9,710
54	Inner California Coast Ranges	ICC 6	0.01	\$984	\$2,460	-0.02	-\$1,970	-\$4,920
55	Klamath West	KLW 5	0.01	\$779	\$1,950	-0.02	-\$1,560	-\$3,900
56	Oregon Coast	ORC 1	0.00	\$344	\$859	-0.01	-\$688	-\$1,720
57	West Cascades North	WCN 1	0.00	\$250	\$625	-0.01	-\$500	-\$1,250
58	West Cascades North	WCN 2	0.00	\$17	\$43	0.00	-\$34	-\$85
59	North Coast Olympics	NCO 4	0.00	\$0	\$0	0.00	\$0	\$0
59	North Coast Olympics	NCO 3	0.00	\$0	\$0	0.00	\$0	\$0
59	Redwood Coast	RDC 3	0.00	\$0	\$0	0.00	\$0	\$0
59	Redwood Coast	RDC 4	0.00	\$0	\$0	0.00	\$0	\$0
59	Redwood Coast	RDC 5	0.00	\$0	\$0	0.00	\$0	\$0
TOTAL			12.28	\$1,230,000	\$3,070,000	-24.56	-\$2,460,000	-\$6,140,000

201. Exhibit 4-14 summarizes potential incremental impacts to Federal timber harvest by land manager over the next 20 years, assuming harvest volumes generally remain constant, using a seven-percent discount rate and a three-percent discount rate. The exhibit shows an annualized potential increase in the total value of timber harvest of between \$1.2 million and \$3.1 million under Scenario 2 and an annualized potential decreased between \$2.5 million and \$6.1 million under Scenario 3. In each scenario, approximately 68 percent of potential incremental effects to Federal timber harvest occur on USFS managed lands and 32 percent occur on BLM managed lands. If minimal or no changes are adopted by the action agencies, the incremental impacts of the designation would be predominantly administrative costs, which are described above.

EXHIBIT 4-14. POTENTIAL CHANGE IN TOTAL VALUE OF TIMBER HARVEST BY FEDERAL AGENCY (\$2011), 2012-2031

FEDERAL AGENCY	POTENTIAL CHANGE IN VALUE OF TIMBER HARVEST, 2012-2031 (PRESENT VALUE, \$ MILLIONS)											
	SCENARIO 2						SCENARIO 3					
	7% DISCOUNT RATE		3% DISCOUNT RATE		ANNUALIZED		7% DISCOUNT RATE		3% DISCOUNT RATE		ANNUALIZED	
	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
BLM	\$4.4	\$11.0	\$5.9	\$14.9	\$0.39	\$0.97	-\$8.8	-\$22.0	-\$11.9	-\$29.7	-\$0.78	-\$1.94
USFS	\$9.5	\$23.8	\$12.9	\$32.2	\$0.84	\$2.10	-\$19.0	-\$47.6	-\$25.7	-\$64.4	-\$1.68	-\$4.20
TOTAL	\$13.9	\$34.8	\$18.8	\$47.0	\$1.23	\$3.07	-\$27.8	-\$69.6	-\$37.6	-\$94.1	-\$2.46	-\$6.14
<u>Note:</u> All estimates are rounded to three significant digits and may not sum due to rounding.												

202. We note again that which of these scenarios, or combinations of these scenarios, comes to pass is largely dependent on the approaches undertaken by the land management agencies and the cooperative section 7 processes between the Forest Service or BLM and the Fish and Wildlife Service. Both the Forest Service and the BLM manage their timberlands under the direction of the NWFP, which includes provisions for management both within and outside of reserved areas. Inside reserves, the Service believes that the guidance for development of late-successional forest characteristics is consistent with recommendations for implementing ecological forestry methods to benefit the retention and development of spotted owl habitat. In the non-reserved, or the Matrix, portion of the landscape which these agencies manage, the NWFP provides minimum levels and sizes of standing trees that must remain post-harvest, depending on specific location within the range of the species. The NWFP does not, however, mandate that retaining only these minimum levels of retained trees is necessary. Indeed, in the past decade, the BLM and Forest Service have shifted their timber management emphasis in the Matrix from a regeneration harvest dominated program to one more focused on thinning prescriptions that leave more trees per acre than the minimums allowed under the NWFP. Since both

the BLM and Forest Service have a track record of planning and implementing these thinning sales, the Service believes there will be a smooth transition to designing and implementing timber sales that are consistent with the ecological forestry recommendations in the Revised Recovery Plan and the proposed critical habitat designation and with the green-tree retention levels of the NWFP. We mention, however, that the timing of this implementation is uncertain. Thus, Scenario 1 may be more representative of likely outcomes in the near term.

4.6 ADDITIONAL SENSITIVITY ANALYSIS

203. As indicated above, this analysis develops one baseline projection for future timber harvest on Federal lands, and then utilizes three scenarios to measure potential incremental changes to timber harvest from this baseline resulting from the proposed designation. Several comments submitted during the public comment period provided information to inform certain alternative assumptions concerning the baseline timber harvest projection. In this section, we test these alternative assumptions.
204. Specifically, BLM and USFS suggested certain alterations to the baseline timber harvest projection. The details of these alterations include:
 - a. BLM: Information provided by the BLM Oregon State Office asserts that occupancy in BLM matrix lands with NSO habitat may be overstated. Specifically, BLM personnel represent that median home range data imply that a higher percentage of acres of regular to lower quality NSO habitat are likely to be unoccupied than the 6.5 percent contemplated in the above analysis.¹⁶² While there is considerable uncertainty regarding precise locations, BLM estimates that approximately 50 percent of regular to lower quality habitat is likely to be unoccupied by the NSO, while a much lower percentage of structurally complex NSO habitat is likely to be unoccupied. BLM also provided data showing that approximately 54 percent of NSO habitat is structurally complex habitat, while the remaining 46 percent consists of other NSO habitat.¹⁶³ Therefore, we contemplate a sensitivity analysis in which 6.5 percent of structurally complex NSO habitat and 50 percent of other NSO habitat is likely to be unoccupied. Overall, this implies that 26.6 percent of NSO habitat on BLM matrix lands is likely to be unoccupied.¹⁶⁴ Therefore, this sensitivity analysis includes an additional 59,747 acres of BLM matrix lands with NSO habitat that is likely to be unoccupied where potential incremental impacts to timber harvest may occur. Overall, this sensitivity analysis contemplates potential incremental changes in timber harvest on 1,449,534 acres of Federal matrix lands compared to 1,389,787 acres as described in the economic analysis above (a 4.3 percent increase).

¹⁶² Information provided during public comment period from BLM Oregon State Office.

¹⁶³ Submission provided by Chris Cadwell, BLM, Oregon State Office under report entitled, "Proposed Spotted Owl Critical Habitat - Economic Analysis Assumptions for BLM Timber Harvest Effects," April 17, 2012.

¹⁶⁴ We calculate the percentage of unoccupied NSO habitat as 6.5 percent unoccupied × 53.7 percent structurally complex NSO habitat + 50 percent unoccupied × 46.2 percent other NSO habitat = 26.6 percent.

- b. USFS: Information provided by USFS Region 6 suggests that projections based on historical timber harvest may underestimate future levels of timber harvest. Specifically, the Region 6 timber program is endeavoring to increase production in FY 2013 and FY 2014.¹⁶⁵ USFS will undertake future actions related to the use of active forest management targeting a 20 percent increase in terms of timber harvest volume and acres. Therefore, we contemplate a sensitivity analysis in which the baseline timber harvest accounts for a 20 percent increase in USFS Region 6 relative to historical yields.

205. We present the results of this sensitivity analysis in Exhibit 4-15 below. As the exhibit shows, the alternative assumptions widen the range of annualized potential impacts to Federal timber harvest relative to the economic analysis presented above. In the economic analysis, the incremental impacts to timber harvest range from a potential stumpage value increase of \$2.88 million (under Scenario 2) to a potential decrease of \$6.46 million (under Scenario 3) from a baseline harvest projection of approximately 122.80 MMBF per year. In the sensitivity analyses, the baseline timber harvest projection increases by up to an additional 27.99 MMBF per year. Therefore, the range of incremental impacts to Federal timber harvest widens from a potential increase of \$3.58 million (under Scenario 2) to a potential decrease of \$7.86 million (under Scenario 3) per year. This represents an annualized increase of \$0.7 million (under Scenario 2) and an annualized decrease of \$1.4 million (under Scenario 3) relative to the results presented above.

¹⁶⁵ Information provided during public comment period from USFS Region 6.

**EXHIBIT 4-15. SENSITIVITY ANALYSIS OF ANNUALIZED POTENTIAL INCREMENTAL IMPACTS ON
FEDERAL LANDS UNDER THREE SCENARIOS**

ANNUALIZED POTENTIAL INCREMENTAL IMPACTS ON FEDERAL LANDS	SCENARIO 1		SCENARIO 2		SCENARIO 3	
	LOW IMPACT	HIGH IMPACT	LOW IMPACT	HIGH IMPACT	LOW IMPACT	HIGH IMPACT
1) Sensitivity: BLM Projection						
Baseline Timber Harvest Projection (MMBF)	144.64					
Potential Change in Timber Harvest Volume (MMBF)	0.0		+14.46		-28.93	
Potential Change in Value of Timber Harvest	\$0	\$0	+\$1,450,000	+\$3,620,000	-\$2,890,000	-\$7,230,000
Administrative Costs	-\$185,000	-\$316,000	-\$185,000	-\$316,000	-\$185,000	-\$316,000
TOTAL	-\$185,000	-\$316,000	+\$1,130,000	+\$3,430,000	-\$3,080,000	-\$7,550,000
2) Sensitivity: USFS Projection						
Baseline Timber Harvest Projection (MMBF)	128.94					
Potential Change in Timber Harvest Volume (MMBF)	0.0		+12.89		-25.79	
Potential Change in Value of Timber Harvest	\$0	\$0	+\$1,290,000	+\$3,220,000	-\$2,580,000	-\$6,450,000
Administrative Costs	-\$185,000	-\$316,000	-\$185,000	-\$316,000	-\$185,000	-\$316,000
TOTAL	-\$185,000	-\$316,000	+\$973,000	+\$3,040,000	-\$2,760,000	-\$6,760,000
3) Sensitivity: BLM and USFS Projection Combined						
Baseline Timber Harvest Projection (MMBF)	150.79					
Potential Change in Timber Harvest Volume (MMBF)	0.0		+15.08		-30.16	
Potential Change in Value of Timber Harvest	\$0	\$0	+\$1,510,000	+\$3,770,000	-\$3,020,000	-\$7,540,000
Administrative Costs	-\$185,000	-\$316,000	-\$185,000	-\$316,000	-\$185,000	-\$316,000
TOTAL	-\$185,000	-\$316,000	+\$1,190,000	+\$3,580,000	-\$3,200,000	-\$7,860,000
<u>Notes:</u> All dollar estimates are rounded to three significant digits and may not sum due to rounding.						

206. In addition to the sensitivity analysis presented above concerning the baseline timber harvest projection, we also consider an alternative assumption regarding stumpage rates for Federal timber harvest within the proposed critical habitat designation. Specifically, information provided by the AFRC suggests that recent industry trends indicate a higher range of timber prices than contemplated in the economic analysis. Therefore, this sensitivity analysis provides a high price illustration using a ceiling of \$350/mbf in place

of the \$250/mbf value used in the economic analysis. Exhibit 4-16 presents the results of this sensitivity analysis. The high impact case under Scenario 2 represents a 43 percent increase from \$2.88 million to \$4.11 million in total annualized potential impacts relative to the economic analysis. Under Scenario 3, this represents a 38 percent increase from – \$6.46 million to –\$8.91 million. The low impact case does not change.

EXHIBIT 4-16. SENSITIVITY ANALYSIS OF ANNUALIZED POTENTIAL INCREMENTAL IMPACTS USING A PRICE CEILING OF \$350/MBF FOR THE “HIGH IMPACT” CASE

ANNUALIZED POTENTIAL INCREMENTAL IMPACTS ON FEDERAL LANDS	SCENARIO 1		SCENARIO 2		SCENARIO 3	
	LOW IMPACT	HIGH IMPACT	LOW IMPACT	HIGH IMPACT	LOW IMPACT	HIGH IMPACT
Potential Change in Timber Harvest Volume (MMBF)	0.0		+12.28		-24.56	
Potential Change in Value of Timber Harvest	\$0	\$0	+\$1,230,000	+\$4,300,000	-\$2,460,000	-\$8,600,000
Administrative Costs	-\$185,000	-\$316,000	-\$185,000	-\$316,000	-\$185,000	-\$316,000
TOTAL	-\$185,000	-\$316,000	+\$912,000	+\$4,110,000	-\$2,640,000	-\$8,910,000

207. To put these potential incremental impacts in context, it is useful compare the results with those of EA prepared for the 2008 critical habitat designation for the NSO. As outlined above, this 2012 study distinguishes the incremental costs of designation from baseline costs, and quantifies specific potential effects to timber harvest practices and volume along with administrative costs. As discussed in detail in this report, the annualized incremental impacts under the negative impact scenario range from a loss of approximately \$2.65 to \$6.48 million, while the positive impact scenario ranges from a gain of approximately \$900,000 to \$2.9 million (including impacts estimates in this Chapter as well as those related to the linear projects described later in Chapter 7). The analysis also contemplates an “administrative cost only” scenario, with annualized losses of \$196,000 to \$335,000. In addition to these base scenarios, we present a number of sensitivity analyses that yield a broader range of impacts.
208. In contrast, in its evaluation of the incremental costs of the designation, the 2008 Economic Analysis did not identify any incremental effects of critical habitat designation beyond administrative costs related to the consultation process. On an annualized basis, these losses totaled \$132,000 to \$202,000 (similar to the range of administrative costs estimated in this 2012 analysis).
209. This 2012 Economic Analysis characterizes all potential future NSO conservation as either baseline (i.e., expected to occur absent the designation of critical habitat) or incremental (i.e., expected to occur as a result of critical habitat designation). The Service provided guidance on distinguishing the incremental costs of the designation, as described in Appendix B of this report. The analysis only quantifies incremental impacts because these are the costs, or benefits, that would be avoided if the Secretary of the DOI chooses to exclude certain areas from the final designation. Where we include quantitative or qualitative information about the historical impacts of northern spotted

owl conservation, this information is intended only to provide context for potential future incremental impacts.

210. The 2008 Economic Analysis provided a comprehensive quantitative assessment of baseline impacts related to NSO conservation and recovery, inclusive of all effects resulting from the species' listing in 1990. For the pre-designation period (1990 – 2007), the annualized estimate of these baseline impacts totaled \$563 to \$600 million. For the post-designation period, annualized baseline impacts (i.e., those impacts expected to occur regardless of whether critical habitat is designated) were estimated to be approximately \$602 million.

CHAPTER 5 | TIMBER IMPACTS - STATE AND PRIVATE LANDS

211. Chapter 3 describes the importance of access to non-Federal timber to the regional economy. As harvests from Federal lands have declined, other sources of timber have become relatively more important to the regional economy. Many mills acquire most, if not all of their logs from private landowners. In this chapter, we estimate the potential effect of the proposed critical habitat designation on State and private timberlands.

We undertake the following steps to estimate impacts:

- **Step 1** – First, we identify the amount of State and private lands proposed for designation and the relevant land managers.
- **Step 2** – Next, we evaluate which acres may experience incremental impacts as a result of the proposed rule. These impacts may result directly from the implementation of section 7 of the Act, or they may be the indirect effect of changes in management by State regulators or in practices by private entities in response to increased awareness of the ecological importance of these areas.
- **Step 3** – Once we have identified the acres that may experience incremental impacts, we qualitatively discuss the potential costs resulting from the designation.

Overall, we find that none of the State lands proposed for designation are likely to experience incremental changes in harvested volumes of timber as a result of designating critical habitat for the NSO. Of the approximately 1.3 million acres of private lands proposed for designation, harvest practices on approximately one-quarter of those acres (307,000) may be indirectly affected by the designation. Incremental impacts on the remaining lands are unlikely due to the substantial protections, and corresponding restrictions, already in place for the NSO. The downstream impacts of incremental changes in harvests experienced by the timber industry (e.g., saw mills, logging companies) and the communities dependent on this industry are discussed in Chapter 6.

5.1 STEP 1 - IDENTIFY STATE AND PRIVATE ACRES PROPOSED FOR DESIGNATION

212. In this section, we summarize the amount State and private land proposed for critical habitat designation. For State lands, we also note the relevant management agencies. Identification of the individual landowners is beyond the scope of this analysis.

5.1.1 STATE LANDS

213. A total of 671,036 acres of State lands in Washington, Oregon and California are proposed for designation as Critical Habitat for the NSO. Of those lands, 226,869 acres (34 percent) are proposed in Washington, 228,733 acres (34 percent) are proposed in Oregon, and 215,434 acres (32 percent) are proposed in California. A breakdown of State lands by agency ownership is displayed in Exhibit 5-1.

EXHIBIT 5-1. STATE LANDS WITHIN CRITICAL HABITAT

STATE LAND CATEGORY	AREA PROPOSED FOR DESIGNATION (ACRES)
WASHINGTON	
Washington Department of Natural Resources	225,013
Washington State Parks	104
Washington Department of Fish and Wildlife	1,752
OREGON	
Oregon Department of Forestry	228,733
CALIFORNIA	
California State Parks	164,672
California State Forests	50,762
TOTAL	671,036
<u>Note:</u> Total State acres differ slightly from the acres presented in the Executive Summary and Chapter 1, which are based on GIS data provided by the Service. Source: 77 FR 14134 - 14135, Table 6.	

5.1.2 PRIVATE LANDS

214. If none of the proposed exclusions are adopted, a total of 1,269,890 acres of land owned by private entities could be designated. Of that land, 86 percent (1,091,743) is located in California, while 14 percent (178,147 acres) is in Washington. No private lands in Oregon are proposed for designation.¹⁶⁶ These figures are summarized in Exhibit 5-2.

¹⁶⁶ A public comment submitted by Green Crow, a private timberland owner in Oregon, showed that two tracts in Oregon, thought to be owned by the State and included in the proposed designation, had been purchased by the company in 2010 (see public comment submitted by Green Crow on July 2, 2012). These private acres are not included in the final designation.

EXHIBIT 5-2. PRIVATE LANDS IN PROPOSED DESIGNATION BY STATE

STATE	AREA IN PROPOSED DESIGNATION (ACRES)
Washington	178,147
Oregon	0
California	1,091,743
TOTAL	1,269,890
Source: GIS data layers provided by the U.S. Fish and Wildlife Service on March 1, 2012. Acreage numbers may differ slightly from those provided in the Proposed Rule due to minor boundary adjustments included within the GIS data used to inform the Economic Analysis.	

5.2 STEP 2 - IDENTIFY ACRES POTENTIALLY SUBJECT TO INCREMENTAL IMPACTS

215. As described in Chapter 2, the focus of this incremental analysis is to determine the impacts on land uses and activities from the designation of critical habitat that are above and beyond those impacts resulting from existing required or voluntary conservation efforts being undertaken due to other Federal, State, and local regulations or guidelines. Incremental impacts to State and private lands may result either through the direct implementation of critical habitat regulation under the Act, or indirectly as a result of the informational nature of the rule. To isolate potential incremental effects, we identify the pathways by which effects may be realized and consider the total acreage of lands which may be affected.
216. The direct, incremental impacts of critical habitat designation stem from the consideration of the potential for destruction or adverse modification of critical habitat during section 7 consultations. State and private lands may be directly affected only if a “Federal nexus” exists by which the Federal government may influence activities taking place on privately-held or State-owned property.¹⁶⁷ A Federal nexus may exist because a project involves Federal funding or requires a Federal permit, such as a Clean Water Act permit or an incidental take permit for another listed species that co-occurs with NSO. Where there is a Federal nexus, project proponents (in this case, non-Federal applicants seeking Federal funding or approval) may need to make modifications to their project to avoid an adverse modification finding, resulting in a direct incremental impact.¹⁶⁸
217. Incremental effects of designation may also manifest themselves indirectly. Indirect impacts are those unintended changes in economic behavior that may occur outside of the Act, through other Federal, State, or local actions, and that are caused by the designation of critical habitat. For example, as a result of Federal critical habitat designation, a State permitting agency may alter its own requirements relative to timber harvest on private lands to further protect the habitat in question. These changes may result in additional

¹⁶⁷ Section 7(a)(2) of the Act requires Federal agencies to consult with the Service whenever activities they undertake, authorize, permit, or fund may affect a listed species or designated critical habitat. The Federal discretionary action serves as the “nexus” by which the Service may become involved in the project.

¹⁶⁸ For a detailed discussion of section 7 requirements to consider designated critical habitat, see Chapter 2 of this report.

costs associated with carrying out that activity in compliance with new regulations. In other cases, designation of one's property may result in concern or uncertainty about potential future regulation, altering the decisions made about productive uses of that land, or stigmatizing the property such that the value of the property is affected.

218. In the following sections, we consider the potential for both direct and indirect impacts on State and private lands to result from NSO critical habitat designation. We begin by considering the potential for a nexus to result in changes to timber harvest practices and associated incremental costs (i.e., direct incremental impacts). We then evaluate the total acreage of State and private land subject to any potential direct incremental costs.
219. Next, we consider the potential for changes to State policies dictating timber harvest practices, and evaluate the extent to which identified changes would result in indirect incremental costs. We then evaluate the total acreage of land potentially affected by these changes. Finally, we consider other indirect impacts, and similarly identify the acreage affected and potential incremental costs stemming from those impacts. The potential for additional administrative costs is discussed qualitatively throughout the Chapter.

5.2.1 DIRECT EFFECTS

220. Direct incremental effects of NSO critical habitat designation are only possible on State or private lands where a Federal nexus exists. We identify three potential sources of a nexus to State and private lands proposed for designation and discuss each of them in the sections below.¹⁶⁹

Habitat Conservation Plans and Safe Harbor Agreements

221. Habitat Conservation Plans (HCPs) and Safe Harbor Agreements (SHAs) are approved by the Service, resulting in a Federal nexus.^{170,171} As such, approval and renewal of these

¹⁶⁹ We also considered and dismissed a fourth possible nexus. The U.S. Department of Agriculture's Natural Resources Conservation Service (NRCS) provides financial and technical assistance to private landowners through programs like the Environmental Quality Incentives Program (EQIP) and the Wildlife Habitat Incentive Program (WHIP). The programs are intended to assist landowners with the planning and implementation of conservation practices addressing natural resource concerns, including improving wildlife habitat (for more information, see www.nrcs.gov/wps/portal/nrcs/main/national/programs). We reviewed the consultation history for the NSO since the 2008 designation and did not identify any consultations with NRCS. In addition, we attempted to contact NRCS representatives in Washington and spoke with a representative in California, and we spoke with Service biologists about its history consulting with NRCS on any species (Personal communication with Thomas Moore, State Biologist, U.S. Department of Agriculture, Natural Resources Conservation on October 15, 2012; and Personal communication with U.S. Fish and Wildlife Service, Oregon Fish and Wildlife Office on August 8, 2012 and the Arcata, California Fish and Wildlife Office on August 29, 2012). Because the NRCS does not have a history of initiating consultation with the Service on these types of grants in areas occupied by NSO, we assume that it will continue its current practices in the future. If surveys do not detect the owl, and the area is not subject to an existing HCP or SHA, then the likelihood of a consultation is uncertain. In general, NRCS funds projects intended to be beneficial to the species in the long term. Thus, for the purposes of this analysis, we assume consultations on NRCS funding are unlikely.

¹⁷⁰ Habitat Conservation Plans (HCPs) are planning documents required as part of an application for an 'incidental take' permit pursuant to section 10 of the Act. They describe the anticipated effects of the proposed taking; how those impacts will be minimized, or mitigated; and how the HCP is to be funded. For more information, see Chapter 2.

agreements requires section 7 consultation, potentially necessitating the Federal government to request changes to timber harvest activities to avoid destruction or adverse modification of critical habitat and potentially resulting in effects on timber harvest.

222. In the proposed rule, the Service indicates that all HCPs in the proposed designation that meet the following criteria are appropriate for consideration for exclusion from the final designation:

- “(1) It provides for the conservation of the essential physical and biological features or areas otherwise determined to be essential;
- (2) There is a reasonable expectation that the conservation management strategies and actions contained in a management plan will be implemented into the future;
- (3) The conservation strategies in the HCP are likely to be effective; and
- (4) The HCP contains a monitoring program or adaptive management to ensure that the conservation measures are effective and can be adapted in the future in response to new information.”¹⁷²

All lands with approved HCPs are proposed for exclusion, and each HCP will be evaluated with regard to the stated criteria in consideration of potential exclusion from the final designation. Furthermore, in its Incremental Effects Memorandum, the Service writes,

“Service staff in California and Washington have reviewed the HCPs and SHAs that would be affected by the proposed revised spotted owl critical habitat. The results of their preliminary analysis suggest that the activities covered under these permits are not likely to result in adverse modification of critical habitat...Thus, we do not anticipate any incremental effects associated with HCPs or SHAs attributable to the designation of critical habitat other than formalizing our adverse modification analysis.”¹⁷³

Thus, even if these lands were not excluded from the final designation, we conclude that impacts would be limited to minor administrative costs associated with re-initiating section 7 consultation to consider adverse modification. Incremental project modifications are unlikely.

¹⁷¹ A Safe Harbor Agreement (SHA) is a voluntary agreement involving private or other non-Federal property owners whose actions contribute to the recovery of listed species. The agreement is between cooperating non-Federal property owners and the Service. In exchange for actions that contribute to the recovery of listed species on non-Federal lands, participating property owners receive a section 10 permit allowing them to “take” the species back to the baseline level. The Service also generally provides formal assurances that if they fulfill the conditions of the SHA, the Service will not require any additional or different management activities by the participants without their consent.

¹⁷² 77 FR 14138.

¹⁷³ U.S. Fish and Wildlife Service, “Incremental Effects Memorandum for the Economic Analysis of the Proposed Rule to Revise Critical Habitat for the Northern Spotted Owl,” March 23, 2012, pp. 16-17.

Clean Water Act Permitting for Timber Roads on Private Lands

223. Construction of roads near or affecting streams or other navigable waters is often subject to National Pollution Discharge Elimination System (NPDES) permitting under section 404 of the Clean Water Act (CWA). However, road construction involved in silviculture operations is exempt from section 404 permitting requirements under section 404(f) if the operation adheres to the U.S. Army Corps of Engineer's Best Management Practices. Section 404(f) of the CWA, "provides that discharges that are part of normal farming, ranching, and forestry activities associated with an active and continuous ("ongoing") farming or forestry operation generally do not require a Section 404 permit." "Normal" operations are defined as "activities such as plowing, cultivating, minor drainage, and harvesting for the production of food, fiber, and forest products, or upland soil and water conservation practices (Section 404(f)(1)(A))"¹⁷⁴
224. Future regulatory changes could create a circumstance in which silviculture operations are no longer exempt from 404 permitting requirements or are otherwise subject to a Federal nexus. Specifically, in the Ninth Circuit, Northwest Environmental Defense Center v. Brown, redefines road construction and other common practices associated with silviculture operations as sources of point-source pollution, as opposed to non-point source pollution, as previously defined.¹⁷⁵ This ruling has the potential to increase permitting requirements for silviculture operations in States within the Ninth Circuit, including California, Oregon, and Washington, because several common forestry practices, when defined as sources of point-source pollution, are not subject to the section 404(f) exemptions described above.
225. Considerable uncertainty surrounds this ruling and whether it will in fact change the permitting requirements for silvicultural operations within the next 20 years. It follows that the likelihood for a Federal nexus for timber harvest activities on State and private lands is likewise uncertain. For this analysis, we assume the current exemption and subsequent lack of a Federal nexus continues, and therefore do not anticipate direct effects on private or State lands associated with CWA permitting activities.

Commercial Hauling on Forest Development Roads

226. In the Northwest, many privately-held and State timberlands are co-mingled in a checkerboard pattern with lands owned by the Federal government. Hauling of timber from State and private lands thus, in many instances, requires transit through Federal land and use of federally-maintained Forest Development Roads. Use of these roads for commercial timber hauling requires a Federal permit, potentially creating a nexus between the Federal government and State and private timber activities.

¹⁷⁴ U.S. EPA, "Memorandum: Clean Water Act Section 404 Regulatory Program And Agricultural Activities," accessed at <http://water.epa.gov/lawsregs/guidance/wetlands/cwaag.cfm> on April 9, 2012..

¹⁷⁵ Northwest Environmental Defense Center v. Marvin Brown, 640 F.3d 1063 (9th Cir. 2010).

227. According to representatives of the USFS and BLM, current policy states that formal consultation on this type of activity is not prioritized.¹⁷⁶ A review of Federal consultations over the last three years indicates that no consultations related to NSO have resulted from application for this type of permit. Additionally, according to the USFS and BLM, any request for consultation would likely be limited to hauling activity, and would not include the timber harvest activity itself. Thus, we do not anticipate any direct effects on timber harvest on State or private lands as a result of this potential nexus.

Summary of Potential for Direct Impacts

228. Given present conditions, including permitting exemptions currently in place, we conclude that the designation of critical habitat for the NSO is unlikely to directly affect timber harvests on State or private lands. Minor administrative costs are possible if critical habitat is designated in areas with existing or planned HCPs or SHAs. These costs arise from the need to re-initiate section 7 consultation to consider the potential for the activity to adversely modify critical habitat. Additional project modifications are not anticipated to result from such consultation.

5.2.2 INDIRECT EFFECTS DUE TO STATE MANAGEMENT CHANGES

229. We next consider the potential for indirect effects resulting from changes in State policies guiding timber harvest practices on State and private lands. To identify potential modifications to State timber management practices developed in response to Federal critical habitat designation, we conducted a series of informational interviews with State agencies currently involved in managing timber harvest on State and private lands. A complete list of entities consulted during this process is included as Appendix C.
230. In the sections below, we first identify existing policies for timber harvest on State lands. We then consider any likely modifications to those policies due to Federal designation of critical habitat. Next, we estimate the total acreage of land that may be subject to any identified indirect incremental costs associated with State regulators' reaction to the designation. Finally, we repeat the same discussion and analysis for private lands. At the end of this section, we summarize this process and present our conclusions in two exhibits, one for State lands and the other for private lands.

Washington

Existing Policies - State Lands

231. Timber harvest on State lands is guided by a number of State laws and policies. The Washington State Environmental Policy Act (SEPA) requires analysis of environmental impacts and consideration of reasonable alternatives for actions proposed by the State. State timber harvest activities must also comply with the State Forest Practices Act (Chapter 76.09 RCW), which regulates all forest management activities in Washington.

¹⁷⁶ Personal communication with Lee Folliard and Chris Cadwell, U.S. Bureau of Land Management, Oregon State Office on March 16, 2012; and Personal communication with Debbie Hollen and Tracy Beck, U.S. Forest Service, Region 6 on March 22, 2012.

The management of State trust lands, specifically, is guided by the Forest Resource Plan, which was adopted by the Board of Natural Resources in 1992. Among other things, the policies of the Plan require the Washington Department of Natural Resources (DNR) analyze and potentially modify the impacts of its activities on watersheds, wildlife habitat, special ecological features, wetlands, and other natural resources to maintain healthy forests for future generations.¹⁷⁷

232. In addition to the State policies described above, all forest lands managed by the DNR and considered in the proposed rule are covered by an HCP. The HCP, approved in 1997, is an ecosystem-based forest management plan designed to provide habitat for a number of species, including NSO. It contains a specific conservation strategy for the NSO. The HCP's conservation objective relative to NSO is "to provide habitat that makes a significant contribution to demographic support, maintenance of species distribution, and facilitation of dispersal."¹⁷⁸
233. According to Washington Department of Fish and Wildlife (DFW) lands managers, the DFW does not carry out commercial timber harvest on its lands, and harvest activities are limited to some thinning. They are currently in the process of developing an HCP that would provide protection for a number of endangered species, including the NSO.
234. Finally, the Service proposes to designate approximately 104 acres of WA State Parks land. According to the Proposed Rule, the Service states, "these lands are managed consistent with the conservation and recovery needs of the northern spotted owl."¹⁷⁹ Furthermore, a review of the Washington Administrative Code suggests that except in limited cases, and subject to significant limitations, commercial timber harvests do not occur in within State parks.¹⁸⁰ Therefore, we do not anticipate that the Washington State Parks and Recreation Commission will alter its management of these acres as a result of the designation.

Potential Modifications and Associated Impacts - State Lands

235. According to Washington DNR State forest managers, the agency does not anticipate revising current management practices on State lands as a result of designation of Federal critical habitat. They believe the practices and policies established in the HCP are successfully protecting NSO habitat, and that they have fifteen years of history (since implementation of the HCP in 1997) that demonstrates this fact. Similarly, as timber harvest is not occurring on lands managed by DFW or in State parks, we do not anticipate indirect impacts on timber harvest to occur on these lands.

¹⁷⁷ Washington State Department of Natural Resources. 1997. Final Habitat Conservation Plan. Olympia, WA. September.

¹⁷⁸ Ibid.

¹⁷⁹ 77 FR 14142.

¹⁸⁰ See WAC 352-28-020, which describes requirements for the limited sale or lease of State Park natural resources, and WAC 352-28-010, which describes circumstances in which cutting, collection, or removal of natural resources is allowed in State Parks.

Identification of Affected Acreage - State Lands

236. A total of 226,869 acres of State lands in Washington are considered for designation as critical habitat. Of these lands, activities on 225,013 acres are covered by the Washington DNR's HCP, and are not anticipated to be affected by the designation through changes in State management policies. Furthermore, we do not anticipate incremental effects related to activities occurring on the 1,752 acres of land managed by the Washington DFW, as commercial timber harvest does not occur on those lands, and an HCP is under development. Finally, we remove the 104 acres of State lands from further consideration in this analysis because these activities on these lands are similarly unlikely to be affected by the designation. In summary, we do not anticipate any changes in timber harvest activities on State lands in Washington as a result of critical habitat designation.

Existing Policies - Private Lands

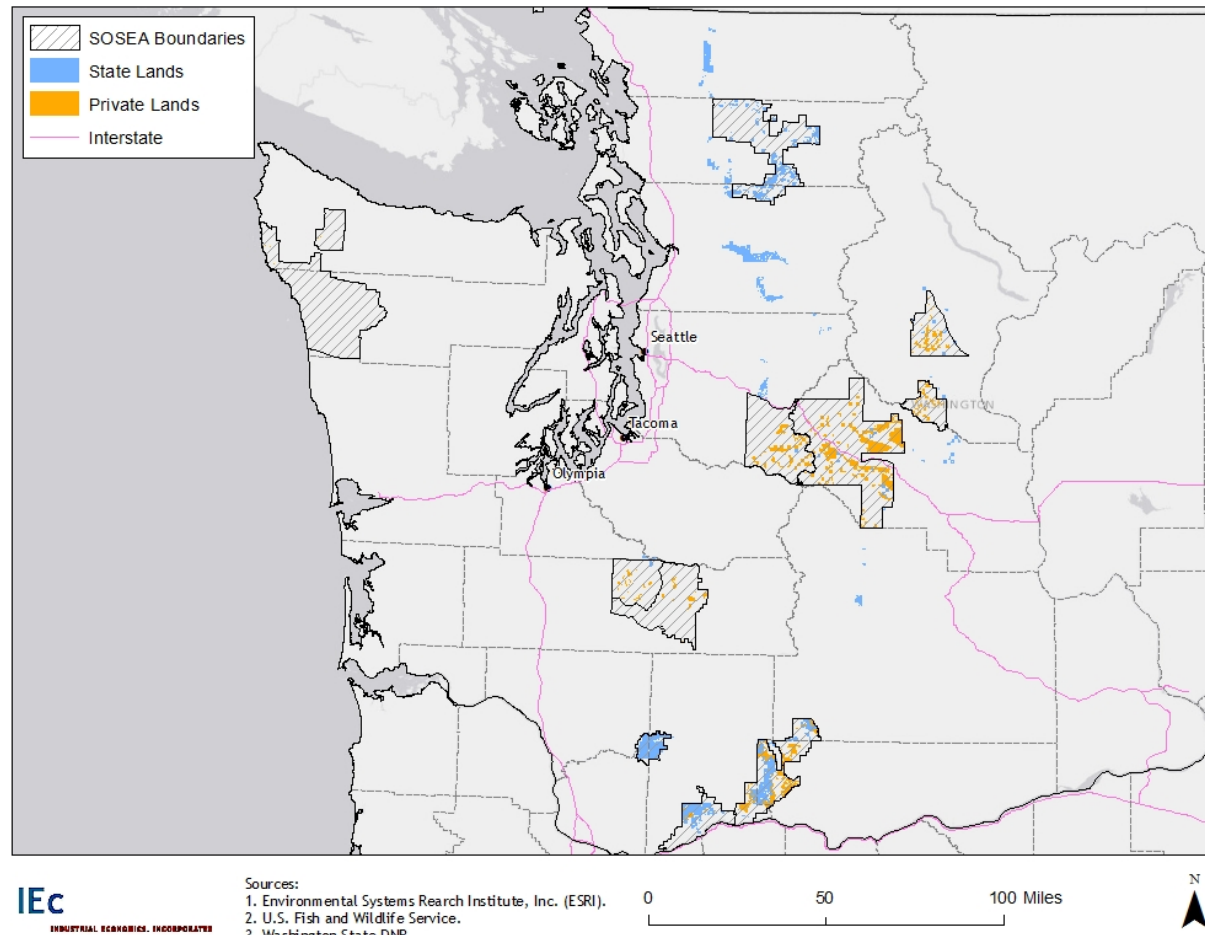
237. The Washington State Forest Practices Rules, which guide State and private timber harvest, are administered by the Washington DNR through the Forest Practices Act of 1974.¹⁸¹ The Rules that implement the purposes and policies of the Forest Practices Act are adopted by a 13-member, multi-stakeholder Forest Practices Board.¹⁸² Ultimately, it is this Forest Practices Board that will determine what, if any, response the State of Washington implements as a result of Federal critical habitat designation.
238. In 1996, the Forest Practices Board established rules related to protection of NSO, which included establishment of Spotted Owl Special Emphasis Areas (SOSEAs) and designation of "critical habitat state" for the species.¹⁸³ Within each SOSEA, these rules establish "median home range" circles around identified owl "site centers." The ultimate goal of these management rules is to maintain the highest quality 40 percent of habitat within each circle as such. Outside of the SOSEAs, rules are focused on protecting the habitat around identified site centers during the nesting season. Exhibit 5-3 shows the location of the Washington SOSEAs as they relate to the proposed designated State and private lands. It is noteworthy that all private lands in Washington proposed for possible designation are located in SOSEAs.

¹⁸¹ WAC Title 222.

¹⁸² RCW 76.09.030

¹⁸³ SOSEAs represent key landscapes where spotted owl conservation is important.

EXHIBIT 5-3. OVERLAP BETWEEN WASHINGTON’S SPOTTED OWL SPECIAL EMPHASIS AREAS AND PRIVATE AND STATE LANDS PROPOSED FOR CRITICAL HABITAT DESIGNATION



239. All suitable habitat identified within a median home range circle is considered to be “critical habitat state.” Timber harvest on lands identified as critical habitat state requires a “Class IV – Special” application, which triggers the State Environmental Policy Act (SEPA).¹⁸⁴ Analogous to the National Environmental Policy Act (NEPA), SEPA requires an environmental review of proposed activities based on the landowner’s existing knowledge of his site. All activities requiring SEPA review are considered carefully by Washington DNR prior to approval of a forest practice proposal. SEPA review may not result in significant modifications to proposed projects; however, many landowners prefer to avoid this review if possible as it creates additional opportunities for anyone to protest the proposed activity.¹⁸⁵
240. If the proposed activity is located in what the State has designated as the “best 40 percent” of habitat in the median home range circle, or on suitable habitat inside a circle where the total suitable habitat is already limited, the guidelines created by SEPA will often lead to a need for development of an Environmental Impact Statement (EIS) under SEPA. Because of the time and cost associated with developing an EIS, most landowners choose not to pursue harvest of timber on lands where an EIS would be required as part of the harvest application.¹⁸⁶
241. Landowners holding less than 500 acres are exempt from the requirement to submit a Class IV Special application (i.e., their land is not considered to be “critical habitat-state”) as long as the proposed activity will not occur within 0.7 miles of an identified spotted owl site center.¹⁸⁷

Potential Modifications and Associated Impacts – Private Lands

242. Any modification to State Forest Practices Rules is ultimately the decision of the State Forest Practices Board. DNR representatives offered several scenarios of potential responses to Federal designation of critical habitat on private lands in Washington. It is important to note that DNR representatives did not comment upon the likelihood that any of these scenarios would occur, but rather, offered them as examples of potential outcomes of the designation. These examples bound the possible lowest and highest cost outcomes.
- **Scenario 1: No changes.** Under this scenario, the Forest Practices Board reviews the Services’ critical habitat designation and sees that the private lands proposed all fall within State-designated SOSEAs. The Board concludes that current Forest Practices Rules are in line with the Service’s intent, and makes no changes to the Forest Practices Rules.
 - **Scenario 2: Re-designation of “critical habitat state.”** Under this second scenario, which represents perhaps the most restrictive possible response of the

¹⁸⁴ WAC 222-16-050(1)(b)

¹⁸⁵ Personal communication with Darin Cramer, Washington Department of Natural Resources, on March 27, 2012.

¹⁸⁶ Personal communication with Lenny Young, Washington Department of Natural Resources, on March 14, 2012.

¹⁸⁷ WAC 222-16-080 (1)(h)(iv)

State, the Forest Practices Board designates all suitable habitat overlapping Federal critical habitat within the SOSEAs as “critical habitat state” and rewrites the SEPA guidelines such that harvest on any suitable habitat within the SOSEAs likely necessitates an EIS.^{188,189} As a result, harvest of any suitable NSO habitat within a SOSEA will require a Class IV Special application, which triggers SEPA and likely leads to a need to develop an EIS. Because of the expense and time associated with development of an EIS, most landowners likely will now choose to avoid harvesting on any suitable owl habitat anywhere within the SOSEA. Existing exemptions for landowners holding less than 500 acres will continue.

Identification of Affected Acreage – Private Lands

243. A total of 178,147 acres of private land are proposed for designation as critical habitat in Washington. Of those lands, 195 acres are covered by an approved SHA, and 44,056 acres are covered by existing HCPs. Private lands with an approved HCP or SHA are effectively exempted from the SOSEA/Median Home Range Circle requirements, as the State feels that the landowner has provided conservation for the northern spotted owl in a different manner that has been approved by Service.¹⁹⁰ As such, they do not anticipate modifying how timber harvest is carried out on those lands, and we do not anticipate incremental effects to result under either of the identified scenarios.¹⁹¹
244. Of the remaining 133,896 acres of private land, 16,267 acres are currently being reviewed for approval of a pending HCP. Since proposed HCPs are being reviewed under existing guidelines, and the Service and the State have said existing HCPs provide adequate NSO habitat protection, we assume this HCP will be approved and no project modifications will be required by the State or the Service.
245. The balance of proposed private lands (117,628 acres) all fall within the State’s Spotted Owl Special Emphasis Areas.¹⁹² Under Scenario 2 presented above, in which the Forest Practices Board modifies its current rules, landowners could decide to avoid harvesting on any suitable owl habitat anywhere within the SOSEA due to the additional burden of preparing an EIS. The total number of affected acres may be overstated, as some of these areas likely fall within median Home Range Circle requirements, where the burden of

¹⁸⁸ DNR states that all suitable habitat within SOSEAs could be identified as “critical habitat state.” However, it is unclear why this designation would create an incentive to increase restrictions on lands that are not designated as Federal critical habitat. Thus, for the purposes of this analysis, we assume that only lands designated as Federal critical habitat are reviewed by the Forest Practices Board.

¹⁸⁹ DNR representatives did discuss the extreme possibility that the Board could consider elimination of the 500 acre exemption as part of the most restrictive potential outcome. However, because of disproportionate impacts and the special considerations afforded this class of landowner, DNR representatives indicated that complete elimination of the 500 acre exemption was highly unlikely. As such, we do not include an elimination of the 500 acre exemption in our analysis.

¹⁹⁰ Personal communication with Darin Cramer, Washington Department of Natural Resources, on March 22, 2012.

¹⁹¹ *Ibid.*

¹⁹² Acreage totals may not sum due to rounding.

preparing an EIS already exists. Data necessary to map the Home Range Circles are not readily available.

Oregon

Existing Policies – State Lands

246. Timber harvests on State lands in Oregon are guided by the Forest Practices Act and Forest Practices Rules. An existing statute requires that State forests are managed to achieve “greatest permanent value,” which has been interpreted by the Forest Policy Board as being holistic, considering economics, environmental, and cultural goals.¹⁹³ Each State Forest has a Forest Management Plan that seeks to implement these ideals. Ultimately, the State’s goal is to produce timber revenue and also provide for a range of habitats across ownership.
247. Thirty percent of Oregon State forests must be managed for “complex forest structures” and late seral tree species, for the benefit of a number of wildlife species. The locations of these managed lands are based in part on locations of spotted owl nests. Within these areas, a variety of treatments are employed to manage for diversity.¹⁹⁴ In addition, specific policies and procedures have been adopted which provide for the protection and conservation of NSO and its habitat. In particular, circles are designated around all known spotted owl activity sites and a variety of protections are employed to maintain proximal habitat and avoid take and disturbance of the species.¹⁹⁵

Potential Modifications and Associated Impacts – State Lands

248. Managers from the Oregon Department of Forestry have indicated that they do not anticipate altering timber harvest policies on State lands in response to critical habitat designation, as current planning and management practices are already contributing effectively to the conservation of NSO and its habitat.¹⁹⁶

Identification of Affected Acreage – State Lands

249. A total of 228,733 acres of State lands, all managed by the Department of Forestry, are proposed for critical habitat designation in Oregon. We do not anticipate changes in timber harvest on any of these lands due to an indication by the agency that it does not anticipate revising timber harvest policies on state lands as a result of critical habitat designation.

Identification of Affected Acreage – Private Lands

250. No private lands in Oregon are considered for designation as critical habitat.

¹⁹³ Personal communication with Mike Bordelon, Oregon Department of Forestry, on March 19, 2012.

¹⁹⁴ *Ibid.*

¹⁹⁵ Oregon Department of Forestry, State Forests Division. 2012. Northern Spotted Owl Operational Policies. Effective January 3.

¹⁹⁶ Personal communication with Mike Bordelon, Oregon Department of Forestry, on March 19, 2012.

California

Existing Policies – State Land

251. The California Department of Forestry and Fire Protection (CAL FIRE) manages State forestland for research purposes and to demonstrate different forest management techniques, including demonstrating timber harvests. The forests are used for “experimentation to determine the economic feasibility of artificial reforestation, and to demonstrate the productive and economic possibilities of good forest practices toward maintaining forest crop land in productive condition.”¹⁹⁷ Harvests are regulated by the California Forest Practice Rules, promulgated under the Z’berg-Nejedly Forest Practice Act of 1973, and other applicable laws and regulations.¹⁹⁸ The Forest Practice Rules contain specific provisions for the protection of NSO, described in greater detail later in this Chapter in reference to the management of private timberlands in California.
252. In addition, under State law, a Forest Management Plan (FMP) is developed for each State forest.¹⁹⁹ The Plans are reviewed in a public Board of Forestry and Fire Protection process every five years, and each plan is revised and updated at least every 10 years. Any plan revisions are subject to review under CEQA.
253. California State Parks are managed by the California Department of Parks and Recreation. The Agency’s mission is to “administer, protect, provide for recreational opportunity, and develop the State Park System...”²⁰⁰ We are unaware of any commercial timber harvests in State Parks.

Identification of Affected Acreage and Potential Modifications and Associated Impacts – State Lands

254. The Service proposes to designate as critical habitat 50,762 acres of State Forest land. According to a representative of CAL FIRE, these lands include the Jackson Demonstration State Forest (JDSF) located in Mendocino County.²⁰¹ Representatives of CAL FIRE believe that the Forest Practice Rules are sufficiently protective of NSO.²⁰² Specifically, JDSF is currently managed subject to its 2008 FMP, which underwent extensive review in 2008 through 2011 by a public advisory committee, the Jackson Demonstration State Forest Advisory Group (JAG).²⁰³ According to CAL FIRE,

¹⁹⁷ California Department of Forestry and Fire Protection, “Demonstration Forests,” as viewed at http://www.fire.ca.gov/resource_mgt/resource_mgt_stateforests.php on April 8, 2012.

¹⁹⁸ California Forest Practice Rules, Title 14, California Code of Regulations, Chapters 4, 4.5 and 10.

¹⁹⁹ California Public Resources Code Section 4645 requires the preparation of FMPs. The remaining information in this paragraph is taken from the public comment submitted by the California Department of Forestry and Fire Protection on July 6, 2012, p. 2.

²⁰⁰ California State Parks, *The Seventh Generation: The Strategic Vision of California State Parks 2001*, p. 9, as viewed at <http://www.parks.ca.gov/pages/91/files/seven01.pdf>.

²⁰¹ Personal communication with a representative of the California Department of Forestry and Fire Protection on March 12, 2012 and subsequent email communication on April 5, 2012.

²⁰² Personal communication with a representative of the California Department of Forestry and Fire Protection on March 12, 2012 and subsequent email communication on April 5, 2012.

²⁰³ Public comment submitted by the California Department of Forestry and Fire Protection on July 6, 2012, p. 2-3.

“Large areas within the JDSF have management goals for a forest structure condition that directly benefits [sic] the growth and conservation of nesting, roosting and foraging habitat for the NSO. These land allocations include a requirement for a mix of silvicultural methods and resultant successional stages that range from late seral , older forest, mature and large tree, to mixed age, regeneration and pole-size trees across the forest...Timber harvesting projects throughout JDSF protect old growth aggregations and/or individual old growth trees. In addition, NSO nesting, roosting, and foraging habitat is protected through JDSF’s implementation of most recent ‘Attachment A’ (USFWS 2011 Revision of the Northern Spotted Owl Take Avoidance Analysis and Guidance for California Coast Forests Districts) including its NSO habitat acreage requirements and specific disturbance buffers associated with timber harvest plans, as well as the most current California Forest Practice Rules.”²⁰⁴

255. The State is unlikely to promulgate additional regulations or change current timber management practices based on the designation of critical habitat on State lands.²⁰⁵ Thus, incremental changes in forest harvests on State forest lands are not anticipated.
256. Timber harvests are not anticipated on State Parks land. Furthermore, according to the Proposed Rule, State Park lands are managed consistent with the conservation and recovery needs of the NSO, and the Service proposes to exclude these lands from the final designation. We do not anticipate incremental changes in timber harvest on State Parks land.²⁰⁶

*Existing Policies – Private Lands*²⁰⁷

257. Timber operations on private lands, including timber harvesting for forest products or converting land to another use other than growing and harvesting timber, are also regulated by the State in accordance with the California Forest Practice Rules and other applicable laws and regulations. In order to obtain approval to harvest, landowners generally hire a registered professional forester (RPF) to prepare a Timber Harvesting Plan (THP). THPs are environmental review documents that outline what timber will be harvested, how it will be harvested, and the steps that will be taken to prevent damage to the environment.
258. CAL FIRE reviews THPs under the California Environmental Quality Act (CEQA) as a “lead agency” and trustee of the State’s natural resources.²⁰⁸ As a result of its review,

²⁰⁴ Ibid.

²⁰⁵ Personal communication with a representative of the California Department of Forestry and Fire Protection on March 12, 2012 and subsequent email communication on April 5, 2012.

²⁰⁶ 77 FR 14141.

²⁰⁷ The information in this section was provided by Chris Browder of CAL FIRE during a telephone interview conducted on March 12, 2012 and subsequent email exchanges on April 5 and 6, 2012, unless otherwise noted.

²⁰⁸ CEQA functions similarly to the National Environmental Policy Act (NEPA). It requires State and local agencies (“the lead agency”) to determine whether a proposed project would have a “significant” impact on the environment, and for any such impacts identified, determine whether feasible mitigation measures or feasible alternatives will reduce the impact to a less-than-significant level.

CAL FIRE may recommend changes to the THP so that significant impacts to natural resources, or “take” of Federally-listed species, will be avoided or mitigated.

259. The Forest Practice Rules prohibit CAL FIRE from approving any permit resulting in the “take” of NSO, unless such take is covered under a State or Federal incidental take permit. Historically, to demonstrate that “take” will not occur, project proponents had two options. They either obtained an incidental take permit (ITP) from the Service, which includes developing and implementing an HCP; or they had the Service review the THP and state, in writing, that the plan would likely avoid “take.”²⁰⁹
260. For harvests not covered by an HCP, sections 919.9 and 919.10 of the 2012 California Forest Practice Rules outline procedures for avoiding NSO “take” and the criteria by which the potential for “take” will be evaluated. The Forest Practice Rules define “take” in terms of harm or harassment if feeding, nesting, or sheltering sites are affected. These procedures apply to actions within a Northern Spotted Owl Evaluation Area or within 1.3 miles of a known northern spotted owl activity center outside of a Northern Spotted Owl Evaluation Area. This area is generally synonymous with the range of the NSO in California and encompasses the areas proposed for critical habitat designation in California (see Exhibit 5-4).²¹⁰ Thus, future timber harvesting occurring within the areas proposed for designation will be subject to these regulatory provisions regardless of whether these areas are ultimately designated as Federal critical habitat.
261. We note that approximately 25,431 proposed acres of private land along the border of Sonoma and Napa Counties fall outside the State’s Northern Spotted Owl Evaluation Area (see Exhibit 5-4). These acres are located within subunit ICC-6, and activities on these lands are not subject to an existing HCP or conservation easement. In the proposed rule, the Service states that the expected function of this unit is to support an isolated population, and that approximately 90 percent of the area of the entire subunit was covered by verified spotted owl home ranges at the time of listing.²¹¹ Thus, given the presence of the species, these areas are likely to be subject to the NSO protections provided by the California Forest Practice Rules even though they fall outside the boundaries of the Northern Spotted Owl Evaluation Area.
262. Other than obtaining an ITP from the Service, the procedures outlined in sections 919.9 include provisions for the contents of the THP and the measures taken to avoid or minimize take of the NSO. These provisions include the need to provide detailed maps of owl habitat and survey results, avoidance of nesting habitat (within 500 feet of an activity center), retention of sufficient habitat to support roosting and to provide protection from predation and storms (within 500 to 1,000 feet of an activity center), provision of 500 acres of owl habitat within 0.7 miles of an activity center; provision of 1,336 total acres

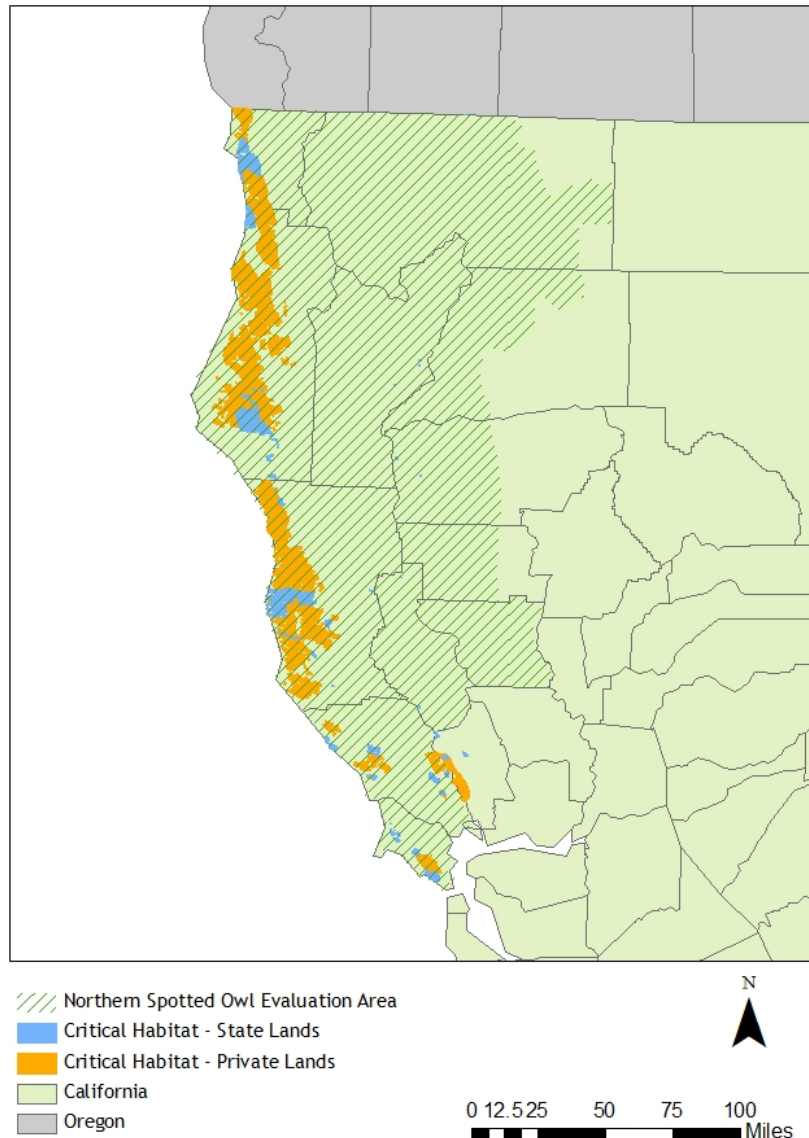
²⁰⁹ A few industrial landowners obtain programmatic approval for multiple projects through an NSO management plan; however, fewer than five such programmatic plans currently exist.

²¹⁰ This conclusion is based on a visual comparison of the proposed critical habitat designation and a map of the NSO Evaluation Area provided by Chris Browder, CAL FIRE, on April 5, 2012.

²¹¹ 77 FR 14123.

of owl habitat within 1.3 miles of each activity center; and timing restrictions on the conduct of timber operations.²¹²

EXHIBIT 5-4. OVERLAP BETWEEN CALIFORNIA'S NSO EVALUATION AREA AND PRIVATE LANDS PROPOSED FOR CRITICAL HABITAT DESIGNATION



Sources:
 1. Environmental Systems Research Institute, Inc. (ESRI).
 2. U.S. Fish and Wildlife Service.
 3. NSO Evaluation Area datalayer provided by Chris Browder, CAL FIRE, via email on April 6, 2011

²¹² California Forest Practices Rules 2012, Title 14 California Code of Regulations, Chapters 4, 4.5, and 10, Article 9, Section 919.9.

263. The Service provides alternative standards to State law for protecting the NSO and encourages project proponents to use its standards instead. These standards vary depending on forest type. One set of standards applies to Coastal redwood forests; a second set applies to Coastal non-redwood forests, the Klamath region, and the Cascades (driest) region. If the Service's standards are applied in the THP, CAL FIRE reviews the THP to ensure that the paperwork is in order and may conduct a field review to ensure that the information contained in the written document is consistent with that found in the plan area.
264. According to CAL FIRE, in the Coastal redwood forests, project proponents tend to follow the Service's standards, which are somewhat more stringent than State standards. The Coast Redwood region is very productive for owls, with smaller home ranges and high densities of owls. In the other areas, more project proponents follow the State standards. Following the State, rather than Service, standards requires more documentation to demonstrate that "take" will be avoided.
265. Finally, during the preparation of the THP, the RPF may certify that owl surveys demonstrated the absence of owls in the areas. At this time, CAL FIRE has no plans to impose new requirements for the protection of NSO under such circumstances. A representative of the agency noted that third-party lawsuits under CEQA are possible; however, predicting the likelihood of such legal action is difficult.

Potential Modifications and Associated Impacts - Private Lands

266. In summary, proposed critical habitat overlaps NSO Special Evaluation Areas defined by the State of California, or is otherwise subject to those rules, and those lands are therefore already subject to significant requirements under the California Forest Practice Rules to protect the owl and its habitat. Given the extensive protection already required by State law and regulation, CAL FIRE is unlikely to impose any new requirements on project proponents if Federal critical habitat is designated in these areas.²¹³ Thus, indirect impacts resulting from changes in State approval of THPs are unlikely.
267. One stakeholder noted the potential need to provide additional documentation under CEQA to demonstrate that a THP will mitigate impacts to Federally-designated critical habitat.²¹⁴ He estimates that the additional administrative burden would, at a minimum, add \$10,000 to \$25,000 in costs and might delay the initiation of harvesting by one to two months, with additional costs, delay, or THP denial possible in some circumstances.²¹⁵ If incurred, such costs would be an incremental effect of the designation.

Identification of Affected Acreage - Private Lands

268. A total of 1,091,743 acres of private land are proposed for designation in California. Of these, activities on 813,102 acres are already covered by approved or proposed HCPs or

²¹³ A representative of CAL FIRE states that because owl densities are relatively high and stable in areas proposed for designation, and so much protection is already occurring in California, it would be difficult to make an argument that an activity was adversely modifying critical habitat.

²¹⁴ Personal communication with Galen Schuler, Green Diamond Resources Company, March 5, 2012.

²¹⁵ Ibid.

SHAs. In addition, 89,400 acres are subject to existing conservation easements. Harvests on the remaining 189,241 acres must comply with the California Forest Practice Rules; CAL FIRE is unlikely to request additional protective measures for habitat beyond those already required by these regulations. Thus, incremental costs are limited to the potential for additional administrative burden under CEQA.

5.2.3 OTHER INDIRECT EFFECTS

269. As described above, a variety of other indirect incremental effects may be experienced by owners of private lands that are designated as critical habitat. Regulatory uncertainty created by the designation of private lands as critical habitat may result in measurable costs if landowners modify their management practices in response. In addition, even if no changes are implemented, the market value of the parcels could be temporarily stigmatized as the public gains a better understanding of the implication of the new designation.

Regulatory Uncertainty

270. The timber industry in the Northwest has experienced a range of new regulations and management policies as a result of Federal species listings and critical habitat designations, among other things. As regulations are modified or expanded over time, landowners may become increasingly wary of the potential for future regulation, or resulting policy decisions, to limit the use of their land for timber harvest. Where information suggests that this type of regulatory uncertainty stemming from the designation may affect a project or economic behavior, associated impacts are considered indirect, incremental impacts of the designation. Examples of the changes to timber harvest practices that private parties have suggested have already occurred, or may occur in the future, as a result of regulatory uncertainty related to the protection of NSO and NSO habitat include:²¹⁶

- Harvesting existing trees as early as is economically feasible to capture their financial value in advance of possible future regulatory limits;
- Maintaining shorter harvest rotations, which results in younger forest stands, thereby ensuring that suitable NSO habitat does not develop on private property and trigger additional regulation; or
- Discontinuing the use of private property for timber production and switching to development or other land uses to protect against future regulation that limits the property's timber production potential.

²¹⁶ We note that pre-emptive efforts to avoid the establishment of forest habitat for another Federally-listed avian species, the re-cockaded woodpecker, have been documented in the peer-reviewed, academic literature. The authors find that as proximity of a timber lot to the species increases, the probability that the lot will be harvested increases and the age of the timber when it is harvested decreases. (Lueck, Dean and Jeffrey A. Michael, April 2003, "Preemptive Habitat Destruction Under the Endangered Species Act," *Journal of Law and Economics*, 46: 27-60.) Furthermore, in public comments on the DEA, several private landowners indicate that they are already taking such action in response to the NSO's listing or may take such action if their lands are designated as critical habitat (see, for example, comments submitted by SDS Lumber Company, dated July 2 (p. 3), 2012; and Rayonier, July 6, 2012 (p. 2)).

271. Given the high degree of uncertainty regarding whether landowners will implement such measures as a result of critical habitat designation, we are unable to quantify likely incremental costs at this time. To the extent private landowners harvest timber earlier or shorten timber rotations, the present value of those timberlands may decrease. However, the total value of the land will not be lost.
272. The degree to which land values may decrease if trees are cut earlier depends on multiple factors, including the economics of when a stand would reach financial maturity and the incremental change in the stand age at the time of harvest. Financial maturity is a function of the time period during which a stand becomes merchantable (i.e., the trees become large enough to enter the market), market conditions (particularly timber and log prices), and landowner discount rates. If a landowner manages his land on a 40-year rotation, the harvested trees are smaller on a relative basis; however, the landowner waits a shorter period to obtain the value of those trees. Managing on a 60-year rotation generally results in more biomass (timber) volume per acre, plus (for mill owners) the ability to produce higher valued premium products from larger logs. However, they incur a longer wait time (time value of money) to obtain those higher returns. Often, landowners make decisions about the optimal time to harvest based on calculations of the present value of their investment.
273. In proposed critical habitat for the NSO, where Douglas fir is likely to be a dominant tree species cultivated for harvest, from a biological standpoint, the mean annual growth rate of the trees are likely to peak at an ages of 70 to 80 years or more.²¹⁷ However, in economic terms, when balancing the preference for larger trees with a preference for dollar returns sooner rather than later, the present value of those trees may peak earlier, 40 to 60 years.²¹⁸ The optimal harvest age varies depending on landowner preferences and market conditions.
274. If, as a result of the regulatory uncertainty created by the designation of critical habitat, some landowners shorten their rotations from 60 to 40 years, the magnitude of their loss is uncertain and will depend on the factors described above. It is possible that some landowners will not experience a loss if the reduction in biomass volumes resulting from earlier harvest is compensated for by earlier returns on their investment. However, it is also possible, given landowners' discount rates, that the present value of the harvest could be incrementally lower.
275. In Washington, if the State regulations change as suggested, it is possible that some acres will no longer be harvestable. Under such circumstances and assuming the land cannot be put to other productive uses, most of its value could be lost. However, as discussed earlier, the likelihood that the State will revise its existing regulations is speculative; thus probabilistic estimates of lost land values are not possible at this time.

²¹⁷ Personal communication with Jeff Jenkins, Atterbury Consultants, Inc., April 20, 2012.

²¹⁸ *Ibid.*

Stigma/Marketability of Private Land

276. In some cases, the public may perceive that critical habitat designation may result in limitations on private property uses above and beyond those associated with anticipated project modifications and regulatory uncertainty described above. Public attitudes about the limits or restrictions that critical habitat may impose can cause real economic effects to property owners, regardless of whether such limits are actually imposed. All else equal, a property that is designated as critical habitat may have a lower market value than an identical property that is not within the boundaries of critical habitat due to perceived limitations or restrictions.²¹⁹ As the public becomes aware of the true regulatory burden imposed by critical habitat (e.g., regulation under section 7 of the Act is unlikely), the impact of the designation on property markets may decrease. If stigma effects on markets were to occur, these impacts would be considered indirect, incremental impacts of the designation.

Development of Habitat Conservation Plans

277. Development and approval of HCPs and/or SHAs may allow a landowner to have some control over the measures that will be employed to protect NSO and its habitat, and some certainty regarding potential future regulation. As a result of the new critical habitat designation for NSO, some landowners may elect to seek approval of an HCP or SHA. Development of such plans results in opportunity costs associated with the use of administrative resources.

Identification of Potentially Affected Acreage

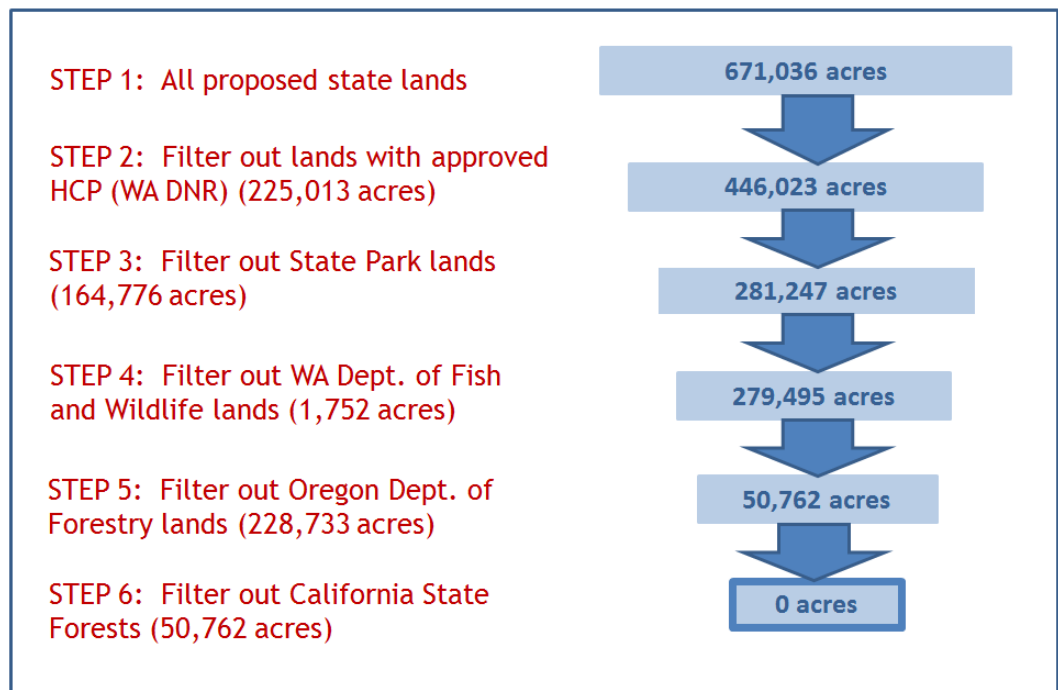
278. We assume that all proposed private lands not covered by an existing HCP, SHA or other Conservation Agreement would be subject to these categories of indirect effects and that timber harvest practices on these lands may be affected as a result of designation. We do not anticipate that State lands would be affected by these types of impacts.

²¹⁹ Several studies have attempted to estimate the impact of perceptions about the effect of critical habitat designation on land values and economic activity. Examples include Auffhammer, M., M. Oren, and D. Sunding. 2009. "Economic Impacts of Critical habitat Designation: Evidence from the Market for Vacant Land." Workshop Paper, The University of Arizona, Program on Economics, Law, and the Environment, available at <http://ele.arizona.edu/files/ELEsunding1-30-09.pdf>; List, J.A., M. Margolis, and D. E. Osgood. 2006. "Is the Endangered Species Act Endangering Species?" National Bureau of Economic Research Working Paper Series, Working Paper 12777, available at <http://www.nber.org/papers/w12777>; and Lueck, Dean and Jeffrey A. Michael, April 2003, "Preemptive Habitat Destruction Under the Endangered Species Act," *Journal of Law and Economics*, 46: 27-60. Furthermore, the Washington Forest Protection Association (WFPA) submitted a public comment stating, "these potential regulatory risks will lower the value of private land that has been federally designated as critical habitat as compared to land that has not been designated as a buyer will not pay as much for designated land because of the potential regulatory risks." In support of this statement, WFPA quotes a member, who stated, "When we do due diligence on potential timberland purchases for our clients or our own account we put zero value on any timber that meets the 'Demographic Support' definition and appears limiting within owl circles. If a tract is all habitat we do not even make an offer." (as cited in the public comment submitted by WFPA, July 6, 2012, p. 2). [Note: the WFPA member appears to be discussing areas identified by the State of Washington as places thought to be occupied by the northern spotted owl, and thus these areas will receive protection regardless of whether critical habitat is designated. However, the quote is indicative of the potential reaction of the organization to designating unoccupied stands as Federal critical habitat.

5.2.4 SUMMARY OF POTENTIALLY AFFECTED STATE AND PRIVATE LANDS

279. Exhibit 5-5 summarizes the process we use to isolate State-owned acres where the designation of critical habitat has the potential to alter timber harvest practices. It is important to note that as we eliminate acres from further consideration in this analysis, these areas may still be subject to harvest restrictions related to State regulations protecting the NSO based on its status as a listed species. Baseline costs are not the focus of this report, and thus these acres are eliminated from further consideration of the incremental project modification costs resulting from critical habitat designation.

EXHIBIT 5-5. POTENTIALLY AFFECTED STATE LANDS



Note:

Total acres differ slightly from the acres presented in the Executive Summary and Chapter 1, which are based on GIS data provided by the Service.

Source: 77 FR 14134, Table 6.

280. Of the 671,036 acres of State lands proposed for designation as critical habitat, 225,013 (34 percent) are already protected by an approved HCP; 164,776 acres (25 percent) are State park lands where timber harvests are not anticipated; and 1,752 acres (less than one percent) are lands managed by the Washington DFW which is preparing an HCP. The remaining 279,495 acres (42 percent) are State forests managed by the Oregon Department of Forestry and CAL FIRE, which have stated that existing regulations provide protection for the NSO.²²⁰ These agencies do not intend to alter timber management practices in response to the designation of critical habitat. Thus, we

²²⁰ Totals may not sum due to rounding.

conclude that timber harvests on State lands are unlikely to be affected by the designation of critical habitat for the NSO.

281. Exhibit 5-6 summarizes the similar process used to identify private lands potentially subject to incremental changes in timber management practices as a result of the designation.

EXHIBIT 5-6. PRIVATE LANDS POTENTIALLY AFFECTED BY CRITICAL HABITAT DESIGNATION



Source: IEc calculations based on GIS data layers provided by the U.S. Fish and Wildlife Service on March 1, 2012. Acreage numbers may differ slightly from those provided in the Proposed Rule due to minor boundary adjustments included within the GIS data used to inform the Economic Analysis.

282. In total, the Service is considering designating critical habitat on 1,269,890 acres of private land in Washington and California. No private land in Oregon is proposed for designation. Activities on 873,621 (69 percent) are subject to existing or proposed HCPs or SHAs. Thus, as described previously, incremental changes in timber management practices on these acres are unlikely. Some minor administrative costs may be incurred by the Service to re-initiate section 7 consultation and consider the potential for the plans or agreements to adversely modify critical habitat. In addition, 89,400 acres (7 percent) are subject to existing conservation agreements; no incremental impacts are anticipated.
283. Indirect incremental impacts are possible on the remaining 306,869 acres (24 percent). These lands include 117,628 acres in Washington and 189,241 acres in California. We assume that faced with regulatory uncertainty, private landowners in both States may harvest their timber as soon as possible (if the stands provide suitable habitat for the species) or shorten their harvest rotations to prevent the stands from becoming suitable habitat. In addition, under our high-end impact scenario, we assume the Washington Forest Practices Board redefines “critical habitat state” to include suitable owl habitat within SOSEAs overlapping Federally-designated critical habitat, diminishing the likelihood that these stands will be harvested.
284. Exhibit 5-7 shows how the potentially affected private lands are distributed across subunits. The majority, 963,021 acres are already protected and therefore may only

experience increased administrative burden, if any costs are incurred at all. Of the 306,869 acres potentially experiencing incremental costs, most (285,154) will only be affected if landowners react to regulatory uncertainty by changing harvest schedule decisions. We make this conclusion because of the 117,628 acres potentially affected acres in Washington, only 21,725 are identified by the State as “suitable” habitat that could be subject to additional State regulation. We also note that this figure is likely overstated because some of these acres may already fall within median home range circles and thus are already subject to the more stringent requirements contemplated in this analysis.

285. Importantly, we note that although likely incremental impacts in approximately $\frac{3}{4}$ of proposed private acres are limited to minor administrative costs, incremental project modifications are possible in all but two of the proposed subunits with private acres. This counter-intuitive finding results from the fact that each subunit includes a mix of private acres with varying levels of potential effects. Exhibits 5-8 through 5-10 illustrates this phenomenon by showing the distribution of private acres in the three subunits in Washington with the most acres potentially subject to new State regulation. In each map, we identify the private lands proposed for critical habitat designation, and color-code each parcel to reflect the nature of potential incremental effects anticipated on that land.²²¹

²²¹ Note that these maps illustrate the type/extent of incremental effects anticipated on each parcel, rather than the relative subunit-wide ranking identified in Exhibit 5-6 (as all three of the depicted subunits have been identified as having a relative effect level of “high”).

EXHIBIT 5-7. POTENTIALLY AFFECTED PRIVATE ACRES BY SUB-UNIT

STATE	SUBUNIT	ACRES PER POTENTIAL EFFECT LEVEL			
		Admin burden only (no change in harvest levels)	Regulatory uncertainty only (moderate changes in harvest levels possible)	New WA regulation (greatest change in harvest levels possible)	TOTAL
WA	ECN 4	10,322	45,009	11,480	66,812
WA	ECN 3	39	17,490	5,046	22,575
WA	ECN 6	15,728	19,962	2,408	38,098
CA	RDC 2	275,132	109,966	-	385,099
WA	WCC 1	32,314	11,457	1,690	45,461
CA	ICC 6	73	40,041	-	40,114
WA	WCC 3	540	221	985	1,746
CA	RDC 5	-	21,392	-	21,392
CA	RDC 4	301	17,774	-	18,075
WA	NCO 1	-	882	56	938
WA	ECN 5	1,381	891	50	2,322
CA	RDC 1	580,454	68	-	580,522
CA	RDC 3	46,541	-	-	46,541
WA	WCC 2	195	-	-	195
TOTAL		963,021	285,154	21,715	1,269,890
Source: IEc calculations described in this Chapter.					

EXHIBIT 5-8. POTENTIAL EFFECTS ON PRIVATE LANDS DUE TO CRITICAL HABITAT DESIGNATION IN ECN-4

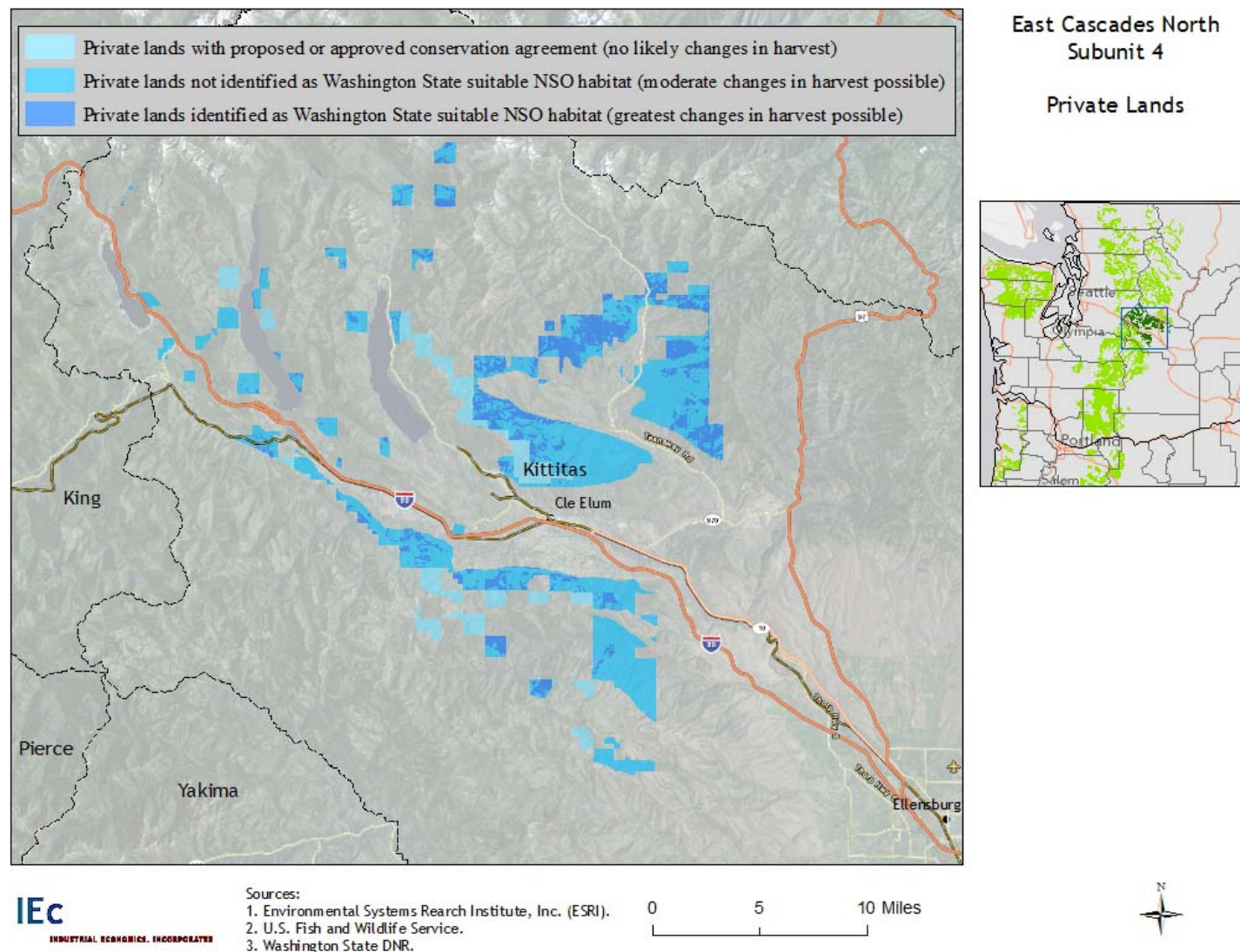


EXHIBIT 5-9. POTENTIAL EFFECTS ON PRIVATE LANDS DUE TO CRITICAL HABITAT DESIGNATION IN ECN-3

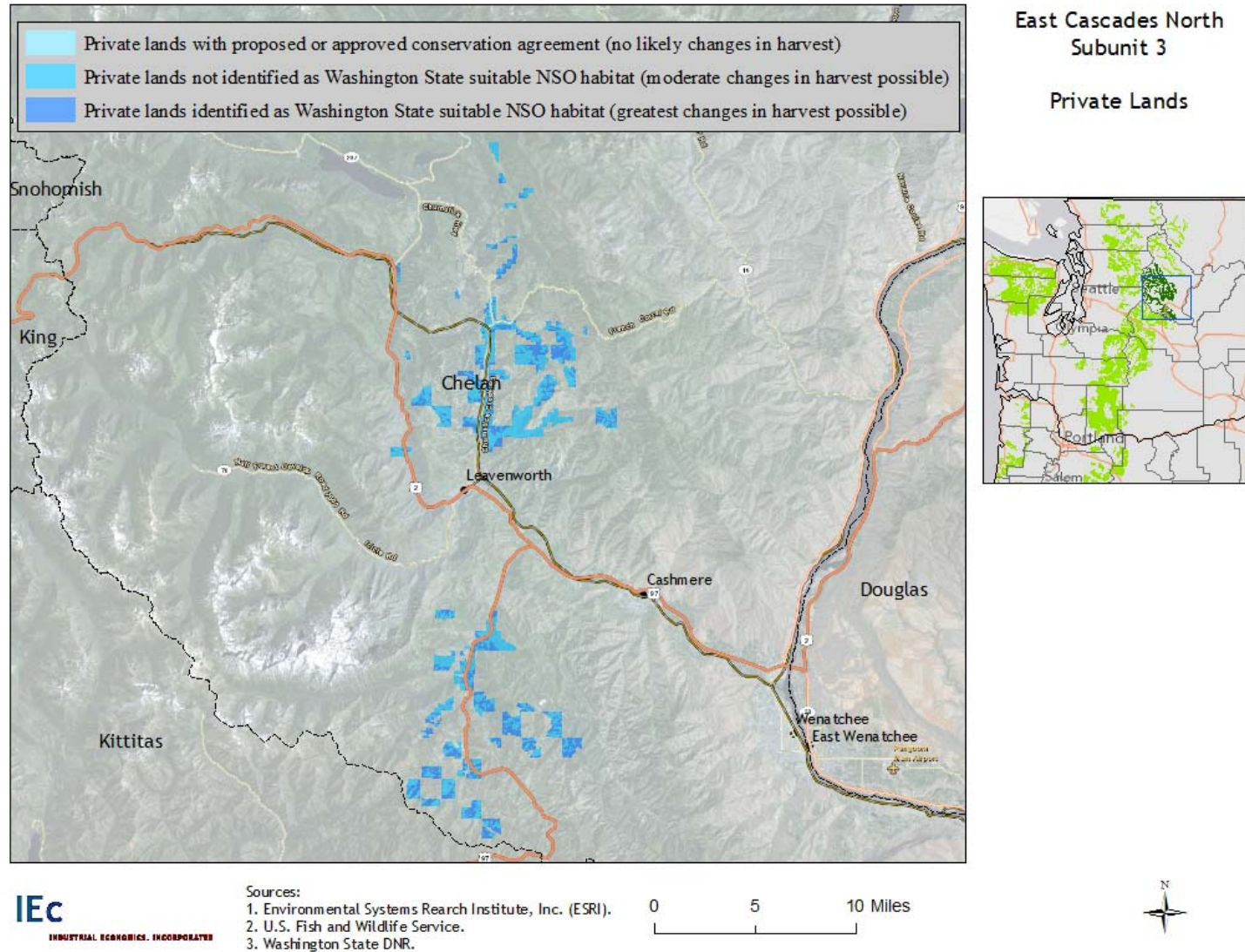
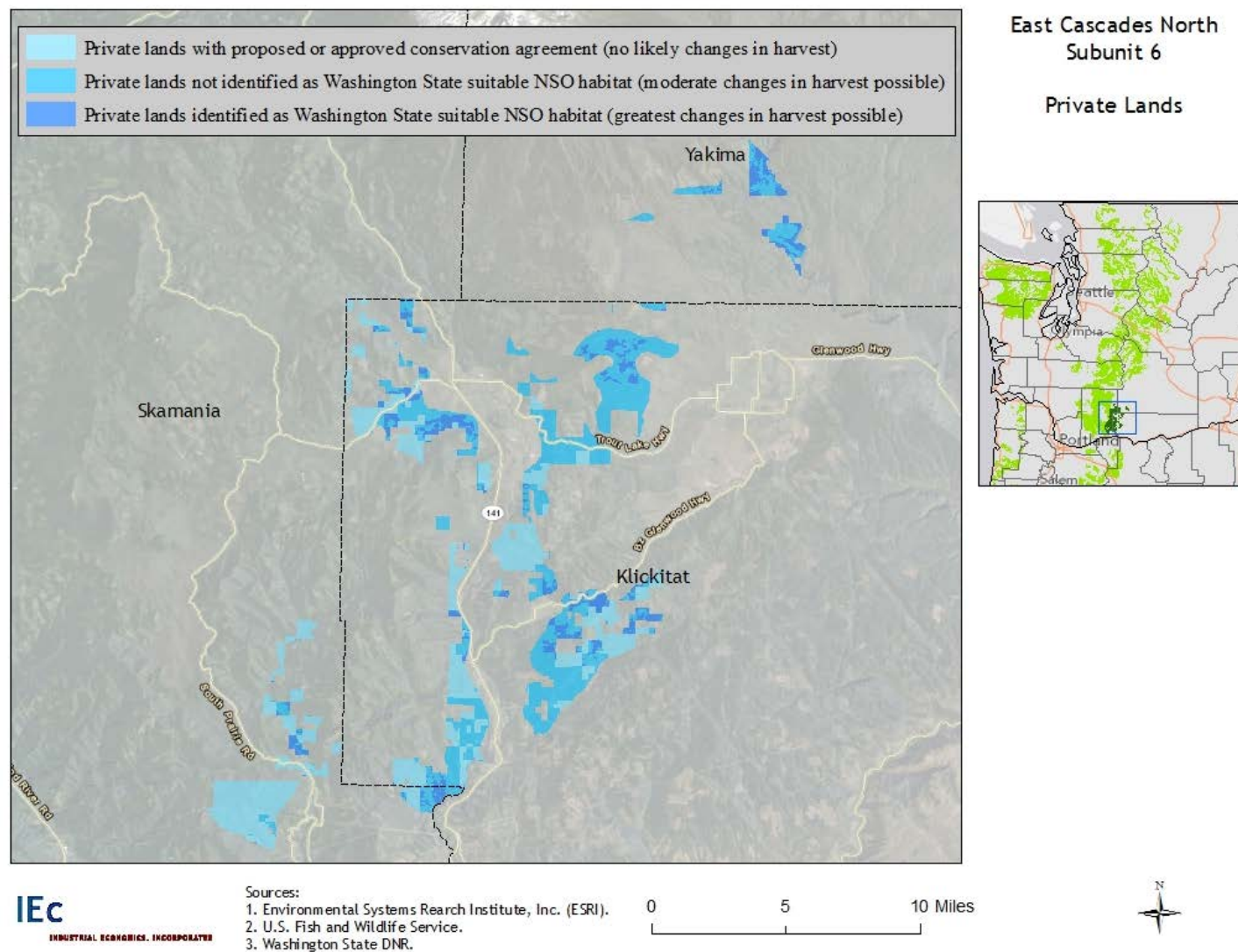


EXHIBIT 5-10. POTENTIAL EFFECTS ON PRIVATE LANDS DUE TO CRITICAL HABITAT DESIGNATION IN ECN-6



5.3 STEP 3 - ESTIMATE THE RELATIVE COSTS OF CHANGES TO TIMBER HARVEST ON PRIVATE LANDS

286. As described above, we identify a total of 306,869 acres of land potentially subject to critical habitat-related indirect impacts resulting from regulatory uncertainty, and of those acres, 117,628 are potentially subject to additional indirect impacts related to possible changes in Washington State Forest Practice Rules. In this section, we describe the data necessary to monetize these potential impacts. First, we describe the costs associated with changing timber rotations. Then, we describe costs associated with foregone harvests on WA lands. Due to data limitations, we conclude with a qualitative discussion of potential impacts.
287. To the extent private landowners harvest timber earlier or shorten timber rotations, the present value of those timberlands may decrease. However, the total value of the land will not be lost. The degree to which land values may decrease if trees are cut earlier depends on multiple factors, including the economics of when a stand would reach financial maturity and the incremental change in the stand age at the time of harvest. Financial maturity is a function of the time period during which a stand becomes merchantable (i.e., the trees become large enough to enter the market), market conditions (particularly timber and log prices), and landowner discount rates. If a landowner manages his land on a 40-year rotation, the harvested trees are smaller on a relative basis; however, the landowner waits a shorter period to obtain the value of those trees. Managing on a 60-year rotation generally results in more biomass (timber) volume per acre, plus (for mill owners) the ability to produce higher valued premium products from larger logs. However, they incur a longer wait time (time value of money) to obtain those higher returns. Often, landowners make decisions about the optimal time to harvest based on calculations of the present value of their investment.
288. In proposed critical habitat for the NSO, where Douglas fir is likely to be a dominant tree species cultivated for harvest, from a biological standpoint, the mean annual growth rate of the trees are likely to peak at an ages of 70 to 80 years or more.²²² However, in economic terms, when balancing the preference for larger trees with a preference for dollar returns sooner rather than later, the present value of those trees may peak earlier, 40 to 60 years.²²³ The optimal harvest age varies depending on landowner preferences and market conditions.
289. If, as a result of the regulatory uncertainty created by the designation of critical habitat, some landowners shorten their rotations from 60 to 40 years, the magnitude of their loss is uncertain and will depend on the factors described above. It is possible that some landowners will not experience a loss if the reduction in biomass volumes resulting from earlier harvest is compensated for by earlier returns on their investment. However, it is

²²² Personal communication with Jeff Jenkins, Atterbury Consultants, Inc., April 20, 2012.

²²³ *Ibid.*

also possible, given landowners' discount rates, that the present value of the harvest could be incrementally lower.

290. In Washington, if the State regulations change as suggested, it is possible that some acres will no longer be harvestable. Under such circumstances and assuming the land cannot be put to other productive uses, most of its value could be lost. However, as discussed earlier, the likelihood that the State will revise its existing regulations is speculative; thus probabilistic estimates of lost land values are not possible at this time.
291. Quantification of the incremental costs of these impacts to private landowners requires detailed data, such as:
 - The likelihood that each landowner will alter current management practices,
 - The characteristics of the stands (type of tree, age, etc.) subject to these management changes,
 - Current and revised harvest schedules (where the effect is to accelerate harvests),
 - Financial models of the change in the present value of existing lands that incorporate information about stumpage prices, stand growth curves, and the opportunity cost of capital to private timber managers; and
 - Information regarding the probability that the Washington Forest Practices Board will undertake regulatory changes.

For example, only a portion of current landowners may determine that the regulatory uncertainty created by the designation provides sufficient incentive to alter existing timber management practices. Furthermore, potential changes to regulations in Washington are speculative. Because the necessary data are not readily available; quantification of potential reductions in timber harvests from private lands and/or incremental reductions in land values is not possible at this time.

292. In Exhibit 5-11, we summarize our conclusions regarding the potential incremental impacts of the proposed designation on harvests on State and private lands. As described earlier in this Chapter, whether the WA Forest Practices Board will change its regulations in response to the designation of Federal critical habitat is speculative. Representatives from the WA DNR identified two possible outcomes, reflected in this summary table.

EXHIBIT 5-11. SUMMARY OF POTENTIAL IMPACTS TO STATE AND PRIVATE TIMBER LANDS

LAND OWNERSHIP	LOW SCENARIO	HIGH SCENARIO
State lands	No impact anticipated.	No impact anticipated.
Private lands	<p>963,021 acres = No impact anticipated beyond minor, increased administrative burden.</p> <p>306,869 acres = Regulatory uncertainty may lead to changes in harvest decisions by private landowners</p>	<p>963,021 acres = No impact anticipated beyond minor, increased administrative burden.</p> <p>285,154 acres = Regulatory uncertainty may lead to changes in harvest decisions by private landowners</p> <p>21,715 acres = Changes in WA regulations may result in reductions in timber harvests</p>
<p>Notes:</p> <ol style="list-style-type: none"> 1. Acreage estimates based on analysis presented in this Chapter. The number of acres potentially affected by new State regulation in WA under the high scenario (21,715) may be overstated because these areas likely include some acres that overlap median home range circles that are already subject to significant baseline protections. 2. Monetization of the potential cost impacts associated with these acres is not possible due to the data limitations described in this Chapter. 		

5.4 KEY SOURCES OF UNCERTAINTY

293. The primary sources of uncertainty in our analysis of the potential for private lands to be subject to incremental changes in timber management practices as a result of the critical habitat designation for the NSO are described below in Exhibit 5-12.

EXHIBIT 5-12. SOURCES AND DIRECTION OF BIAS WITHIN PRIVATE LANDS RANKING ANALYSIS

ASSUMPTION	EFFECT ON IMPACT ESTIMATE
We assume all small-owner parcels are exempt from scenario in which timber harvest on suitable habitat is effectively discontinued due to designation as critical habitat state. However, timber harvest on lands owned by small owners within 0.7 miles of a Site Center generally does not occur, and would likely continue not to occur.	-
Available data largely limits our ability to identify acreage of suitable habitat within SOSEAs to areas that have been surveyed, which are largely within Median Home Range Circles. To the extent that suitable habitat exists outside of the surveyed area, additional lands subject to designation as critical habitat state are not included in our analysis. DNR staff have indicated that suitable habitat outside of designated median home range circles is likely to be extremely limited.	-
Available data to not allow us to identify those private lands within the “best 40 %” of suitable spotted owl habitat that are presently not harvested due to existing regulation. As such, our analysis must assume that suitable habitat that overlaps with the proposed designation and is within SOSEAs is all subject to new harvest restrictions as a result of critical habitat designation when, in fact, some of this land is already, practically-speaking, unharvestable.	+
The effects of potential changes in management on private lands in Washington are four times greater than the effects of regulatory uncertainty.	+/-
Private or State timberland managers in California may experience additional administrative costs to address the impacts of future proposed projects under CEQA.	-
We are unable to predict the likelihood that approved projects in California will be subject to third-party lawsuits under CEQA as a result of critical habitat designation.	-
<u>Notes:</u> - : This assumption may result in an underestimate of actual impacts. + : This assumption may result in an overestimate of actual impacts. +/- : This assumption has an unknown effect on the magnitude of impact estimates.	

CHAPTER 6 | REGIONAL IMPACTS

294. We have identified approximately 1.3 million acres of Federal lands and 307,000 acres of private lands where timber harvest practices may be directly or indirectly affected by the designation. As described in Chapters 4 and 5, we expect that changes in harvest practices resulting from the designation could reduce or increase harvests from portions of these lands, but these changes are unlikely to eliminate the harvests completely. In this chapter, we assess the potential distributional effects of the designation based on historical trends and current economic conditions in the region.

6.1 SOCIOECONOMIC PROFILES OF SUBJECT COUNTIES

295. As described in Chapters 4 and 5, certain subunits contain a higher proportion of lands that are relatively more likely to experience incremental impacts due to the designation of critical habitat. Exhibit 6-1 presents these subunits, along with their respective units and the counties in which they are located (hereafter, “subject counties”).²²⁴ There are 23 subject counties in total (nine in California; nine in Oregon; and five in Washington).

EXHIBIT 6-1. SUBUNITS WITH RESPECTIVE UNITS AND SUBJECT COUNTIES

SUBUNIT	UNIT	COUNTY
ECN-3	East Cascades North	Chelan, WA
ECN-4	East Cascades North	Kittitas, WA
ECN-6	East Cascades North	Klickitat, WA
		Skamania, WA
		Yakima, WA
ECS-3	East Cascades South	Siskiyou, CA
ICC-1	Inner California Coast Ranges	Humboldt, CA
		Shasta, CA
		Tehama, CA
		Trinity, CA
ICC-6	Inner California Coast Ranges	Napa, CA
		Sonoma, CA
ICC-7	Inner California Coast Ranges	Shasta, CA
		Trinity, CA
KLW-7	Klamath West	Del Norte, CA

²²⁴ With regard to private lands, we include subunits with relatively larger amounts of land in Washington potentially susceptible to changes in State regulations as well as subunits in California with a relatively greater number of acres potentially subject to the effects of regulatory uncertainty (see Exhibit 5-7).

SUBUNIT	UNIT	COUNTY
		Humboldt, CA
		Siskiyou, CA
KLW-9	Klamath West	Humboldt, CA
		Trinity, CA
ORC-2	Oregon Coast	Benton, OR
		Lane, OR
		Lincoln, OR
ORC-5	Oregon Coast	Douglas, OR
		Coos, OR
RDC-2	Redwood Coast	Humboldt, CA
		Mendocino, CA
WCS-1	West Cascades South	Clackamas, OR
		Hood River, OR
		Multnomah, OR
WCS-6	West Cascades South	Douglas, OR
		Klamath, OR
		Lane, OR

6.1.1 HARVEST TRENDS

296. Exhibit 6-2 presents timber production data for the subject counties in 2010, along with the percent of harvests from public lands and the percent change in total production (from public and private lands) between 1990 and 2010. In all subject counties, timber harvests declined between 1990 and 2010. The greatest declines occurred in Napa and Del Norte Counties, CA and Kittitas and Yakima Counties, WA, where production declined by over 90 percent during this time period. In 2010, over 50 percent of harvests came from public lands in Chelan and Yakima Counties, WA.
297. In California, timber harvests decreased statewide by 71 percent between 1990 and 2010. Of the nine subject counties, the following five experienced decreases in harvests that exceeded the statewide level: Del Norte, Mendocino, Napa, Sonoma, and Trinity. In 2010, 12 percent of the timber harvested in California came from public lands. In each of the subject counties, the percentage of timber harvested from public lands in 2010 did not exceed 12 percent.

EXHIBIT 6-2. TIMBER PRODUCTION TRENDS IN SUBJECT COUNTIES

COUNTY	TOTAL TIMBER HARVEST 2010 (MBF)	% HARVESTED FROM PUBLIC LANDS*	% CHANGE IN PRODUCTION (1990-2010, PUBLIC AND PRIVATE LANDS)
Del Norte, CA	6,680	0	-96
Humboldt, CA	218,651	0	-65
Mendocino, CA	94,724	0	-77
Napa, CA	0	0	-100
Shasta, CA	151,116	4	-12
Siskiyou, CA	188,750	11	-53
Sonoma, CA	8,902	0	-84
Tehama, CA	53,934	0	-60
Trinity, CA	36,363	1	-84
CA Statewide Total	1,160,588	12	-71
Benton, OR	91,368	20	-27
Clackamas, OR	97,223	18	-49
Coos, OR	233,586	21	-43
Douglas, OR	435,923	14	-56
Hood River, OR	11,083	43	-64
Klamath, OR	94,347	47	-75
Lane, OR	455,146	25	-49
Lincoln, OR	121,445	17	-59
Multnomah, OR	13,916	6	-61
OR Statewide Total	3,226,550	22	-48
Chelan, WA	10,234	71	-89
Kittitas, WA	8,597	48	-95
Klickitat, WA	81,259	5	-36
Skamania, WA	58,841	28	-75
Yakima, WA	13,315	63	-91
WA Statewide Total	2,739,185	33	-53

*Public harvest data for California include harvests from State and County lands in addition to Federal lands. Public harvest data for Oregon include harvests from USFS and BLM lands. Public harvest data for Washington include harvests from USFS, BLM, and other Federal (i.e., military) lands.

Sources: California State Board of Equalization, "California Timber Harvest By County: Year 2010 Quarter 1 to 4." Accessed at <http://www.boe.ca.gov/proptaxes/pdf/ytr362010.pdf>; Oregon Department of Forestry, "Oregon Annual Timber Reports." Accessed at http://www.oregon.gov/ODF/STATE_FORESTS/FRP/annual_reports.shtml; Washington State Department of Natural Resources, "Washington State Timber Harvest." Accessed at http://www.dnr.wa.gov/BusinessPermits/Topics/EconomicReports/Pages/obe_washington_timber_harvest_reports.aspx

298. In Oregon, timber harvests decreased statewide by 48 percent between 1990 and 2010. During the same time period, the following seven subject counties experienced decreases in timber harvests that exceeded the statewide level: Clackamas, Douglas, Hood River, Klamath, Lane, Lincoln, and Multnomah. In 2010, 22 percent of statewide harvests came from public lands. In three of the nine subject counties (Hood River, Klamath, and Lane), the percentage of total harvests coming from public lands exceeded 22 percent.
299. In Washington, timber harvests decreased statewide by 53 percent between 1990 and 2010. Harvests in the following four subject counties decreased by 75 percent or more: Chelan, Kittitas, Skamania, and Yakima. In 2010, 33 percent of statewide harvests came from public lands. In three of the five subject counties (Chelan, Kittitas, and Yakima), public harvests represented greater than 33 percent of total harvests.

6.1.2 EMPLOYMENT TRENDS

300. Exhibit 6-3 illustrates timber industry employment trends in the subject counties. In all but two subject counties (Napa and Tehama Counties, CA), employment in the timber industry decreased between 1989 and 2009. In 2009, timber industry employment represented less than ten percent of total employment in 18 of the 23 subject counties.
301. In California, timber industry employment decreased statewide by 55 percent between 1989 and 2009. During the same time period, seven of the nine subject counties experienced decreases in timber employment that exceeded the statewide level, with the greatest decrease occurring in Del Norte County. The remaining two counties (Napa and Tehama) experienced increases in timber industry employment. In 2009, timber industry employment represented over 10 percent of employment in Tehama and Trinity Counties.
302. In Oregon, timber industry employment decreased statewide by 30 percent between 1989 and 2009. In the subject counties, timber industry employment declined significantly during this period, with the greatest declines occurring in Hood River and Multnomah Counties. In 2009, timber industry employment represented over ten percent of total employment in Douglas and Klamath Counties.
303. In Washington, timber industry employment declined statewide by 51 percent between 1989 and 2009. Timber industry employment declined by 40 percent or more in all five of the subject counties during this period, most significantly in Skamania County. In 2009, timber industry employment represented 14 percent of total employment in Skamania County.

EXHIBIT 6-3. TIMBER INDUSTRY EMPLOYMENT TRENDS IN SUBJECT COUNTIES

COUNTY	ANNUAL INDUSTRY EMPLOYMENT/ PERCENT OF TOTAL EMPLOYMENT			PERCENT GROWTH (1989-2009)
	1989	1999	2009	
Del Norte, CA	519/13	129/3	19/0	-96
Humboldt, CA	4,982/16	4,298/12	1,373/4	-72
Mendocino, CA	2,626/13	2,187/9	870/4	-67
Napa, CA	193/1	256/1	302/1	57
Shasta, CA	2,753/7	1,645/4	933/2	-66
Siskiyou, CA	1,596/18	664/7	508/6	-68
Sonoma, CA	1,927/2	1,522/1	662/0	-66
Tehama, CA	1,492/17	1,847/16	1,878/16	26
Trinity, CA	627/34	234/16	184/12	-71
CA Statewide Total	110,450/1	81,932/1	49,826/0	-55
Benton, OR	1,705/6	1,695/6	619/3	-64
Clackamas, OR	3,902/5	2,416/2	1,404/1	-64
Coos, OR	2,759/14	1,881/11	1,292/8	-53
Douglas, OR	8,768/26	6,185/20	4,690/17	-47
Hood River, OR	532/7	7,606/4	183/2	-66
Klamath, OR	3,779/19	2,002/12	1,876/11	-50
Lane, OR	12,203/11	8,052/7	5,372/5	-56
Lincoln, OR	637/5	993/7	569/4	-11
Multnomah, OR	4,109/1	2,387/1	1,360/0	-67
OR Statewide Total	81,195/7	55,568/4	56,963/4	-30
Chelan, WA	429/2	373/2	258/1	-40
Kittitas, WA	251/5	138/2	129/1	-49
Klickitat, WA	729/25	549/16	255/7	-65
Skamania, WA	604/58	200/17	184/14	-70
Yakima, WA	2,052/4	1,981/3	990/2	-52
WA Statewide Total	56,130/3	45,101/2	27,575/1	-51
Notes: Timber employment is defined as the North American Industry Classification System (NAICS) codes 113 "Forestry and Logging," 321 "Wood Product Manufacturing," and 322 "Paper Manufacturing," 1153 "Support Activities for Forestry," 325191 "Gum and Wood Chemical Manufacturing," 337129 "Wood Television, Radio, and Sewing Machine Cabinet Manufacturing," and 337211 "Wood Office Furniture Manufacturing."				

6.1.3 COUNTY TIMBER REVENUE SHARING PAYMENTS

304. As discussed in Chapter 3, counties each currently receive Federal land payments from a subset of the following four programs: the USFS 25% Fund; the BLM O&C lands payments; PILT; and SRS.²²⁵ For reasons unrelated to proposed critical habitat, the future of the PILT and SRS programs is uncertain. Going forward revenues may come only from the USFS 25% Fund and BLM program, both of which are based on commercial receipts, mainly from timber, generated on Federal lands.
305. Exhibit 6-4 shows Federal payments to the subject counties as percentages of total local government revenue (counties and schools) in FY 2009, demonstrating the relative importance of these funds to county budgets.²²⁶ The percentages are given in ranges: zero to two percent, three to four percent, five to six percent; seven to 13 percent, 14 to 25 percent, and 26 to 50 percent. In general, Federal land payments contributed six percent or less to total government revenues in the majority of the subject counties, with a few notable exceptions.

EXHIBIT 6-4. FEDERAL LAND PAYMENTS TO SUBJECT COUNTIES AS PERCENT OF TOTAL LOCAL GOVERNMENT REVENUE (COUNTIES AND SCHOOLS) IN FY 2009

COUNTY	PAYMENTS AS % TOTAL COUNTY REVENUES (FY 2009)
Del Norte, CA	3-4%
Humboldt, CA	0-2%
Mendocino, CA	0-2%
Napa, CA	N/A*
Shasta, CA	0-2%
Siskiyou, CA	3-4%
Sonoma, CA	N/A*
Tehama, CA	0-2%
Trinity, CA	7-13%
Benton, OR	5-6%
Clackamas, OR	5-6%
Coos, OR	5-6%
Douglas, OR	14-25%
Hood River, OR	5-6%
Klamath, OR	7-13%
Lane, OR	7-13%

²²⁵ Counties have the option of receiving either SRS or 25% Fund/O&C payments, but not both.

²²⁶ Headwaters Economics. December 2010. "County Payments, Jobs, and Forest Health: Ideas for Reforming the Secure Rural Schools and Community Self-Determination Act (SRS) and Payments in Lieu of Taxes (PILT)." White Paper. Accessed at http://headwaterseconomics.org/wp-content/uploads/Reform_County_Payments_WhitePaper_LowRes.pdf.

COUNTY	PAYMENTS AS % TOTAL COUNTY REVENUES (FY 2009)
Lincoln, OR	5-6%
Multnomah, OR	0-2%
Chelan, WA	3-4%
Kittitas, WA	0-2%
Klickitat, WA	0-2%
Skamania, WA	26-50%
Yakima, WA	0-2%
<p>*County is not eligible for Forest Service and BLM Secure Rural Schools payments. Source: Headwaters Economics. December 2010. "County Payments, Jobs, and Forest Health: Ideas for Reforming the Secure Rural Schools and Community Self-Determination Act (SRS) and Payments in Lieu of Taxes (PILT)." White Paper. Accessed at http://headwaterseconomics.org/wphw/wp-content/uploads/Reform_County_Payments_WhitePaper_LowRes.pdf.</p>	

306. In California, payments represented four percent or less of the revenues in all subject counties except for in Trinity County, where they represented between seven and 13 percent of total revenues.
307. In Oregon, payments represented six percent or less of the revenues in all subject counties except for three. In Douglas County, they represented between 14 and 25 percent, and in Klamath and Lane Counties, they represented between seven and 14 percent of total revenues.
308. In Washington, payments represented four percent or less of the revenues in all subject counties except for in Skamania County, where they represented between 26 and 50 percent of total revenues.
309. The future of these payment programs is uncertain and dependent on forces, including Congressional action, unrelated to critical habitat designation. If funding is not appropriated to PILT, and/or SRS is not reauthorized, payments from USFS 25% Fund and the BLM O&C lands become relatively more important. Since payments for these programs are based on commercial receipts, mainly from timber generated on Federal lands, future Federal harvest levels would affect the amount of funds available through these programs.²²⁷
310. In recent years, most counties have opted to receive SRS payments; for example, in FY 2009 all 18 counties in Oregon that contain BLM lands opted to receive SRS payments

²²⁷ As discussed in Chapter 2, payments from PILT and SRS are not as closely linked to fluctuations in timber sales, and these programs are responsible for the largest shares of the four payment programs.

instead of the BLM O&C lands revenue sharing payment.²²⁸ Therefore, it is difficult to quantify the effects that future changes in timber harvests from Federal lands resulting from critical habitat designation would have on counties if SRS and PILT payment programs ended and the counties were forced to rely on revenue sharing payments only.

6.2 SUMMARY OF SOCIOECONOMIC ANALYSIS

311. The above socioeconomic analysis of the subject counties reveals that certain counties may be more sensitive to additional incremental changes in timber harvests, timber-related employment, and Federal land payments.
312. Of the subject counties in California, Del Norte County has experienced the greatest declines in timber harvests, as well as the greatest declines in timber industry employment. Trinity County is relatively more dependent on timber industry employment, which represented over ten percent of total employment in the county in 2009, and on Federal land payments, compared to the other subject counties in California.
313. Of the subject counties in Oregon, Klamath County has experienced the greatest declines in timber harvests. Douglas and Klamath Counties are relatively more dependent on timber industry employment as it represented over ten percent of total employment in each county in 2009. Douglas and Klamath Counties are also relatively more dependent on Federal land payments compared to other subject counties in Oregon.
314. Of the subject counties in Washington, Skamania County has experienced significant declines in timber harvests and timber industry employment and was also the most reliant of all the subject counties on Federal land payments in FY 2009. Skamania was also relatively more dependent on timber industry employment as it represented over ten percent of total employment in the county in 2009.
315. In sum, due to recent socioeconomic trends, the counties presented in Exhibit 6-5 may be more sensitive to future changes in timber harvests, industry employment, and Federal land payments. Timber harvest changes related to critical habitat designation are one potential aspect of this sensitivity.

²²⁸ Headwaters Economics. December 2010. "County Payments, Jobs, and Forest Health: Ideas for Reforming the Secure Rural Schools and Community Self-Determination Act (SRS) and Payments in Lieu of Taxes (PILT)." White Paper. Accessed at http://headwaterseconomics.org/wphw/wp-content/uploads/Reform_County_Payments_WhitePaper_LowRes.pdf.

EXHIBIT 6-5. SUBJECT COUNTIES THAT MAY BE RELATIVELY MORE SENSITIVE TO FUTURE CHANGES IN TIMBER HARVESTS, EMPLOYMENT AND PAYMENTS

COUNTY
Del Norte, CA
Trinity, CA
Douglas, OR
Klamath, OR
Skamania, WA

6.3 DISCUSSION OF POTENTIAL IMPACTS OF CRITICAL HABITAT

316. As discussed in Chapter 3 of this report, myriad forces affect harvest and employment trends in the Pacific Northwest timber industry, including fluctuations in national demand; changes in export markets; changes in timberland ownership; and increasing mechanization and productivity. In evaluating trends in harvests and employment in the subject counties, it is important to remember that timber-related employment includes jobs other than those associated with growing and harvesting timber (for example, wood product manufacturing).^{229,230,231} Therefore, timber-related jobs in a certain county are not necessarily closely correlated with the amount of timber being harvested in that specific county. Jobs in a particular county are likely to be affected by broader, region-wide changes in harvests.
317. It is important to note that although the subject counties—and in particular those listed in Exhibit 6-5—have experienced declines in timber-related employment, the Siskiyou region, which contains all of the California and Oregon counties listed in Exhibit 6-5, has experienced population and employment growth that has outpaced the U.S. as a whole.²³² Although the Siskiyou region still relies on the timber industry to some extent, its economy has diversified significantly away from timber-related manufacturing and into services sectors.²³³ Although the region lost 5,726 timber-related jobs between 1998 and 2007, it added 45,555 new non-timber jobs.²³⁴ Many of these new jobs are associated

²²⁹ Mason, L.C. and B.R. Lippke. 2007. *Jobs, Revenues, and Taxes from Timber Harvest: An Examination of the Forest Industry Contribution to the Washington State Economy*. Working Paper 9: September 2007. Rural Technology Initiative. Accessed at <http://www.ruraltech.org/pubs/working/09/index.asp> on April 6, 2012.

²³⁰ Lippke, B.R. and L.C. Mason. *Implications of Working Forest Impacts on Jobs and Local Economies*. October 24, 2005. Accessed at <https://digital.lib.washington.edu/researchworks/bitstream/handle/1773/2235/tp4.pdf?sequence=1> on April 6, 2012.

²³¹ Power, Thomas M. "Public Timber Supply, Market Adjustments, and Local Economies: Economic Assumptions of the Northwest Forest Plan." *Conservation Biology* 20.2 (2006): 341-50.

²³² Headwaters Economics. 2010. *The Siskiyou Region: Demographic, Economic, and Fiscal Fundamentals*. Accessed at <http://headwaterseconomics.org/land/reports/the-siskiyou-region/> on April 10, 2012.

²³³ *Ibid.*

²³⁴ *Ibid.*

with the services economy, which had been growing nationwide; in 2008, 66 percent of all jobs in the Siskiyou region were considered “services” jobs.²³⁵

318. In general, estimates of the number of jobs created per MMBF of harvest vary depending on the type of harvest and degree of primary and secondary manufacturing considered.²³⁶ A recent report published by the Pacific Northwest Research Station of the USFS states that in Oregon there were 9.4 direct jobs per MMBF of timber harvested in 2010, and 9.9 direct jobs per MMBF in Washington, for a weighted average of 9.61.²³⁷ Other studies focusing on specific geographic regions or earlier time periods estimate a broader range of jobs multipliers, suggesting the number of direct jobs affected in a specific geographic location could be smaller or larger depending on the specific characteristics of the industry in that affected region.²³⁸ Thus, increases or decreases in timber harvests from Federal or private lands could result in positive or negative changes in jobs, respectively.
319. As described in Chapters 4 and 5, the potential impact of the designation of critical habitat on timber harvest levels, and whether that change will be positive or negative, is uncertain. Therefore, how critical habitat designation—and the adoption of ecological forestry practices—may impact the timber industry in terms of future harvest levels, employment, and revenue-sharing payments to counties is also uncertain. Note that the “jobs per unit of timber volume” relationships identified here are static in nature, and would not necessarily be representative of the marginal change in employment associated with the incremental change in timber harvest potentially resulting from critical habitat designation. Furthermore, timber industry employment is affected not only by harvest trends but also by fluctuations in national and international markets; changes in land ownership; and increasing mechanization and productivity in the industry. Please note that the scope of the analysis is limited to the incremental effects of critical habitat related to and within the geographic area of the proposed designation for the NSO. The analysis does not consider potential changes in timber activities on lands outside the proposed

²³⁵ *Ibid.*

²³⁶ In addition to direct timber-related employment, many indirect jobs result from timber harvesting. There are very few recent estimates of indirect jobs created per MMBF of harvest, and estimates vary widely based on the definitions of “direct” versus “indirect” jobs. Thus, we are unable to estimate potential indirect job losses at this time.

²³⁷ Warren, Debra. 2011. *Production, Prices, Employment, and Trade in Northwest Forest Industries, All Quarters 2010*. USDA. http://www.fs.fed.us/pnw/pubs/pnw_rb260.pdf. Note that on page 1 of the report, the USFS states these multipliers are based on 2007 data; however, we believe this to be a typographical error.

²³⁸ The study by Warren (2011) calculates the reported averages for 2010 based on data on total timber harvested and total timber-related jobs in that year. Applying the same methodology and using the historical data provided by USFS in its report, the jobs multiplier has been as high as 12.8 for Washington (2009) and 15.6 for Oregon (2001). A study of the region by Lippke and Mason (2005) provides estimates for the direct and total employment for forest products activity based on a model developed by Richard Conway in 1996. The report estimates 12.34 jobs in the logging, sawn wood, primary wood, secondary wood, and primary paper industries per MMBF harvested. (Lippke, B.R. and L.C. Mason. *Implications of Working Forest Impacts on Jobs and Local Economies*. October 24, 2005. Accessed at <https://digital.lib.washington.edu/researchworks/bitstream/handle/1773/2235/tp4.pdf?sequence=1> on April 6, 2012). In contrast to these multi-State studies, the Oregon Forest Research Institute estimates 17.4 jobs per MMBF in Oregon based on data provided by the Oregon Department of Employment and the Oregon Department of Forestry (Email communication with Michael Haske, U.S. Bureau of Land Management, May 24, 2012.). Adding jobs created through induced effects (e.g., non-timber-related industries supporting workers in the timber industry) would further increase these multipliers.

critical habitat designation. As such, this analysis cannot evaluate the potential effects related to the timber industry as a whole.

320. As described in Chapter 4, the analysis considers three scenarios to provide an illustrative bounding of the uncertainty associated with potential changes in harvests on Federal lands, including:

- **Scenario 1 – Administrative Costs Only.** If minimal or no changes to current management practices are adopted by the action agencies as a result of critical habitat, the incremental impacts of the designation would be predominantly administrative. Such an outcome would be unlikely to affect timber industry employment.
- **Scenario 2 – Positive Economic Impact.** This scenario contemplates that changes in timber management practices as result of critical habitat could yield an increase in harvest levels on federal lands, relative to the baseline. Such an outcome could result in increased employment in the timber industry.
- **Scenario 3 – Negative Economic Impact.** This scenario illustrates impacts attributable to a decline in harvest volumes relative to the baseline. Such an outcome could result in decreased employment in the timber industry.

321. Furthermore, as described in Chapter 5, the analysis considers two scenarios of possible impacts associated with designating private lands, including:

- **Low Scenario – Regulatory uncertainty** may cause private landowners to harvest earlier and/or more frequently. Such changes in timber management could result in near term increases in employment.
- **High Scenario – In addition to the effects of regulatory uncertainty** described in the low scenario, regulatory changes in Washington could result in decreased harvests on some private lands. Such a regulatory change could result in a counterbalancing negative effect on jobs.

322. As discussed above, given the baseline uncertainty associated with the continuance of SRS and PILT payments, we are unable to quantify possible changes in county revenue payments that could result from the critical habitat designation in the absence of these other programs.

6.4 KEY SOURCES OF UNCERTAINTY

323. Exhibit 6-6 summarizes the key sources of uncertainty in our analysis. In each case, we indicate the direction of potential bias associated with our assumptions. A “plus” sign suggests that the assumption may result in an underestimate of actual impacts, while a “minus” sign suggests the opposite. In many cases, the direction of potential bias is unknown.

EXHIBIT 6-6. SOURCES AND DIRECTION OF BIAS WITHIN REGIONAL IMPACT ANALYSIS

ASSUMPTION	EFFECT ON IMPACT ESTIMATE
Employment multipliers may overestimate or underestimate the number of direct jobs associated with timber harvests in any particular county.	+/-
The analysis does not consider effects of critical habitat designation on indirect jobs.	-
The analysis does not analyze the potential for growth in other industries to mitigate the effects of reductions in timber industry employment.	+
Due to uncertainty surrounding the future of the SRS and PILT payment programs, the analysis is unable to predict the effects of future changes in timber harvests on county revenues.	+/-
See Chapters 4 and 5 for the limitations associated with our estimates of the changes in timber harvests. In particular, future decisions by land management agencies concerning their timber harvest practices are uncertain.	+/-
<u>Notes:</u> - : This assumption may result in an underestimate of actual impacts. + : This assumption may result in an overestimate of actual impacts. +/- : This assumption has an unknown effect on the magnitude of impact estimates.	

CHAPTER 7 | POTENTIAL ECONOMIC IMPACTS TO LINEAR PROJECTS

324. Activity related to road and bridge construction and maintenance, and installation and maintenance of power transmission lines and other utility pipelines, (hereafter, “linear projects”) can affect the NSO and its habitat.²³⁹ The primary threats related to these activities are the limited removal of habitat for staging areas during construction or for the roadways, pipelines, or transmission lines themselves.
325. This chapter considers the potential for linear projects to be affected by critical habitat designation for the NSO. It first describes existing baseline protections for the species, including Best Management Practices employed by State Departments of Transportation (DOTs). The chapter then discusses the expected temporal and spatial distribution of linear projects over the next 20 years. Finally, it quantifies potential incremental costs associated with linear projects in critical habitat areas. As described more fully below, given the extent of baseline protections related to NSO conservation, incremental costs attributable to critical habitat are limited to the administrative costs of section 7 consultation on these projects.

7.1 EXISTING BASELINE PROTECTIONS

326. Section 7 of the Act provides baseline protections to the Owl based on the presence of the species, as described in Chapter 2 of this report. This subsection describes typical conservation efforts requested in the section 7 consultation process. In addition to the Act and other Federal and State regulations that provide baseline conservation to the NSO, agencies in charge of transportation and energy transmission projects in each State adhere to Best Management Practices (BMPs) and other guidance in order to prevent or minimize the negative effects of these activities on the NSO.
327. Project proponents are generally aware of the owl’s presence and take precautions in early project design stages to avoid take of the species during activities like linear projects. The Washington Department of Transportation (WSDOT), Oregon Department of Transportation (ODOT), and California Department of Transportation (CalTrans) commonly retain Fish and Wildlife Service staff to serve as liaisons between the Service and State DOTs. FWS liaisons assist DOT staff in early stages of project design, as well as during section 7 consultation, in order to avoid impacts to the species by minimizing tree removal and noise disturbance during project implementation.
328. When conducting road and bridge construction and maintenance projects, the WSDOT employs BMPs to avoid several detrimental impacts of transportation activity. Of

²³⁹ U.S. Fish and Wildlife Service. Proposed Rule to List the Northern Spotted Owl as Endangered. (57 FR 1796) January 15, 1990.

particular concern are noise disturbance and tree removal.²⁴⁰ In order to mitigate such impacts, WSDOT BMPs used in the design of, and after the completion of construction, require compliance with all standards and guidelines of the NWFP and special procedures in Federal areas with listed species or critical habitat present.²⁴¹ Special procedures include minimization of contaminant spills, erosion prevention, and re-vegetation of construction and staging areas.²⁴²

329. ODOT also considers whether listed species or critical habitat are present when developing plans for roadwork. When ESA listed avian species, such as the NSO, are present within or in proximity to a proposed project, ODOT adheres to site specific guidelines that dictate adjustments to the timing of activities, staging locations, and other aspects of projects, which the project proponent must implement during construction to minimize or eliminate incidental take of listed species.²⁴³ CalTrans observes guidelines containing similar management practices to the WSDOT and ODOT BMPs listed above.²⁴⁴
330. In addition to broadly applied guidelines provided in DOT BMPs, past section
331. 7 consultations have outlined a number of conservation measures for transportation and powerline and pipeline activity. These typical baseline conservation efforts requested by the Service during the section 7 consultation process are presented in Exhibit 7-1.
332. Baseline impacts associated with conservation efforts requested during section 7 consultation on linear projects, such as those described in the exhibit, are not quantified in this analysis. Based on these existing protections, however, potential incremental impacts to all linear activity are limited to administrative costs.

²⁴⁰ Personal communication with WSDOT on March 19, 2012.

²⁴¹ WSDOT, Environmental Procedures Manual M 31-11.10. June 2011

²⁴² WSDOT, Maintenance and Operations Division, Best Management Practices Field Guide for ESA § 4 (d) Habitat Protection. March 2004.

²⁴³ ODOT, Endangered Species Act Biological Assessment Guidance Manual. October 2005.

²⁴⁴ Personal communication with official FWS Liaison to CalTrans on March 14, 2012.

**EXHIBIT 7-1. TYPICAL PROJECT MODIFICATIONS REQUESTED DURING NSO CONSULTATION
ASSOCIATED WITH LINEAR PROJECTS**

General

- All staging areas will be reviewed by a biologist to ensure no effects would occur to listed species.
- Only weed-free gravel, fill, quarry, and borrow material will be used for the proposed action.
- All construction equipment will be cleaned before being brought into the action area.
- Strict garbage control measures will be used to prevent the attraction of predators, including corvids.

Scheduling of Blasting and other Noise-Intensive Activity

- Between April 1 and September 15 of any construction year, construction activities that create noise at or above 92 dBA will be restricted to between two hours after sunrise to two hours before sunset.
- All tree-felling (except danger trees) within suitable habitat for the NSO will occur between October 1 and February 28 of any construction year.
- If helicopter use is required, flights to and from the action area will be at least 1,000 feet above the ground.
- Blasting with charges larger than two pounds will not occur during the early breeding seasons for NSO.
- Minimize the effects of blasting during NSO nesting seasons by using customary mitigation techniques, including soil overburden, blasting mats, and minimum weight charges. Consolidate blasting events temporally to the extent practicable with a goal of avoiding several consecutive days of blasting.

Minimize Habitat Removal

- To the extent practicable, choose a linear project alignment that requires felling the least number of large diameter trees. Where trees must be removed, choose those with the lowest likelihood for nest platforms and where adjacent trees provide the least amount of cover to trees with possible nest platforms.
- Employ all protection measures feasible to retain the largest available snags, trees, and down woody debris for the purpose of increasing the quality of nesting, roosting, and foraging habitat.
- Top or high stump danger trees, where feasible, to retain as much structure as possible.
- Prepare a plan to address the removal of trees greater than or equal to 21 inch diameter at breast height (dbh) and logs that would need to be moved for construction activities.
- Construction shall minimize impacts to adjacent late-successional forest habitats by falling trees away from the habitat to the extent practicable.
- Leave in place all merchantable and non-merchantable wood pieces over 20 inches in diameter, whether found or created in the cleared area, or yard them into the intact part of the stand.
- Where possible, place poles instead of towers in the transmission line right-of-way.
- Where possible, maintain a 60 percent canopy closure throughout the hazard-free buffer during hazard tree removal.
- In order to evaluate the effect of buffer creation and maintenance on habitat conservation and development, estimate the level of canopy closure, mean dbh of remaining trees, and down wood coverage in each stand that overlaps the right-of-way, before and after buffer creation, and before and after the first maintenance activity.

Monitoring

- Conduct monitoring and reporting of actions taken. Report the number, species, and dbh of all felled trees over 21 inch dbh. Report any evidence of nesting material observed.
- Report to the extent practicable any non-target “potential nest trees” outside the clearing limit that had nesting structures damaged from tree felling. A description of the non-target tree shall include the species, the dbh, and the extent that nesting structures were lost, if any.
- If blasting was required, report the dates blasting occurred, how many blasts occurred each day, the location of the blast, the size of the charge, the approximate depth the charge was placed, the amount of overburden and/or type of blasting mats used, and any other sound mitigation measures.

Sources: (a) U.S. Fish and Wildlife Service, Biological Opinion Dosewallips Roads Reconstruction (13410-2010-F-0063). June 11, 2012; (b) U.S. Fish and Wildlife Service, Biological Opinion Nisqually Transmission Line Relocation (1-3-04-F-1171).

7.2 FREQUENCY OF FUTURE LINEAR PROJECT ACTIVITY

333. Past consultations on linear activities have primarily included bridge and road construction and maintenance projects. From 1990, when the NSO was listed, to 2008, the Service conducted 593 consultations on transportation projects and 69 on pipelines and powerlines (an annual rate of approximately 33 and four consultations, respectively). More recently, the number of consultations on linear projects has declined. Since 2008, the Service has conducted three section 7 consultation on transportation projects related to the NSO, as presented in Exhibit 4-8. The Service has not completed a consultation on powerlines and pipelines since 2008, however two consultations were initiated in relation to FERC-licensed projects discussed later in this Section.²⁴⁵
334. This analysis does not anticipate incremental impacts to linear project activities beyond administrative costs due to the designation of critical habitat. The Service's Incremental Memorandum states that "at the scale energy-transportation projects are planned, it would be highly unlikely for there to be impacts to spotted owl critical habitat but not to spotted owls ... Therefore, we anticipate consultations will be formal in nature, will require effects on spotted owls to be minimized to the extent possible (thus likely minimizing impacts to critical habitat as well), and ... would have very few incremental effects to the project beyond including an additional adverse-modification analysis in the consultations."
335. In addition, as discussed below, representatives of State DOTs, State energy agencies, FERC, and the Corps generally expect a relatively low level of activity for these projects in proposed critical habitat. Representatives of these agencies also report that incremental project modifications due to critical habitat are extremely rare. State DOTs report that construction of new roadways seldom occurs and the majority of transportation projects are "maintenance related" and are far less disruptive in nature than new road construction activity. State energy agencies identified relatively few transmission line projects in areas containing proposed critical habitat. Based on the historical level of activity and the number of current pending permits/licenses, this analysis anticipates relatively few Corps- and FERC-regulated linear projects.

Transportation

336. Washington Department of Transportation (WSDOT), Oregon Department of Transportation (ODOT), and the California Department of Transportation (CalTrans) permit or conduct all State and county road and bridge construction in Washington, Oregon, and California, respectively. The three agencies generally enter into section 7 consultation with the Service regarding the effects of these projects on listed species and critical habitats. The vast majority of these consultations are expected to be informal, due to their high frequency and repetitive nature.²⁴⁶ Additionally, State DOTs are not

²⁴⁵ Written communication with the Service on May 14, 2012.

²⁴⁶ Personal communication with WSDOT March 19, 2012; personal communication with official FWS Liaison to CalTrans on March 14, 2012.

currently carrying out construction of new roads in the area of proposed critical habitat, so the majority of planned or ongoing projects involve maintenance activities only, which are far less invasive.

337. Using five-year plans from CalTrans and WSDOT, and a programmatic biological assessment carried out by ODOT that estimates the number of ODOT consultations related to the NSO from 2012 to 2015, this analysis forecasts planned or ongoing road and bridge maintenance projects located within proposed critical habitat and describes the geographical and temporal distribution of consultation costs related to these projects within the next four to five years.²⁴⁷ It is expected that one informal consultation will result from each planned or ongoing road or bridge project included in WSDOT's and CalTrans' five-year plans.²⁴⁸ ODOT, in its programmatic biological assessment, anticipates both formal and informal consultations related to road and bridge projects over the next four years between 2012 and 2015. Outside of routine resurfacing and maintenance occurring within the next four to five years, considerable uncertainty surrounds the frequency and location of future DOT construction activity beyond five years due to the recent economic downturn and fluctuations in demand for such projects.²⁴⁹ Therefore, this analysis does not attempt to forecast future projects beyond five years.
338. Over the next four to five years, we estimate a total of 13 formal and 122 informal section 7 consultations associated with road and bridge maintenance projects. Conversations with CalTrans and WSDOT indicate that road construction activity will result in consultation whenever roadways enter proposed critical habitat in Washington and Oregon.²⁵⁰ In California and Washington, we rely on GIS data to determine the number of road crossings in critical habitat and forecast road and bridge construction and maintenance projects based on these figures. In Oregon, the expected number of consultations is based on the conclusions of the programmatic biological assessment, which includes a detailed analysis of the kinds of projects that are likely to occur in proposed critical habitat and specifically those that will require consultation. Although this biological assessment uses the current critical habitat boundaries as a basis for its analysis, representatives from ODOT do not anticipate the frequency or level of effort of consultations to increase significantly due to the inclusion of state and private lands in the proposed critical habitat designation.²⁵¹

²⁴⁷ Personal communication with WSDOT on March 19, 2012; personal communication with official FWS Liaison to CalTrans on March 14 2012; personal communication official FWS Liaison to ODOT on March 12, 2012.

²⁴⁸ Personal communication with WSDOT on March 19, 2012; personal communication with official FWS Liaison to CalTrans on March 14 2012.

²⁴⁹ Personal communication with WSDOT on March 19, 2012; personal communication with official FWS Liaison to CalTrans on March 14 2012; personal communication official FWS Liaison to ODOT on March 12, 2012.

²⁵⁰ Personal communication with WSDOT on March 19, 2012; personal communication with official FWS Liaison to CalTrans on March 14 2012.

²⁵¹ Personal communication official FWS Liaison to ODOT on March 12, 2012.

339. The majority of activity is expected to occur within the East Cascades North Unit, consisting of primarily informal consultations in Washington. This could be a result, in part, of a more complete record of planned WSDOT projects or the large geographic extent of the unit. Exhibit 7-2 describes the distribution of forecast section 7 consultations associated with road and bridge construction projects within the proposed designation.

EXHIBIT 7-2. FORECAST PROJECTS REQUIRING CONSULTATION ASSOCIATED WITH BRIDGE AND ROAD CONSTRUCTION ACTIVITY, 2012-2016

UNIT	PROJECTS REQUIRING FORMAL CONSULTATION IDENTIFIED IN ODOT PROGRAMMATIC BIOLOGICAL ASSESSMENT ¹	PROJECTS REQUIRING INFORMAL CONSULTATION IDENTIFIED BY WSDOT, ODOT, AND CALTRANS	TOTAL PROJECTS RESULTING IN CONSULTATION
North Coast Olympics	1.2	7.2	8.4
Oregon Coast	1.2	2.2	3.4
Redwood Coast	1.2	14.2	15.4
West Cascades North	1.2	6.2	7.4
West Cascades Central	1.2	7.2	8.4
West Cascades South	1.2	2.2	3.4
East Cascades North	1.2	61.2	62.4
East Cascades South	1.2	5.2	6.4
Klamath West	1.2	4.2	5.4
Klamath East	1.2	2.2	3.4
Inner California Coast Ranges	1.2	10.2	11.4
TOTAL	13.2	122.2	135.4
<p>Sources: Written communication with WSDOT on March 28, 2012; written communication with official FWS Liaison to ODOT on March 12, 2012; personal communication with official FWS Liaison to CalTrans on March 14, 2012; CalTrans CTIS Projects and Downloads, accessed at http://www.dot.ca.gov/hq/tpp/offices/osp/ctis_sources_download.html on March 20, 2012.</p> <p>Notes:</p> <p>1. Minimal formal consultations are expected to result from WSDOT and CalTrans road and bridge construction and maintenance projects.</p>			

Utilities

340. Similar to transportation activity, installation, construction, and maintenance of power transmission lines and utility pipelines may affect the Owl and its habitat.²⁵² State energy agencies in Washington, Oregon, and California regulate certain power transmission activities, while the Federal Energy Regulation Commission (FERC) regulates others, including interstate natural gas facilities, non-federal hydropower facilities and related electric transmission lines. In California, the California Energy Commission (CEC) regulates the production and transmission of coal, oil, geothermal,

²⁵² 2011 Proposed Listing and Critical Habitat Rule, 76 FR 61482.

solar thermal, and all other sources of thermal-electric power over 25 megawatts in the State.²⁵³ Oregon's Department of Energy (ODOE) regulates generation and transmission of wind, solar, natural gas, and thermal-electric power.²⁵⁴ Washington's Energy Facility Site Evaluation Council (EFSEC) regulates a wide range of energy generation and transmission, including:²⁵⁵

- Any stationary thermal (non-hydro) power plants with electrical generating capacity of 350 Megawatts or more including associated facilities such as transmission lines in excess of 115 kilovolts; Floating thermal power plants of 100 MW (100,000 kilowatts) or more.
- Wind, Solar, Geothermal, Landfill gas, Wave or tidal action, and Biomass.
- Crude or refined petroleum or liquid petroleum product pipelines larger than 6 inches in diameter and greater than 15 miles in length.
- Natural gas, synthetic fuel, gas, or liquefied petroleum gas pipelines larger than 14 inches in diameter and greater than 15 miles in length (intrastate only).
- Electrical transmission facilities in a national interest electric transmission corridor.
- Electrical transmission facilities for which an applicant chooses to receive certification under EFSEC, and the facility is:
 - Greater than 115 kilovolts and located outside an electrical transmission corridor; or
 - At least 115 kilovolts and located in a new corridor or located in more than one jurisdiction that has promulgated land use plans and zoning ordinances.

341. EFSEC identified three planned or ongoing energy transmission projects in the vicinity of NSO proposed critical habitat in Washington; however, none of these projects are expected to result in a section 7 consultation as they all occur outside of proposed critical habitat boundaries. The projects include:²⁵⁶

- The I-5 Corridor Reinforcement Project in Multnomah County, Oregon and Clark County, Washington;
- The Big Eddy-Knight Transmission Project in Wasco County, Oregon and Klickitat County, Washington; and

²⁵³ Personal communication with CEC on March 12, 2012.

²⁵⁴ Personal communication with ODOE on March 12, 2012.

²⁵⁵ Energy Facility Site Evaluation Council, Siting/Review Process, accessed at <http://www.efsec.wa.gov/cert.shtml#EnergyFacility> on April 5, 2012.

²⁵⁶ Energy Facility Site Evaluation Council, Siting/Review Process, accessed at <http://www.efsec.wa.gov/cert.shtml#EnergyFacility> on April 5, 2012.

- Central Ferry-Lower Monumental Transmission Line Project in Columbia, Walla Walla, Franklin, Whitman, and Garfield Counties, Washington.

342. Outside of the I-5 Corridor Reinforcement Project and the Big Eddy-Knight Transmission Project mentioned above, which overlap lands in both Oregon and Washington, officials at ODOE identified only one other project with the potential to incur impacts from NSO critical habitat designation in Oregon.²⁵⁷ ODOE, along with the USFS and the BLM are currently reviewing Portland General Electric's application for the Cascade Crossing Transmission Line Project (Cascade Crossing Project), which overlaps eight counties in Oregon, including Linn, Marion, Clackamas, Jefferson, Wasco, Sherman, Gilliam, and Morrow Counties.²⁵⁸ The project proposes to cross critical habitat subunits ECN7, WCS1, WCS2, and WCS3. The proposed transmission line will cross Federal, tribal, state, and private lands and requires a site certificate from the Energy Facility Siting Council (EFSC), as well. In addition to the EFSC site certificate, the project requires an EIS under the NEPA. The NEPA process is required for any proposed action on Federally-managed lands. The new line would cross 64 percent privately-owned lands, 20 percent lands managed by Federal agencies, 14 percent tribal lands on the Warm Springs Reservation of Oregon and two percent state or municipal lands.²⁵⁹ The project consists of installation of approximately 215 miles of 500-kilovolt transmission line running from Boardman to Salem, Oregon. Pacific General Electric would also construct four new power substations and upgrade existing ones. Operations are expected to begin by 2017.²⁶⁰ Because the Cascade Crossing Project action area directly overlaps portions of critical habitat, we anticipate the need for one incremental formal section 7 consultation upon finalization of critical habitat related to this project. As previously stated, linear projects are not expected to incur incremental project modifications.
343. According to the CEC, no projects are currently ongoing or in the planning stages in California counties containing proposed critical habitat.²⁶¹
344. FERC-licensed linear projects include interstate natural gas pipelines and primary electric transmission lines associated with non-federal hydroelectric projects.²⁶² FERC is currently considering applications for two projects in counties containing proposed critical habitat.²⁶³ These projects include the Pacific Connector Gas Pipeline and the

²⁵⁷ Personal communication with ODOE March 12, 2012.

²⁵⁸ Cascade Crossing Project, accessed at <http://www.cascadecrossingproject.com/pge.aspx> on April 5, 2012.

²⁵⁹ ODOE, Energy Facility Siting: Cascade Crossing Transmission Line Project, accessed at <http://oregon.gov/ENERGY/SITING/CCTx.shtml> on April 5, 2012.

²⁶⁰ Cascade Crossing Project, accessed at <http://www.cascadecrossingproject.com/pge.aspx> on April 5, 2012.

²⁶¹ Personal communication with CEC on March 12, 2012.

²⁶² FERC-Regulated Industries, Project Siting, accessed at <http://www.ferc.gov/industries/electric/indus-act/siting.asp> on April 5, 2012.

²⁶³ FERC "Approved Pipeline Projects, 2003 to the Present," accessed at <http://www.ferc.gov/industries/gas/indus-act/pipelines/approved-projects.asp> on April 1, 2012; FERC Pending Natural Gas Pipelines National Outlook, accessed at

Oregon Pipeline Company Project, both of which are located in Oregon.^{264,265} More detailed geographic information on the projects' action areas was not readily available for comparison with proposed critical habitat boundaries. Therefore, this analysis makes the conservative assumption that the two known FERC-licensed or pending projects in counties containing critical habitat will each require one formal section 7 consultation when critical habitat is finalized. No incremental project modification impacts are anticipated related to FERC-licensed projects.

345. Historically, since 2003, FERC has approved 21 utility line projects in California, Washington, and Oregon counties containing proposed critical habitat.²⁶⁶ Future FERC utility line construction activities, however, are closely linked to the demand for transportation and storage of natural gas and hydroelectric electricity, which is in turn closely linked to the demand for these forms of energy. Consequently, considerable uncertainty surrounds the future level of construction of natural gas pipelines and electric transmission lines as significant uncertainty exists related to the level of demand for natural gas and electricity from hydropower sources.²⁶⁷
346. Due to this uncertainty, this analysis does not attempt to forecast activity associated with the construction of new natural gas pipelines and storage facilities or transmission lines related to hydro-power generation based on historical activity levels within the proposed critical habitat area in the foreseeable future. The analysis does, however, forecast maintenance projects permitted by the Army Corps of Engineers (the Corps) related to existing natural gas pipelines and electricity lines based on historical frequency, which occur more consistently than the construction of new linear projects.
347. As stated, utility line projects may also be subject to the Corps' permitting requirements under section 404 of the CWA. Between 1992 and 2012, the Corps' Seattle District has permitted 111 pipeline and transmission line maintenance projects in areas proposed for critical habitat in Washington, or roughly six per year.²⁶⁸ Since 2006, throughout Oregon the Corps' Portland District has permitted 27 pipeline and transmission line maintenance projects related to NSO, at an annual rate of 4.5 projects.²⁶⁹ Based on conversations with officials at the Corps, the past level of activity shown in this historical data is likely representative of future levels of activity in areas proposed for critical habitat.²⁷⁰ The analysis uses the historical permitting levels as a basis for forecasting future Corps pipeline and transmission line maintenance projects. Historical data on the number of

²⁶⁴ FERC "Approved Pipeline Projects, 2003 to the Present," accessed at <http://www.ferc.gov/industries/gas/industry/pipelines/approved-projects.asp> on April 1, 2012.

²⁶⁵ Written communication with the Service on May 14, 2012.

²⁶⁶ FERC "Approved Pipeline Projects, 2003 to the Present," accessed at <http://www.ferc.gov/industries/gas/industry/pipelines/approved-projects.asp> on April 1, 2012.

²⁶⁷ Personal communication with Energy Industry Analyst, FERC, November 16, 2011.

²⁶⁸ Written communication with the Corps' Seattle District on April 3, 2012.

²⁶⁹ Written communication with the Corps' Portland District on April 20, 2012.

²⁷⁰ Written communication with the Corps' Portland District on April 20, 2012; written communication with the Corps' Seattle District on April 3, 2012.

projects permitted within proposed critical habitat in California was not readily available from the Corps' Sacramento District. Exhibit 7-3 presents forecast Corps-permitted projects by unit based on historical frequency.

EXHIBIT 7-3. ARMY CORPS UTILITY LINE PROJECTS, TRANSPORTATION CROSSINGS, AND OTHER MAINTENANCE PROJECTS EXPECTED OVER THE NEXT 20 YEARS

UNIT	NUMBER OF PROJECTS	EXPECTED CONSULTATION TYPE
North Coast Olympics	32.8	Formal
Oregon Coast	10.8	Formal
Redwood Coast	10.8	Formal
West Cascades North	29	Formal
West Cascades Central	12	Formal
West Cascades South	10.8	Formal
East Cascades North	58.8	Formal
East Cascades South	10.8	Formal
Klamath West	10.8	Formal
Klamath East	10.8	Formal
Inner California Coast Ranges	-	-
Source: Operations & Maintenance Business Information Link (OMBIL) Regulatory Module version 2 (ORM2). Received from U.S. Army Corps of Engineers, Seattle District on April 3, 2012; Operations & Maintenance Business Information Link (OMBIL) Regulatory Module version 2 (ORM2), received from U.S. Army Corp of Engineers, Portland District on April 20, 2012. Note: information on past permitted projects in California was not readily available from the Corps Sacramento District.		

348. Exhibit 7-4 presents all forecast projects that are expected to result in formal and informal consultations during the timeframe of this analysis by activity, lead agency, and state. Due to uncertainty surrounding activity forecasts beyond four or five years for DOT projects, as discussed earlier in this Section, the analysis considers DOT projects in a temporal scope of four to five years. Additionally, because the analysis only includes known planned projects regulated by FERC and State energy agencies, consultations associated with these projects are considered to be one-time costs expected to occur when critical habitat is designated.

EXHIBIT 7-4. FORECAST LINEAR PROJECTS BY ACTIVITY, LEAD AGENCY, STATE, CONSULTATION TYPE, AND TIMEFRAME

ACTIVITY	LEAD AGENCY	STATE	FORMAL CONSULTATIONS	INFORMAL CONSULTATIONS	TOTAL CONSULTATIONS	TIMEFRAME
Transportation	WSDOT	WA	0.0	73.0	73.0	Five Years
	ODOT	OR	13.2	24.2	37.4	Four Years
	CalTrans	CA	0.0	25.0	25.0	Five Years
Army Corps Permitted Projects	USACE	WA	111.0	0.0	111.0	20 Years
		OR	63.3	23.3	86.7	20 Years
		CA	-	-	-	20 Years
Pipelines	FERC	WA	0.0	0.0	0.0	One-Time Cost
		OR	2.0	0.0	2.0	One-Time Cost
		CA	0.0	0.0	0.0	One-Time Cost
	State Energy Agencies	WA	0.0	0.0	0.0	One-Time Cost
		OR	1.0	0.0	1.0	One-Time Cost
		CA	0.0	0.0	0.0	One-Time Cost
Transmission Lines	FERC	WA	-	-	-	One-Time Cost
		OR	-	-	-	One-Time Cost
		CA	-	-	-	One-Time Cost
	State Energy Agencies	WA	0.0	0.0	0.0	One-Time Cost
		OR	0.0	0.0	0.0	One-Time Cost
		CA	0.0	0.0	0.0	One-Time Cost
Total	-	-	190.5	145.5	336.1	-
<u>Note:</u> Totals may not sum due to rounding.						

7.3 SUMMARY OF ADMINISTRATIVE COSTS

349. Based on this review, we estimate administrative costs associated with 191 formal and 146 informal consultations expected to occur over the next 20 years. These results are presented on an annualized basis due to differences in planning horizons by the action agencies, as described above. This analysis is limited by uncertainty surrounding activity forecasts beyond four or five years for transportations projects. All potential conservation efforts associated with linear projects are expected to result from the presence of the NSO, not the designation of critical habitat, and are thus considered baseline impacts. Exhibit 7-5 presents administrative cost information by proposed critical habitat unit.²⁷¹ The administrative costs represent additional hours spent by Federal agency staff and the Service to consider critical habitat during section 7

²⁷¹ As noted previously, and in part because the linear projects as considered in this critical habitat are likely to be on a large scale, it is likely that at some point in their length some portion of the project will pass through occupied critical habitat. Since consultation on these projects occur at the scale of the entire project, consultation would be triggered on these projects under the jeopardy standard. The incremental impact of critical habitat would thus be limited to the minimal administrative costs of the additional consultation under the adverse modification standard. Given the scale of these projects, the Service finds it highly unlikely that any such project would pass entirely through unoccupied northern spotted owl critical habitat, thus resulting in increased incremental impacts.

consultation. According to the Incremental Effects Memorandum provided by the Service, consideration of critical habitat during consultation is likely to result in four to six additional person-hours across all Federal staff working on these consultations. Applying government GS-level 11 or 12 labor rates to the estimate of four to six additional hours spent per consultation, results in a range costs of \$277 to \$498 per consultation.²⁷² Applying this range of costs to the 191 formal and 146 informal consultations on forecast linear projects results in administrative costs ranging from \$10,800 to \$19,500 on an annualized basis, assuming a seven percent discount rate, and \$10,800 to \$19,400, assuming a three percent discount rate. Due to variation in the temporal scope across data sources, impacts to ODOT projects are annualized over four years, impacts to WSDOT and CalTrans projects are annualized over five years, and impacts to Corps-permitted utility line projects and projects regulated by FERC State energy agencies are annualized over 20 years. Chapter 2 contains additional information on the cost model underlying these administrative impacts.

EXHIBIT 7-5. SUMMARY OF INCREMENTAL IMPACTS TO LINEAR PROJECTS BY UNIT, 2012-2031 (\$2011)

UNIT NAME	INCREMENTAL IMPACTS			
	ANNUALIZED (7 PERCENT)		ANNUALIZED (3 PERCENT)	
	LOW	HIGH	LOW	HIGH
North Coast Olympics	\$1,060	\$1,910	\$1,060	\$1,910
Oregon Coast	\$480	\$863	\$478	\$860
Redwood Coast	\$1,150	\$2,060	\$1,140	\$2,060
West Cascades North	\$623	\$1,120	\$623	\$1,120
West Cascades Central	\$443	\$797	\$443	\$797
West Cascades South	\$492	\$885	\$488	\$876
East Cascades North	\$4,430	\$7,960	\$4,420	\$7,950
East Cascades South	\$646	\$1,160	\$645	\$1,160
Klamath West	\$591	\$1,060	\$589	\$1,060
Klamath East	\$480	\$863	\$478	\$860
Inner California Coast Ranges	\$443	\$797	\$443	\$797
TOTAL	\$10,800	\$19,500	\$10,800	\$19,400
Notes: Totals may not sum due to rounding.				

²⁷² All calculations use the hourly rates as calculated by the Office of Personnel Management (http://www.opm.gov/oca/12tables/html/gs_h.asp). Accessed on February 21, 2012.

CHAPTER 8 | POTENTIAL ECONOMIC BENEFITS

350. The previous chapters of this report evaluate the potential project modifications and associated economic impacts that may be generated by the designation of critical habitat for the NSO. Most significantly, we estimate the potential positive or negative changes in timber harvests that could result from the proposed rule. Potential beneficial changes in harvest levels are quantified in Chapter 4 of this report.
351. This chapter contemplates other potential economic benefits resulting from possible conservation efforts. First, we introduce economic methods employed to quantify benefits of species and habitat conservation, and discuss the availability of existing literature to support valuation in the context of this rulemaking. We then provide a qualitative description of the potential categories of ancillary benefits that may result from the designation, and identify the units where such benefits may be generated.

KEY ISSUES AND CONCLUSIONS:

- The primary goal of critical habitat designation for the NSO is to support its long-term conservation. Conservation and recovery of the species may result in benefits, including use benefits (wildlife-viewing), non-use benefits (existence values), and ancillary ecosystem service benefits (e.g., public safety benefits of reduced wildfire risks). Potential increases in timber harvests are quantified in Chapter 4 of this report.
- The extent to which critical habitat designation for the NSO may improve the species' population is unknown. That is, information is not available on the potential percent increase in NSO populations, or the incremental change in the probability of recovery, generated by the incremental conservation efforts described in this analysis.
- Absent information on the incremental change in owl populations or recovery potential associated with this rulemaking, we are unable to monetize associated incremental use and non-use benefits economic benefits. However, this chapter summarizes available information on use and non-use values of the NSO from existing studies. These studies evaluate the benefits of conserving the NSO and its old-growth habitat (or the habitat of the closely-related Mexican spotted owl) using the contingent valuation method to elicit the public's willingness to pay.
- This Chapter also qualitatively discusses the potential ancillary ecosystem service benefits, such as water quality improvements and public safety that may be generated by NSO conservation efforts described in Chapters 4 through 7 of this report.

8.1 ESTIMATING CONSERVATION BENEFITS

352. The primary intended benefit of critical habitat is to support the conservation of threatened and endangered species, such as NSO. Thus, attempts to develop monetary estimates of the benefits of this proposed critical habitat designation would focus on the public's willingness to pay to achieve the conservation benefits to NSO resulting from this designation.
353. Quantification and monetization of species conservation benefits requires two primary pieces of information: (1) data on the incremental change in the probability of NSO conservation that is expected to result from the designation; and (2) data on the public's willingness to pay for this incremental change. Neither data element is readily available for this analysis. Specifically, the statutory provisions for identifying critical habitat do not require, nor do any available models allow, the Service to utilize this process to predict either the future owl productivity as a result of this designation, or an economic value that can be readily assigned to the benefits of such designation. Thus, we do not quantify or monetize the conservation benefits of this proposed rule.
354. The proposed critical habitat designation is the result of extensive modeling effort, including evaluating and discarding numerous habitat network scenarios based on the Service's criteria for determining the relatively most efficient network of habitat that simultaneously prioritized Federal lands and best met the recovery goals for the species. The proposed critical habitat is the result of that process, and as described in the proposed rule and the Service's supporting documentation (Dunk et al. 2012), represents the configuration of habitat that demonstrated the greatest likelihood of achieving population goals such as increasing population trend in the maximum number of recovery units.²⁷³
355. Determining the incremental effect of critical habitat on owl conservation, however, is a very complicated exercise, and the Service does not have a model that can perform such an analysis. Such an evaluation would require the ability to isolate and quantify the effect of the designated critical habitat separately from all other ongoing or planned conservation efforts for the NSO, such as the potential removal of barred owls from spotted owl habitat, or the voluntary implementation of any of the numerous recovery actions recommended in the Revised Recovery Plan (such as Recovery Action 10). Thus the Service can make qualitative statements about the benefit of critical habitat to NSO, based on the modeling results as summarized above. The Service does not, however, have data of sufficient precision that would allow it to tease out and quantify the incremental effect of the proposed designation from numerous other recovery actions that may likewise manifest in positive conservation outcomes for the owl.
356. Furthermore, while a number of published studies estimate the value the public places on protecting the NSO, none of these studies specifically estimates the value of the types of

²⁷³ Dunk, J.R., Woodbridge, B., D. LaPlante, N. Schumaker, B. Glenn, B. White, S. Livingston, M.M. Zwartjes, J. Peters, K. Halupka, and J. Caicco. 2012. Modeling and Analysis Procedures used to Identify and Evaluate Potential Critical Habitat Networks for the Northern Spotted Owl. Unpublished report, U.S. Fish & Wildlife Service, Portland, OR. February 28, 2012. 48 pp.

incremental changes in conservation probability that could result from the designation. Rather, in general, existing studies value programs to ensure the species' survival or that it will not go extinct. Thus, even if information about the incremental change in conservation probability were available, monetary estimates of the value of this change are not possible at this time.

357. In the remainder of this section, we provide a more detailed description of the economic techniques that economists would employ to monetize these types of conservation benefits. We also present a brief review of the existing literature valuing NSO protection. These studies provide evidence that the public may have a positive value for efforts that will increase the conservation probability of the species. However, for the reasons described above, they cannot be applied to estimate the incremental changes resulting from critical habitat designation.

8.1.1 ECONOMIC METHODS USED TO VALUE USE AND NON-USE VALUES OF SPECIES AND HABITAT CONSERVATION

358. The primary intended benefit of listing a species and designating its critical habitat is to ensure the long-term conservation of the species.²⁷⁴ Various economic benefits, measured in terms of social welfare or regional economic performance, may result from conservation efforts. The benefits can be placed into two broad categories: (1) those associated with the primary goal of species conservation (i.e. direct benefits), and (2) those additional beneficial services that derive from the conservation efforts but are not the purpose of the Act (i.e., ancillary benefits, such as decreased wildfire threat).
359. Because the purpose of the Act is to provide for the conservation of endangered and threatened species, the benefits of actions taken under the Act are often measured in terms of the value placed by the public on species preservation (e.g., avoidance of extinction, and/or increase in a species' population). Such social welfare values for a species may reflect both use and non-use values for the species. Use values derive from a direct use for a species, such as commercial harvesting or recreational wildlife-viewing opportunities. Non-use values are not derived from direct use of the species, but instead reflect the utility the public derives from knowledge that a species continues to exist (e.g., existence or bequest values).
360. As a result of actions taken to preserve endangered and threatened species, such as habitat management, various other benefits may accrue to the public. Conservation efforts may result in improved environmental quality, which in turn may have collateral human health or recreational use benefits. In addition, conservation efforts undertaken for the benefit of a threatened or endangered species may enhance shared habitat for other wildlife. Such benefits may result from modifications to projects, or may be collateral to such actions. For example, critical habitat designation may change timber harvest practices so as to

²⁷⁴ The term "conservation" means "the use of all methods and procedures which are necessary to bring any endangered species or threatened species to the point at which the measures provided pursuant to this Act are no longer necessary" (16 U.S.C. 1532).

increase the resiliency of the forest stands. This in turn improves the ability of the forests to survive wildfire, droughts, and insect threats.

361. Economists apply a variety of methodological approaches in estimating both use and non-use values for species and for habitat improvements, including stated preference and revealed preference methods. Stated preference techniques include such tools as the contingent valuation method, conjoint analysis, or contingent ranking methods. In simplest terms, these methods employ survey techniques, asking respondents to state what they would be willing to pay for a resource or for programs designed to protect that resource. A substantial body of literature has developed that describes the application of this technique to the valuation of natural resource assets.
362. More specific to use values for species or habitats, revealed preference techniques examine individuals' behavior in markets in response to changes in environmental or other amenities (i.e., people "reveal" their value by their behavior). For example, travel cost models are frequently applied to value access to recreational opportunities, as well as to value changes in the quality and characteristics of these opportunities. Basic travel cost models are rooted in the idea that the value of a recreational resource can be estimated by analyzing the travel and time costs incurred by individuals visiting the site. Another revealed preference technique is hedonic analysis, which is often employed to determine the effect of site-specific characteristics on property values.

8.1.2 LIMITS TO QUANTIFYING THE EFFECT OF CRITICAL HABITAT DESIGNATION ON OWL POPULATION

363. The critical habitat identified by the Service is based, in part, on the utilization of a habitat modeling framework that was developed as part of the Revised Recovery Plan for the Northern Spotted Owl (USFWS 2011). The use of this modeling framework allowed the Service to compare the relative potential for various habitat networks to contribute to the conservation of the northern spotted owl. As detailed in their Modeling Supplement, a technical support document for the critical habitat rule (Dunk et al. 2012), the Service used a spatially explicit northern spotted owl population model to predict relative responses of northern spotted owl populations to different habitat network designs, and evaluated these responses against the recovery objectives and criteria for the species using a rule set based on those criteria.
364. Simulations from these models are not intended to be estimates of future conditions, but rather provide information on trends predicted to occur under different network designs. The models thus allow for the comparison of the *relative* performance of various critical habitat scenarios, using metrics associated with owl population performance (e.g., population trend). **The models do not produce definitive quantitative predictions of future owl population numbers.**
365. The Service used these models to determine which of the potential habitat networks best met the statutory definition of critical habitat. In addition, the Service did so in a way that was efficient (i.e., did not designate more habitat than was necessary) and prioritized reliance on Federal lands, as evaluated against the recovery goals for the northern spotted owl. The Modeling Supplement (Dunk et al. 2012) describes the various assessments

conducted by the Service in the course of evaluating potential habitat networks, and the results of those evaluations. However, it is important to recognize that neither the statutory requirements for identifying critical habitat, nor any available models, allow the Service to utilize this process to predict either the future owl productivity as a result of this designation, or an economic value that can be readily assigned to the benefits of such designation.

8.1.3 USE AND NON-USE VALUATION STUDIES

366. Numerous published studies estimate individuals' willingness to pay to protect endangered species.²⁷⁵ The economic values reported in these studies reflect various groupings of benefit categories (including both use and non-use values). For example, these studies assess public willingness to pay for wildlife-viewing opportunities, for the option for seeing or experiencing the species in the future, to assure that the species will exist for future generations, and simply knowing a species exists, among other values. This literature, however, addresses a relatively narrow range of species and circumstances compared to the hundreds of species and habitats that are the focus of the Act.
367. An ideal study for use in valuing the use and non-use values that may derive from critical habitat designation for the NSO would be specific to the species, the policy question at hand (implementation of the specific conservation efforts associated with critical habitat designation), and the relevant population holding such values (e.g., citizens of the relevant states or of the United States as a whole). No such study has been undertaken to date for the NSO.
368. Absent primary research specific to the policy question (benefits of critical habitat designation for the NSO), resource management decisions can often be informed by applying the results of existing valuation research to a new policy question – a process known to economists as benefit transfer. Benefit transfer involves the application of unit value estimates, functions, data, and/or models from existing studies to estimate the benefits associated with the resource under consideration.
369. OMB has written guidelines for conducting credible benefit transfers. The important steps in the OMB guidance are: (1) specify the value to be estimated for the rulemaking; and (2) identify appropriate studies to conduct benefits transfer based on the following criteria:
- The selected studies should be based on adequate data, sound and defensible empirical methods and techniques;
 - The selected studies should document parameter estimates of the valuation function;
 - The study and policy contexts should have similar populations (e.g., demographic characteristics). The market size (e.g., target population) between the study site and the policy site should be similar;

²⁷⁵ See, for example, the summary in Richardson, L. and J. Loomis. March 2009. The Total Economic Value of Threatened, Endangered, and Rare Species: An Updated Meta-Analysis. *Ecological Economics* 68(5): 1535-1548.

- The good, and the magnitude of change in that good, should be similar in the study and policy contexts;
- The relevant characteristics of the study and policy contexts should be similar;
- The distribution of property rights should be similar so that the analysis uses the same welfare measure (i.e., if the property rights in the study context support the use of willingness-to-accept measures while the rights in the rulemaking context support the use of willingness-to-pay measures, benefits transfer is not appropriate); and
- The availability of substitutes across study and policy contexts should be similar.

8.1.4 AVAILABLE LITERATURE VALUING NSO POPULATIONS

370. We undertook a literature review to identify existing research regarding the use and non-use values the public holds for conserving the NSO and the old growth habitat it relies upon. This search identified several valuation studies focusing on use and non-use values. These studies did not distinguish separate use (e.g., recreational opportunities) and non-use (the knowledge that the birds and their habitat will be conserved in the present and for future generations) values.
371. As stated earlier, existing information on potential use and non-use values does not support a benefit transfer based analysis associated with increased NSO populations. First, insufficient biophysical information exists to support such an analysis. Appropriate allocation of benefits would require modeling changes in owl populations over time in response to the specific incremental conservation efforts described in this analysis. The timing and extent to which the owl populations would be expected to recover, and the extent to which this recovery would be associated with these conservation efforts, are unknown.²⁷⁶ Absent this information, conducting a credible benefit transfer analysis that quantifies benefits of this rulemaking on NSO use and non-use values is not possible. The information in this discussion is therefore provided for context to the analysis. Furthermore, while we have reviewed these studies in order to provide general information on previous research regarding economic values of owl populations, we do not promote a particular estimate, nor offer judgments regarding the quality of the underlying valuation studies.
372. Rubin et al. (1991) surveyed a random group of Washington State households to determine willingness to pay to ensure survival of the NSO.²⁷⁷ The survey did not elicit

²⁷⁶ Richardson and Loomis (2009) developed a model to estimate the value of critical habitat designations based on a meta-analysis of 31 studies published between 1985 and 2005. While one of these studies evaluated benefits of Mexican spotted owl, none evaluated benefits of the NSO. The model generates composite willingness to pay values for species conservation based on an estimate of the percent change in species population likely to result from the critical habitat designation. Implementation of the model requires information regarding the change in the population likely to result from the conservation efforts undertaken in response to the listing or critical habitat designation. Such information is not available for this designation. (Richardson, L. and J. Loomis. March 2009. The Total Economic Value of Threatened, Endangered, and Rare Species: An Updated Meta-Analysis. *Ecological Economics* 68(5): 1535-1548.)

²⁷⁷ Rubin, J., G. Helfand, and J. Loomis. 1991. A Benefit-Cost Analysis of the Northern Spotted Owl: Results from a contingent valuation survey. *Journal of Forestry*. 25-30.

information on separate use and non-use values for the species but for willingness to pay for the species survival. As a result, it is not clear what the public is valuing in their responses (e.g., recreational opportunity, existence values, etc.). The study estimates willingness to pay for NSO survival on a per household in Washington State. Results were extrapolated to Oregon, California, and the remainder of the United States accounting for varying socioeconomic conditions, such as per capita income and household size, and applying a distance-decay factor assuming that willingness to pay decreases with increased distance from the resource being valued. Importantly, this study notes that it is difficult to determine whether these willingness to pay estimates account for the public's value for the NSO, or for old growth forests, more generally.

373. Loomis and White (1996) report varying willingness to pay based on varying percent chances of survival for the NSO. The study does not, however, estimate a functional relationship and the direction of the values is seemingly counterintuitive; the authors report a lesser willingness to pay for an increased chance of survival of the NSO. When presented with a scenario of a 75 percent chance of survival of the species, the willingness to pay of Washington households was lower than for a scenario with a 30 percent chance of survival scenario.²⁷⁸
374. Hagen et al. (1992) estimated the economic benefits of a conservation policy for old growth forests in the Pacific Northwest which would prevent the extinction of the NSO.²⁷⁹ A random sample of households from across the United States was surveyed to elicit willingness to pay per household. The description of the conservation policy provided to respondents was derived from the report of the Interagency Scientific Committee (ISC) to Address the Conservation of the Northern Spotted Owl. The conservation policy described included, for example, precluding timber sales in particular habitat areas. It should be noted that in eliciting willingness to pay for preserving the NSO's old growth forest habitat, values for collateral benefits may be reflected in a household's willingness to pay. In other words, this value may not reflect simply the use and non-use values of the NSO. In considering conservation of old growth habitat, survey respondents may contemplate elements of the entire ecosystem rather than solely considering the survival of the NSO independently.
375. Loomis and González-Cabán (1998) estimated NSO habitat value through a contingent valuation survey focused on the value of protecting old growth forest in California and Oregon.²⁸⁰ A survey randomly mailed to households in California, Oregon, and New England described elements of a hypothetical Fire Prevention and Control Program and asked for households' willingness to pay for a reduction in old growth acres burned as well as a reduction in NSO critical habitat units burned. The study estimated a

²⁷⁸ Loomis, J.B. and D.S. White. 1996. Economic benefits of rare and endangered species: summary and meta-analysis. *Ecological Economics*. 18:197-206.

²⁷⁹ Hagen, D.A., J.W. Vincent and P.G. Welle. 1992. Benefits of Preserving Old-Growth Forests and the Spotted Owl. *Contemporary Policy Issues*. Vol X:13-26.

²⁸⁰ Loomis, J.B. and A. González-Cabán. 1998. A willingness-to-pay function for protecting acres of spotted owl habitat from fire. *Ecological Economics*. 25:315-322.

willingness to pay function for reducing burned acres of old growth forests in Oregon and California to determine national average per household willingness to pay values for varying protected acres.

376. As described above, an ideal study for estimating economic use and non-use values of critical habitat designation would be specific to the species in question (or would address a closely related species), would consider valuation in a context close to the policy issues in question (i.e., economic benefits of implementing the conservation efforts associated with designating critical habitat for this species), and would address a relevant population holding these values (citizens of the United States). While the studies identified and described above are specific to the NSO and address willingness to pay across the United States, none consider valuation in the context of the specific conservation efforts associated with critical habitat designation. One published study was identified that specifically investigates the economic benefits arising from designating critical habitat for the closely-related Mexican spotted owl. While biologically similar to the NSO (both birds are subspecies of the spotted owl), the endangered Mexican spotted owl inhabits montane forests and deep canyons in the southwestern United States. Thus, there is a difference in the commodity being valued in this study.
377. The benefits of critical habitat designation for the Mexican spotted owl in the four corners area were explored using a contingent valuation survey.²⁸¹ Specifically, the purpose of this study was to determine whether the public expressed a difference in willingness to pay for a single species (the Mexican spotted owl) versus a bundle of 62 threatened and endangered species, including the Mexican spotted owl. The authors found that, indeed willingness to pay did increase for the bundled species protections.
378. While this study estimates a value of Mexican spotted owl habitat conservation, it does not estimate the marginal value of protecting an additional species or its habitat. Doing so would require: (a) addressing the willingness to pay for a conservation action additional to all other existing conservation actions; and (b) understanding the expected probability and timing of changes in the species population. As raised by Desvousges et al., it is not clear from the existing literature if the public's willingness to pay for protecting the NSO and its habitat would be any different from the public's willingness to pay for all endangered and threatened species.²⁸² Loomis and Ekstrand did find a significant difference between their determined value of critical habitat designation for the Mexican spotted owl and their calculated value for a group of 62 species. However, this difference is small and the authors themselves note that stated preference valuations of critical habitat designation benefits for individual species are neither additive nor necessarily comparable. They recognize that the value of a cohort of species is not numerically equivalent to a single species multiplied by the number of species comprising the cohort.

²⁸¹ Loomis, J. and E. Ekstrand. 1997. Economic Benefits of Critical Habitat for the Mexican Spotted Owl: A Scope Test Using a Multiple-Bounded Contingent Valuation Survey. *Journal of Agricultural and Resource Economics*. 22(2):356-366.

²⁸² Desvousges, W.H., F.R. Johnson, R.W. Dunford, K.J. Boyle, S.P. Hudson, and K.N. Wilson. 1993. Measuring Natural Resource Damage with Contingent Valuation: Tests of Validity and Reliability. In Hausman, J. ed. *Contingent Valuation: A Critical Assessment*. Amsterdam: North Holland Press, 91-164.

This underscores the uncertainty associated with what, specifically, the public is valuing when expressing a willingness to pay for habitat conservation.

379. A recent study by Richardson and Loomis (2009) focused on estimating a model (i.e., a willingness to pay function) to value threatened or endangered species based on estimates from multiple studies. This type of study is referred to as a “meta-analysis.”²⁸³ The meta-analysis is based on 31 studies with 67 willingness to pay (WTP) observations published from 1985 to 2005 evaluating economic values of endangered, threatened or rare species primarily applying contingent valuation methods. The economic values expressed in the studies that inform the model reflect primarily recreational use, as well as nonuse values. Some of the studies, however, are solely focused on the nonuse component of the economic value. The species included in the study are primarily marine and riverine species (whales, dolphins, seals, otters, sea lions, sea turtles, salmon and other listed fish species), but include some avian and other species, including, most relevantly, spotted owls.
380. A key variable required for the resulting willingness to pay function is the change in the species population levels resulting from the rule. Thus, absent the information on the effect of the critical habitat designation on owl populations, the model does not provide a means to estimate the incremental benefit of the rule in terms of the public’s willingness to pay.
381. Overall, the studies identified through our literature review provide some indication of the use and non-use values of NSO populations. The absence of information on the effect of the designation on NSO populations, however, precludes application of these values to estimate a public willingness to pay for NSO conservation.

8.2 QUALITATIVE DISCUSSION OF THE ANCILLARY BENEFITS OF CRITICAL HABITAT DESIGNATION FOR THE NORTHERN SPOTTED OWL

382. Benefits beyond use and non-use values may also be achieved through a species listing or designation of critical habitat. For example, the public may hold a value for habitat conservation, beyond its willingness to pay for conservation of a specific species. Studies have estimated the public’s willingness to pay to preserve wilderness areas, for wildlife management and preservation programs, and for wildlife protection in general. These studies address categories of benefits (e.g., ecosystem integrity) that may be similar to the types of benefits provided by the listing or critical habitat, but do not provide values that can be used to establish the incremental values associated with this proposed critical habitat designation (i.e., the ecosystem and species protection measures considered in these studies are too dissimilar from the habitat protection benefits that may be afforded by this designation).

²⁸³ Richardson, Leslie and John Loomis. The Total Economic Value of Threatened, Endangered and Rare Species: An Updated Meta-Analysis. *Ecological Economics* (2009): 1535-1548. This paper updates a 1996 study on the same topic by Loomis and White (Loomis, John and D.S. White. Economic Benefits of Rare and Endangered Species: A Meta-Analysis. *Ecological Economics* (1996): 197-206).

383. Such benefits are not the purpose of the listing or critical habitat designation. Thus, the Service has decided not to focus on estimating these values in the Economic Analysis. The remainder of this Chapter includes a qualitative benefits discussion, summarizing the NSO conservation efforts described in Chapters 4 through 7 of this report and linking them with potential categories of economic benefit that may derive from their implementation.
384. Exhibit 8-1 summarizes potential benefits associated with the specific conservation efforts for the NSO that may result from critical habitat designation, as described in Chapters 4 through 7 of this report.²⁸⁴ In general, the ancillary benefits described in Exhibit 8-1 could derive from conservation measures that may be implemented to avoid destruction or adverse modification of critical habitat, possibly such as the implementation of improved ecological timber management practices in certain proposed critical habitat areas (e.g., Federal lands).²⁸⁵ The categories of related economic benefits include:
- **Public safety benefits:** It is possible that the designation could result in increased resiliency of timber stands associated with improved timber management practices, such as thinning, partial cutting, adaptive management and monitoring, may reduce the threat of catastrophic events such as wildfire, drought and insect damage. This in turn may generate benefits in the form of reduced property damage.
 - **Improved water quality:** Adjustments in riparian buffers or greater biomass retention on slopes as the result of critical habitat designation may reduce sedimentation in wetlands and streams and reduce adverse impacts to downstream water quality. Improved water quality may reduce water treatment costs and have human or ecological health benefits.
 - **Aesthetic benefits:** Critical habitat may result in a forest area that emulates native forest development, as opposed to a patchwork of even-aged stands.²⁸⁶ This more natural landscape may be more aesthetically appealing and therefore generate social welfare gains. Preferences for aesthetic improvements may be measured, for example, through increased willingness-to-pay to visit a habitat region for recreation, increased visitation, or changes in the value of neighboring properties.
 - **Carbon storage:** Decreases in the volume of timber harvested, or improvement in forest health from active management practices, may result in changes in the

²⁸⁴ The proposed rule also notes that critical habitat can engender “educational” benefits. These benefits may include for example, the value of simply increasing awareness among the public of where the NSO may be present. Establishing critical habitat boundaries also highlights the significance an area has for NSO conservation in future planning efforts.

²⁸⁵ Several entities provided substantive public comment referring the Service to studies and approaches for estimating the value of ancillary benefits potentially resulting from the designation. For a detailed discussion of the Service’s judgment regarding their applicability to this analysis, see the preamble discussion of public comments provided in the Final Rule.

²⁸⁶ Johnson, K. Norman, and Jerry F. Franklin. Southwest Oregon Secretarial Pilot Projects on BLM Lands: Our Experience So Far and Broader Considerations for Long-term Plans. February 15, 2012.

amount of carbon stored in, and sequestered by, forest biomass. The resulting removal of carbon from the atmosphere may result in decreases in potential damages to crops, human health, and from shoreline erosion due to climate change.²⁸⁷

385. In addition to these categories of potential benefits, all of the conservation efforts described in Exhibit 8-1 are related to the broader conservation and recovery of the species. All conservation efforts therefore relate to the maintenance or enhancement of the use and non-use value (e.g., existence value) that the public may hold specifically for the NSO. Further, many of the conservation efforts undertaken for the NSO may also result in improvements to ecosystem health that are shared by other, coexisting species (including other endangered or threatened species). The maintenance or enhancement of use and non-use values for these other species, or for biodiversity in general, may also result from these conservation efforts for the NSO.
386. The third column of Exhibit 8-1 identifies the relevant proposed critical habitat units in which the described benefits may occur. In general, the relevant units are limited to those units containing Federal lands, as follows:

- **Benefits could occur on Federal matrix lands if changes are made in timber management practices as a result of the critical habitat designation.** While the designation of critical habitat only requires Federal agencies to comply with section 7 on a project-by-project basis, one outcome could be that Federal land managers modify their timber management on a broader basis within critical habitat as appropriate within the context of their land management plans and other legal authorities. In particular, this may be a possibility on Federal matrix lands that are likely to be unoccupied by the NSO. We have assumed for the purposes of this analysis that the units expected to experience these benefits are those units containing this category of Federal lands (see Chapter 4 for a description of the identification of these lands).

In addition, as discussed in Chapter 4, application of some of the ecological forestry measures described in the proposed critical habitat rule may lead to a reduction in some legal and political challenges of Federal matrix land management, thus resulting in an increase in timber harvest from some of these lands. For example, application of some variable retention harvest prescriptions on matrix lands may be less controversial and less subject to successful legal challenge under the Act, when compared to previous proposed regeneration timber harvest and subsequent protests and legal challenges. Application of these methods may also have long term ecological benefits for species other than NSO, if applied as described in the proposed critical habitat rule and using the most up-to-date science.

²⁸⁷ Note that, although this analysis contemplates potential timber harvest impacts over a 20 year period, any material benefits related to carbon sequestration would be dependent upon a longer time period of alternative timber management practices.

- **Benefits are unlikely to be generated by changed timber management practices in critical habitat on State or private lands.**²⁸⁸ The critical habitat designation is not expected to alter timber management practices on State and private lands. Consequently, the benefit categories described in Exhibit 8-1 do not pertain to these areas. In fact, as this analysis presents the possibility that timber management on private lands could be negatively affected by the designation (reductions in rotation periods), there could be negative effects environmental conditions on these private lands. An exception to this may occur in the case that Washington State strengthens its requirements for NSO habitat conservation in order to align with the strategy on Federal lands. If this is the case, State and private lands in Washington may also experience the ancillary benefits described in Exhibit 8-1.

EXHIBIT 8-1. POSSIBLE CONSERVATION EFFORTS FOR THE NORTHERN SPOTTED OWL AND POTENTIAL ASSOCIATED ANCILLARY BENEFITS

POSSIBLE CONSERVATION EFFORT	POTENTIAL ASSOCIATED BENEFITS	RELEVANT UNITS
Improved timber management practices, such as partial cutting, thinning, adaptive management, and monitoring	<ul style="list-style-type: none"> • Reduced wildfire threats • Reduced impacts of droughts • Reduced threat of insect damage to stands • Reduced property damage due to these risk reductions • Aesthetic improvements generating increased quality or quantity or recreational activities • Increased carbon capture and sequestration (if the amount of biomass harvested decreases) 	All subunits except NCO 3, NCO 4, RDC 3, RDC 4, and RDC 5
Increased riparian protections or greater biomass retention on slopes	<ul style="list-style-type: none"> • Improved water quality generating human and ecological health benefits 	
Avoidance of harvests on "critical habitat state" in Washington	<ul style="list-style-type: none"> • Reduced impacts of droughts • Reduced threat of insect damage to stands • Reduced property damage due to these risk reductions • Aesthetic improvements generating increased quality or quantity or recreational activities • Improved water quality generating human and ecological health benefits • Increased carbon capture and sequestration (if the amount of biomass harvested decreases) 	ECN 3; ECN 4; ECN 5; ECN 6; WCC 1; WCC 3; NCO 1
Notes: 1. Conservation efforts derived from detailed discussions in the previous Chapters of this report. 2. All conservation efforts are intended to support the survival and/or recovery of the species. 3. Benefits are not associated with every acre in listed subunits; rather, see Chapters 4 and 5 for a discussion of the specific acres within each subunit where changes in timber management may occur.		

²⁸⁸ As noted, the Service believes that the designation of State and private lands may have other benefits, such as educating the public of the ecological importance of these areas. To the extent that this new information results in changes in behavior that benefit the NSO, neither the costs nor benefits of these actions have been captured in this analysis.

8.3 DISCUSSION

387. As described above, the existing literature does not provide an adequate basis to monetize the incremental benefits of the NSO conservation measures considered in this economic analysis. The quantification of the incremental benefits of designating critical habitat for the NSO is impeded by the absence of studies which provide information on the NSO conservation probability related to the critical habitat designation, which is distinct and separate from the conservation probability due to recovery efforts associated with the listing. The change in NSO population likely to result from the conservation efforts undertaken in response to the critical habitat designation would be necessary to monetize the change in conservation probability attributable solely to critical habitat, and no such studies currently exist.
388. Qualitative consideration of the potential benefits associated with the NSO conservation efforts discussed in prior chapters of this report reveal a number of categories of economic benefits additional to the use and non-use values individuals hold for the NSO itself, including public safety, water quality, and aesthetic benefits. Furthermore, potential increased timber harvests resulting from the designation are quantified in Chapter 4.

REFERENCES

2 U.S.C. 1531 et seq.

5 U.S.C. § 601 et seq.

16 U.S.C § 500

16 U.S.C. § 620a

16 U.S.C. 1532

16 U.S.C. §1533(b)(2)

16 U.S.C. § 1538(a)(1)(G)

31 U.S.C § 69

43 U.S.C § 1181f

50 C.F.R. 17.31(a)

64 FR 43255

77 FR 14123

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APPENDIX A | ADDITIONAL STATUTORY REQUIREMENTS

389. This appendix addresses the remaining analytical requirements under administrative law and executive order. Section A.1 presents an analysis of impacts to small entities which is conducted pursuant to the Regulatory Flexibility Act (RFA), as amended by the Small Business Regulatory Enforcement Fairness Act (SBREFA) of 1996 and Executive Order 13272. Section A.2 assesses the effects of the Proposed Rule on State, local, and Tribal governments and the private sector as required by Title II of the Unfunded Mandates Reform Act of 1995 (UMRA). Section A.3 addresses the potential for federalism concerns as required by Executive Order 13132. And Section A.4 considers potential impacts to the energy industry in response to Executive Order 13211, entitled, “Actions Concerning Regulations That Significantly Affect Energy Supply, Distribution, or Use.”
390. The analyses in this appendix rely on the estimated incremental impacts resulting from the proposed critical habitat designation. The incremental impacts of the rulemaking are most relevant for these analyses because they reflect costs that may be avoided or reduced based on decisions regarding the composition of the final rule.

A.1 RFA/SBREFA ANALYSIS

391. When a Federal agency proposes regulations, the RFA requires the agency to prepare and make available for public comment an analysis that describes the effect of the rule on small entities (i.e., small businesses, small organizations, and small government jurisdictions as defined by the RFA).²⁸⁹ No initial regulatory flexibility analysis is required if the head of an agency certifies that the rule will not have a significant economic impact on a substantial number of small entities. SBREFA amended the RFA to require Federal agencies to provide a statement of the factual basis for certifying that a rule will not have significant economic impact on a substantial number of small entities.
392. Three types of small entities are defined in the RFA:
- **Small Business** - Section 601(3) of the RFA defines a small business as having the same meaning as small business concern under section 3 of the Small Business Act. This includes any firm that is independently owned and operated and is not dominant in its field of operation. The Small Business Administration (SBA) has developed size standards to carry out the purposes of the Small Business Act, and those size standards can be found in 13 CFR 121.201. The size standards are matched to North American Industry Classification System

²⁸⁹ 5 U.S.C. § 601 et seq.

(NAICS) industries. The SBA definition of a small business applies to a firm's parent company and all affiliates as a single entity.

- **Small Governmental Jurisdiction** - Section 601(5) defines small governmental jurisdictions as governments of cities, counties, towns, townships, villages, school districts, or special districts with a population of less than 50,000. Special districts may include those servicing irrigation, ports, parks and recreation, sanitation, drainage, soil and water conservation, road assessment, etc. When counties have populations greater than 50,000, those municipalities of fewer than 50,000 can be identified using population reports. Other types of small government entities are not as easily identified under this standard, as they are not typically classified by population.
- **Small Organization** - Section 601(4) defines a small organization as any not-for-profit enterprise that is independently owned and operated and not dominant in its field. Small organizations may include private hospitals, educational institutions, irrigation districts, public utilities, agricultural co-ops, etc.

393. The courts have held that the RFA/SBREFA requires Federal agencies to perform a regulatory flexibility analysis of forecast impacts to small entities that are directly regulated. In the case of *Mid-Tex Electric Cooperative, Inc., v. Federal Energy Regulatory Commission (FERC)*, FERC proposed regulations affecting the manner in which generating utilities incorporated construction work in progress in their rates. The generating utilities that expected to be regulated were large businesses; however, their customers -- transmitting utilities such as electric cooperatives -- included numerous small entities. In this case, the court agreed that FERC simply authorized large electric generators to pass these costs through to their transmitting and retail utility customers, and FERC could therefore certify that small entities were not directly impacted within the definition of the RFA.²⁹⁰
394. Similarly, *American Trucking Associations, Inc. v. Environmental Protection Agency (EPA)* addressed a rulemaking in which EPA established a primary national ambient air quality standard for ozone and particulate matter.²⁹¹ The basis of EPA's RFA/SBREFA certification was that this standard did not directly regulate small entities; instead, small entities were indirectly regulated through the implementation of State plans that incorporated the standards. The court found that, while EPA imposed regulation on States, it did not have authority under this rule to impose regulations directly on small entities and therefore small entities were not directly impacted within the definition of the RFA.
395. Following the court decisions described above, this analysis considers only those entities directly regulated by the Proposed Rule. The regulatory mechanism through which critical habitat protections are realized is section 7 of the Act, which requires Federal agencies, in consultation with the Service, to insure that any action authorized, funded, or

²⁹⁰ 773 F. 2d 327 (D.C. Cir. 1985).

²⁹¹ 175 F. 3d 1027, 1044 (D.C. Cir. 1999).

carried by the Agency is not likely to adversely modify critical habitat. Therefore, under a strict interpretation of the definition of a “directly regulated entity,” only Federal action agencies are subject to a regulatory requirement (i.e., to avoid adverse modification) as the result of the designation. Because Federal agencies are not small entities, under this interpretation, the Service may certify that the proposed critical habitat rule will not have a significant economic impact on a substantial number of small entities.²⁹²

396. We acknowledge, however, that in some cases, third-party proponents of the action subject to permitting or funding may participate in a section 7 consultation and thus may be indirectly affected. While these entities are not directly regulated, the Service has requested information regarding the potential number of third parties participating in consultations on an annual basis in order to ensure a robust examination of the effects of this proposed rule. Below, we provide that information. We also provide information to assist the Service in determining whether these entities are likely to be “small,” and whether the number of potentially affected small entities is “substantial.”²⁹³
397. Importantly, the impacts of the rule must be *both* significant and substantial to prevent certification of the rule under the RFA and to require the preparation of an initial regulatory flexibility analysis. If a substantial number of small entities are affected by the critical habitat designation, but the per-entity economic impact is not significant, the Service may certify. Likewise, if the per-entity economic impact is likely to be significant, but the number of affected entities is not substantial, the Service may also certify. We focus the remainder of the discussion in this section on the number of small entities potentially affected.

THIRD-PARTY PARTICIPANTS IN CONSULTATIONS ON TIMBER HARVESTS

398. In Chapter 4, we estimate that approximately 1,000 consultations with BLM and USFS will occur over the next 20 years related to timber management projects. We assume, therefore, that 50 consultations are likely on an annual basis. These consultations involve individual projects, batched actions, or programmatic actions. Many do not involve third parties, particularly those involving more than one project or action, as USFS and BLM often complete section 7 consultations with the Service prior to advertising timber sales.²⁹⁴ However, because data limitations do not allow us to estimate third party participation rates, we conservatively assume that all future consultations include a third party. Thus, we likely overstate the number of third party participants in timber harvest-related consultations.
399. We assume that the entities defined by the NAICS codes presented in Exhibit A-1 could be participants in a section 7 consultation if they are buyers of Federal timber sales. This

²⁹² We also note that the direct economic impact of the project modifications resulting from these consultations is a change in Federal revenues generated by timber sales. In other words, if harvests are increased or decreased as a result of the designation, the USFS and BLM will receive more or less revenues, respectively, from the sale of this timber.

²⁹³ The RFA does not provide quantitative thresholds to defining the terms “substantial” and “significant.” In its guidance to Federal agencies on complying with the RFA, SBA provides qualitative descriptions of these terms, leaving the Agencies with discretion to interpret these terms on a case-by-case basis.

²⁹⁴ Email communication, Biologist, Oregon State Office, U.S. Fish and Wildlife Service, May 22, 2012.

exhibit also provides the SBA’s definition of a small entity in each classification. To identify the total number of small entities found within our 56 county study area in these NAICS categories, we rely on data obtained from Dun’s Market Identifiers, a privately-compiled database containing basic company data such as annual revenues and number of employees.²⁹⁵ Exhibit A-1 presents the total number of entities in the 56 county study area in each category, as well as the number and percent that are small.

400. The Dun and Bradstreet data suggest that of the 7,643 entities located in the 56 counties overlapping proposed critical habitat, 7,140 of them, or 93 percent, are “small” entities as defined by SBA. If we assume that all of the entities participating in section 7 consultations are small, then less than one percent ($50/7,140 \times 100 = 0.70$ percent) of small entities in the study area could be affected by the designation of critical habitat on an annual basis.
401. We also consider a separate dataset of information regarding the number of business entities in the study area. The U.S. Census produces County Business Patterns, a dataset collected on an annual basis that includes information about establishments, employment and payroll.²⁹⁶ Because we cannot easily extract only the number of “small” entities from these data, we present the total number of establishments in each NAICS category for comparison to the totals presented in Exhibit A-1. As shown below in Exhibit A-2, the U.S. Census estimates that only 2,616 total entities exist in the study area, compared to the 7,643 identified by Dun and Bradstreet. If we assume that all of the entities identified in Exhibit A-2 are “small,” then approximately 1.9 percent of small entities ($50/2,616 \times 100 = 1.9$ percent) may participate annually in section 7 consultations.
402. Thus, considering the two available data sources, Dun and Bradstreet and U.S. Census, between less than one percent and two percent of small entities may participate in section 7 consultations related to timber harvests on an annual basis. We believe this estimate is conservative (i.e., more likely to overstate than understate the percentage of affected entities) for two reasons. First, not all section 7 consultations will involve a third party. Second, not all of the third parties will be small entities. In addition, we note that we have constrained our population of potentially affected entities to those found in counties overlapping the proposed critical habitat, as opposed to including others found outside of the study area but within the States of Washington, Oregon, and California.

²⁹⁵ Dun and Bradstreet, D&B - Dun’s Market Identifiers, searched via Dialog File 516 on May 16, 2012.

²⁹⁶ Dun and Bradstreet collect data more frequently through daily in-person and telephone interviews, county state, and federal government sources, third party sources, business trade tape exchange programs, and large-volume mailings.

EXHIBIT A-1. TIMBER-RELATED PRIVATE ENTITIES OF INTEREST IN THE 56-COUNTY STUDY AREA BASED ON DUN & BRADSTREET DATA

NAICS CODE	DESCRIPTION	SBA DEFINITION OF A "SMALL" ENTITY	TOTAL ENTITIES	TOTAL "SMALL" ENTITIES	PERCENT "SMALL" ENTITIES
113110	Timber Tract Operations	<\$7.0 million in annual revenues	604	573	95%
113310	Logging	Employs fewer than 500 people	2,105	2,069	98%
115310	Support Activities for Forestry	<\$7.0 million in annual revenues	1,641	1,597	97%
321	Wood Product Manufacturing	Employs fewer than 500 people	2,941	2,655	90%
322	Paper Manufacturing	Employs fewer than 750 people	352	246	70%
325191	Gum and Wood Chemical Manufacturing	Employs fewer than 500 people	0	0	0%
TOTAL			7,643	7,140	93%
Source: Dun and Bradstreet, D&B - Dun's Market Identifiers, searched via Dialog File 516 on May 16, 2012.					

EXHIBIT A-2. TIMBER-RELATED ENTITIES OF INTEREST IN THE 56-COUNTY STUDY AREA BASED ON U.S. CENSUS DATA

NAICS CODE	DESCRIPTION	TOTAL ENTITIES
113110	Timber Tract Operations	50
113310	Logging	1,111
115310	Support Activities for Forestry	359
321	Wood Product Manufacturing	953
322	Paper Manufacturing	141
325191	Gum and Wood Chemical Manufacturing	2
TOTAL		2,616
Source: U.S. Census Bureau, 2009 County Business Patterns, June 2011. Accessed at http://www.census.gov/econ/cbp/index.html on May 16, 2012.		

THIRD PARTY PARTICIPANTS IN CONSULTATIONS ON LINEAR PROJECTS

403. Potential future section 7 consultations on linear projects, including transportation and utility projects, are estimated in Chapter 7. Following the same logic applied in our analysis of timber projects above, we assume that a third party may be involved in each consultation. The characteristics of these third parties are discussed below.

Transportation Projects

404. Transportation projects, including State and county road and bridge construction and maintenance, are permitted by the State departments of transportation (WSDOT, ODOT, and CalTrans). To the extent that these projects rely on Federal funding or require a permit from the Corps, these State agencies may participate in future section 7 consultations. However, these agencies are not “small” government entities; thus no small entities are likely to participate as a third party in section 7 consultations on transportation projects. Further discussion of these projects is provided in Chapter 7 of this report.

Electric and Gas Utility Projects

405. Installation, construction, and maintenance of power transmission lines and gas pipelines are permitted by FERC and the Corps. In Chapter 7 of this report, we discuss the identification of likely future projects that will undergo section 7 consultation. Below, we compare the characteristics of these entities to the definitions of small entities provided by SBA.
- FERC identified one planned electric energy transmission project intersecting critical habitat that will require section 7 consultation. It is currently reviewing Portland General Electric’s application for the Cascade Crossing Project, which consists of installation of approximately 215 miles of 500-kilovolt transmission line running from Boardman to Salem, Oregon. SBA defines small electric energy companies as

having a total electric output of less than 4 million megawatt hours.²⁹⁷ Portland General Electric reported annual retail energy deliveries of over 19 million megawatt hours in 2011; thus, it is not a small entity.²⁹⁸

- FERC also identified a gas pipeline project proposed by the Pacific Connector Gas Pipeline, LP (Jordan Cove Project). SBA defines small companies in the business of pipeline transportation of natural gas as having annual revenues less than 25 million.²⁹⁹ The Pacific Connector Gas Pipeline, LP is a subsidiary of the Williams Companies, Inc. The company is publicly-traded with reported revenues of \$7.9 billion in 2011.³⁰⁰ Thus, it is not a small entity.
- FERC provided information related to the Palomar Gas Transmission project, which is a partnership between NW Natural and TransCanada. Information on the number of annual revenues each company is not readily available; however, both companies are publicly-traded. Thus, neither is likely to be small.
- FERC identified the Oregon Pipeline Company Project as one that could require consultation. The project is proposed by Oregon LNG, which includes LNG Development Company and Oregon Pipeline). Information about the company is not readily available. Therefore, it is possible that Oregon LNG is a small entity.
- We rely on the historical frequency at which the Corps consulted on pipeline and transmission line maintenance projects to forecast future section 7 activity. As described in Chapter 7, we estimate that the Corps will undertake 10 such consultations annually. The third-party project proponents are unknown; therefore, we conservatively assume that they are all small entities.

406. Exhibits A-3 and A-4 present the total number of electric power transmission and distribution and gas pipeline entities in the 56 counties overlapping proposed critical habitat based on Dun and Bradstreet and U.S. Census data, respectively. In most cases, information on the percentage of these entities that meet SBA's definition of small are not available. We assume the total number of third parties that may participate in a section 7 consultation on a linear project in a single year is 11 projects, (the Oregon LNG pipeline project plus 10 pipeline or transmission line projects permitted by the Corps). If we assume that all of the entities listed in these exhibits are small (except for 10 pipeline transportation companies as shown in Exhibit A-3), between five and 11 percent of small entities in the region may be affected.

²⁹⁷ U.S. Small Business Administration, Table of Small Business Size Standards, NAICS 221121, March 26, 2012, as viewed at http://www.sba.gov/sites/default/files/files/Size_Standards_Table.pdf on May 17, 2012.

²⁹⁸ Calculated from information provided on page 10 of Portland General Electric's 2011 Annual Report, as viewed at http://files.shareholder.com/downloads/POR/1878996978x0x557197/e478ffaa-8465-4317-96ba-e243a5b51afa/PGE_Final_2011_AR.pdf on May 17, 2012.

²⁹⁹ U.S. Small Business Administration, Table of Small Business Size Standards, NAICS 486210, March 26, 2012, as viewed at http://www.sba.gov/sites/default/files/files/Size_Standards_Table.pdf on May 17, 2012.

³⁰⁰ The Williams Companies, 2011 Annual Report, as viewed at <http://www.targetdoc.com/viewer.asp?b=630&k=rpvr6883RP&bhcp=1> on May 17, 2012.

407. This estimate of the percentage of affected small entities in the region may be underestimated if a small number of the entities falling under NAICS codes 221121 and 221122 are “small entities” (i.e., the denominator in our calculation would shrink, leading to a higher percentage of affected entities). However, the percentage of affected small entities may also be overstated for the two reasons. First, the number of affected entities may be less than 10 if the same entity participates in more than one section 7 consultation in a given year. Furthermore, not all of the entities participating in section 7 consultation are likely to be small. The magnitude of impact on small entity revenues is unknown; however it is likely to be small as impacts are limited to minor administrative costs on the order of a few thousand dollars.

SUMMARY

408. In conclusion, considering the two available data sources, Dun and Bradstreet and U.S. Census, approximately 50 small entities, or between less than one percent and two percent of small entities in our 56 county study area, may participate in section 7 consultations related to timber harvests on an annual basis. In addition, approximately 11 electricity transmission or natural gas pipeline companies may participate in section 7 consultations in a given year, representing an unknown percentage of total small entities in the area.
409. We believe our estimates are conservative (i.e., more likely to overstate than understate the number of affected entities) for several reasons. First, not all section 7 consultations will involve a third party. Second, not all of the third parties will be small entities. Third, the same entity may consult more than once in a single year. In addition, we note that we have constrained our population of potentially affected entities to those found in counties overlapping the proposed critical habitat, as opposed to including others found outside of the study area but within the States of Washington, Oregon, and California. The magnitude of the effect on these entities’ annual revenues or profits is unknown.

EXHIBIT A-3. UTILITY ENTITIES OF INTEREST IN THE 56-COUNTY STUDY AREA BASED ON DUN AND BRADSTREET DATA

NAICS CODE	DESCRIPTION	SBA DEFINITION OF A "SMALL" ENTITY	TOTAL ENTITIES	TOTAL "SMALL" ENTITIES	PERCENT "SMALL" ENTITIES
221121	Electric Bulk Power Transmission and Control	<4 million megawatt hours	14	Not available	Not available
221122	Electric Power Distribution	<4 million megawatt hours	60	Not available	Not available
486210	Pipeline Transportation of Natural Gas	<\$25 million	32	22	69%
TOTAL			106		
Source: Dun and Bradstreet, D&B - Dun's Market Identifiers, searched via Dialog File 516 on May 17, 2012.					

EXHIBIT A-4. UTILITY ENTITIES OF INTEREST IN THE 56-COUNTY STUDY AREA BASED ON U.S. CENSUS DATA

NAICS CODE	DESCRIPTION	TOTAL ENTITIES
221121	Electric Bulk Power Transmission and Control	Not available
221122	Electric Power Distribution	200
486210	Pipeline Transportation of Natural Gas	8
TOTAL		at least 208
Source: U.S. Census Bureau, 2009 County Business Patterns, June 2011. Accessed at http://www.census.gov/econ/cbp/index.html on May 17, 2012.		

A.2 UMRA ANALYSIS

410. Title II of UMRA requires agencies to assess the effects of their regulatory actions on State, local, and Tribal governments and the private sector.³⁰¹ Under Section 202 of UMRA, the Service must prepare a written statement, including a cost-benefit analysis, for rules that may result in the expenditure by State, local, and Tribal governments, in the aggregate, or by the private sector, of \$100 million or more in any one year. If a written statement is needed, Section 205 of UMRA requires the Service to identify and consider a reasonable number of regulatory alternatives. The Service must adopt the least costly, most cost-effective or least burdensome alternative that achieves the objectives of the rule, unless the Secretary publishes an explanation of why that alternative was not adopted. The provisions of Section 205 do not apply when they are inconsistent with applicable law.
411. As stated in the Proposed Rule, “the designation of critical habitat does not impose a legally binding duty on non-Federal Government entities or private parties. Under the Act, the only regulatory effect is that Federal agencies must ensure that their actions do not destroy or adversely modify critical habitat under section 7. While non-Federal entities that receive Federal funding, assistance, or permits, or that otherwise require approval or authorization from a Federal agency for an action, maybe indirectly impacted by the designation of critical habitat, the legally binding duty to avoid destruction or adverse modification of critical habitat rests squarely on the Federal agency”³⁰² Therefore, this rule does not place an enforceable duty upon State, local, or Tribal governments, or the private sector.

A.3 FEDERALISM IMPLICATIONS

412. Executive Order 13132, entitled “Federalism,” requires the Service to develop an accountable process to ensure “meaningful and timely input by state and local officials in the development of regulatory policies that have federalism implications.”³⁰³ “Policies that have federalism implications” are defined in the Executive Order to include regulations that have “substantial direct effects on the states, on the relationship between the national government and the states, or on the distribution of power and responsibilities among the various levels of government.”³⁰⁴ Under Executive Order 13132, the Service may not issue a regulation that has federalism implications, that imposes substantial direct compliance costs, and that is not required by statute, unless the Federal government provides the funds necessary to pay the direct compliance costs

³⁰¹ 2 U.S.C. 1531 et seq.

³⁰² 2012 Proposed Critical Habitat Rule, 77 FR 14146.

³⁰³ 64 FR 43255.

³⁰⁴ *Ibid.*

incurred by State and local governments, or EPA consults with State and local officials early in the process of developing the regulation.

413. This Proposed Rule does not have direct federalism implications. The designation of critical habitat directly affects only the responsibilities of Federal agencies. As a result, the Proposed Rule does not have substantial direct effects on the States, on the relationship between the national government and the States, or on the distribution of power and responsibilities among the various levels of government, as specified in the Order.
414. State or local governments may be indirectly affected by the proposed revision if they require Federal funds or formal approval or authorization from a Federal agency as a prerequisite to conducting an action. In these cases, the State or local government agency may participate in the section 7 consultation as a third party. As discussed in detail in Chapter 4, although State timberlands have the potential to be affected by the proposed designation, we find that none of the State lands proposed for designation are likely to experience incremental changes in harvested volumes of timber as a result of designating critical habitat for the NSO. This is due to a lack of Federal nexus requiring section 7 consultation on State timberlands. Therefore, the proposed revision of critical habitat is also not expected to have substantial indirect impacts on State or local governments.

A.4 POTENTIAL IMPACTS TO THE ENERGY INDUSTRY

415. Pursuant to Executive Order No. 13211, “Actions Concerning Regulations that Significantly Affect Energy Supply, Distribution, or Use,” issued May 18, 2001, Federal agencies must prepare and submit a “Statement of Energy Effects” for all “significant energy actions.” The purpose of this requirement is to ensure that all Federal agencies “appropriately weigh and consider the effects of the Federal Government’s regulations on the supply, distribution, and use of energy.”³⁰⁵
416. The Office of Management and Budget provides guidance for implementing this Executive Order, outlining nine outcomes that may constitute “a significant adverse effect” when compared with the regulatory action under consideration:
 - Reductions in crude oil supply in excess of 10,000 barrels per day (bbls);
 - Reductions in fuel production in excess of 4,000 barrels per day;
 - Reductions in coal production in excess of 5 million tons per year;
 - Reductions in natural gas production in excess of 25 million Mcf per year;
 - Reductions in electricity production in excess of 1 billion kilowatts-hours per year or in excess of 500 megawatts of installed capacity;
 - Increases in energy use required by the regulatory action that exceed the thresholds above;

³⁰⁵ Memorandum For Heads of Executive Department Agencies, and Independent Regulatory Agencies, Guidance For Implementing E.O. 13211, M-01-27, Office of Management and Budget, July 13, 2001, <http://www.whitehouse.gov/omb/memoranda/m01-27.html>.

- Increases in the cost of energy production in excess of one percent;
- Increases in the cost of energy distribution in excess of one percent; or
- Other similarly adverse outcomes.³⁰⁶

417. As described in Chapter 7, the proposed revised critical habitat designation for NSO is anticipated to affect installation and maintenance of power transmission lines and other utility pipelines. Impacts to these projects may increase the cost of energy distribution. However, we do not anticipate incremental impacts to these projects beyond the administrative costs of addressing the adverse modification standard in section 7 consultation. Given the small number of projects affected, the proposed designation is not anticipated to increase the cost of energy production or distribution in the United States in excess of one percent. Thus, none of the nine threshold levels of impact listed above is exceeded.

³⁰⁶ Ibid.

**APPENDIX B | INCREMENTAL EFFECTS MEMORANDUM FOR THE
ECONOMIC ANALYSIS OF THE PROPOSED RULE TO REVISE CRITICAL
HABITAT FOR THE NORTHERN SPOTTED OWL**

Incremental Effects Memorandum for the Economic Analysis of the Proposed Rule to Revise Critical Habitat for the Northern Spotted Owl

The purpose of this memorandum is to provide information to serve as a basis for conducting an economic analysis for the proposed revised designation of critical habitat for the northern spotted owl (*Strix occidentalis caurina*) (spotted owl). Because we recently completed an economic analysis of revised critical habitat for the spotted owl in 2008, we recognize that much of the factual information provided in that analysis, particularly with regard to the baseline conditions, continues to be informative for the purposes of completing the present analysis. Thus, the information provided in this memo should not be expected to be as comprehensive in scope as the information that would be provided for an initial designation of critical habitat. Additionally, this document is not meant to serve as an independent evaluation of potential economic impacts; its purpose is only to provide enough information on the probable incremental effects of this proposed revision of critical habitat to begin the dialogue with the contracted economists as they start to develop the draft economic analysis. This document represents only one step in this process of coordinating with the economists. The draft economic analysis, itself, will more fully articulate the probable economic incremental effects of the proposed revised designation of critical habitat for the spotted owl.

Section 4(b)(2) of the Endangered Species Act (Act) requires the Secretary of Interior (Secretary) and therefore by delegation the U.S. Fish and Wildlife Service (Service) to consider the economic, national security, and other impacts of designating a particular area as critical habitat. The Secretary may exclude an area from critical habitat if he determines that the benefits of exclusion outweigh the benefits of including the area as critical habitat, unless the exclusion will result in the extinction of the species. To comply with section 4(b)(2) of the Act and consider the economic impacts of a proposed critical habitat designation, the Service prepares an economic analysis that describes and monetizes, where possible, the probable economic impacts of the proposed regulation. The data in the economic analysis are then used to inform the balancing evaluation under section 4(b)(2) of the Act to consider any particular area for exclusion from the final designation.

Determining the economic impacts of a critical habitat designation involves evaluating the "without critical habitat" baseline versus the "with critical habitat" scenario, to identify those effects expected to occur solely due to the designation of critical habitat and not from the protections that are in place due to the species being listed under the Act. Effects of a designation equal the difference, or increment, between these two scenarios, and include the costs of both changes in management and increased administrative efforts that result from the designation. These changes are often thought of as "changes in behavior" or the "incremental effect" that would most likely result from the designation if finalized. Specific measured differences between the baseline (without critical habitat) and the designated critical habitat (with critical habitat) may include (but are not limited to) the economic effects stemming from changes in land or resource use or extraction, environmental quality, or time and effort expended on administrative and other activities by Federal landowners, Federal action agencies, and in some instances, State and local governments or private third parties. These are the incremental effects that serve as the basis for the economic analysis.

Although we are proposing to revise critical habitat, the existing 2008 designation is not included in the baseline. This is a conservative approach in that it will overstate the economic effects rather than understate them, since the economic impacts of designating revised critical habitat where critical habitat currently exists would likely be less than designating critical habitat where there currently is no critical habitat.

One of the primary purposes of this memorandum is to provide information on the likelihood that activities occurring within or affecting critical habitat will be subject to restrictions above and beyond those implemented by the baseline regulatory protections and conservation measures that are in place directly or indirectly due to the listing of the species. There are a number of ways that designation of critical habitat could influence activities; while no two consultations under section 7 of the Act are exactly the same and regional differences in spotted owl habitat exist, we've described the Service's prevailing approaches to consultation and technical assistance that may have economic effects due to the designation of critical habitat. Another important function of this memorandum is to explain any differences between actions required to avoid jeopardy versus actions that may be required to avoid adverse modification that may be reflected in changes or differences in behaviors as a result of the designation. The Service is working to update the regulatory definition of "adverse modification" since it was invalidated by several courts, including the Ninth Circuit and the Fifth Circuit.³⁰⁷ At this time (without updated regulatory language) the Service is analyzing whether destruction or adverse modification would occur based on the statutory language of the Act itself, which requires the Service to consider whether the agency's action is likely "to result in the destruction or adverse modification of habitat which is determined by the Service to be critical" to the conservation of the species. To perform this analysis, the Service considers how a proposed action is likely to affect the capability of the critical habitat unit or subunit to serve its conservation role in relation to that of the entire designated critical habitat. Ultimately, however, a determination of whether an activity may result in the adverse modification of critical habitat is based on the effects of the action to the designated critical habitat in its entirety. The information provided below is intended to identify the possible differences for the spotted owl under the different section 7 standards for jeopardy to the species and adverse modification of critical habitat.

I. Background

The proposed critical habitat rule identifies the habitat we believe meets the definition of critical habitat, i.e., areas occupied at the time of listing that contain the physical and biological features that are essential to the conservation of the species and which may require special management considerations or protections, and areas not occupied at the time of listing that are essential for the conservation of the species. The initial identification of critical habitat includes approximately 13,962,000 ac (5,649,000 ha) in 11 critical habitat units (CHUs) and 63 subunits in the States of Washington, Oregon, and California. Ownership of the lands identified in the proposed rule includes Federal, State, and private lands; however, the vast majority of the lands

³⁰⁷ *Gifford Pinchot Task Force v. United States Fish and Wildlife Service*, 378 F.3d 1059 (9th Cir. 2004); *Sierra Club v. U. S. Fish and Wildlife Service*, 245 F.3d 434 (5th Cir. 2001).

identified in the proposed rule (over 12 million acres, or approximately 86% of the total) are Federal lands.

All Forest Service and BLM lands within the proposed revised critical habitat are managed under the Northwest Forest Plan (NWFP), which established reserved areas (late-successional reserves) intended to provide for, among other things, spotted owl recovery, and non-reserved areas (“matrix” lands) where programmed timber harvest was expected to occur. The proposed revised critical habitat overlays both reserved and non-reserved NWFP lands. We recently issued a Revised Recovery Plan for the Northern Spotted Owl (2011) that recommends more specific types of timber-harvest prescriptions in both areas managed for wildlife and areas managed for timber production, and also recommends extra protections for older habitat and spotted owl sites in non-reserved areas or areas managed for timber production. Currently, the guidelines for managing the large reserves of the NWFP are more restrictive than the recommendations for reserved lands in the Revised Recovery Plan or in the proposed revised critical habitat designation.

State lands in Washington, Oregon, and California and private lands in California and Washington are included in the proposed revised critical habitat rule. No Indian lands are included in the critical habitat designation. Table 1 gives the total amounts of spotted owl critical habitat being proposed by land ownership.

Table 1. Proposed revised critical habitat for the spotted owl, describing area included under different landownerships.

	<u>acres</u>	<u>hectares</u>
USFS	9,527,128	3,855,492
BLM	1,483,666	600,419
NPS	998,585	404,113
State	671,036	271,558
Private	1,267,704	512,279
DOD	14,330	5,799
Indian	0	0
Total	13,962,449	5,649,660

Consultation

Section 7 of the Act requires Federal agencies to consult with the Service when an action “may affect” a listed species or designated critical habitat to ensure the action will not jeopardize the continued existence of the species or result in the destruction or adverse modification of the critical habitat. In areas occupied by the species, a project is more likely to be a “may affect” to the species and trigger a consultation than in unoccupied areas. Where critical habitat is designated, any impact to the primary constituent elements (PCEs) or physical and biological features essential to the species’ conservation or other habitat characteristics in areas determined to be essential would likely reach the “may affect” standard whether the area is occupied or not.

A jeopardy analysis for the spotted owl would look at the magnitude of the proposed action's impacts relevant to the population(s) across the spotted owl's range. More specifically, the jeopardy analysis would focus on the project's effects on the species' reproduction, numbers, and distribution, including impacts to: spotted owl nest sites; core areas around the nest sites; home ranges around the nest sites; the ability of the affected landscape to support spotted owl connectivity between populations; the effect on nesting spotted owls from noise; and the likelihood of spotted owl interactions with barred owls.

A critical habitat adverse-modification analysis would focus on the proposed action's impacts on the PCEs, physical and biological features, or other habitat characteristics, and analyze the impacts of the proposed action on the capability of the critical habitat unit to maintain its conservation role and function for the spotted owl as part of the larger designation. Included in this analysis would be impacts to: the ability of critical habitat to provide adequate nest sites; the ability of critical habitat to provide adequate core areas around those nest sites; and the ability of critical habitat to provide for spotted owl connectivity between populations. The key factor related to evaluating potential adverse modification is whether, with implementation of the proposed Federal action, the affected critical habitat will continue to have the capability to serve its intended conservation role for the species. The designation of critical habitat helps ensure that proposed project actions will not result in adverse effects that would preclude the recovery of the species.

Due to the rarity of past determinations for section 7 consultations regarding the spotted owl reaching the level of jeopardy or adverse modification, it is difficult for us to accurately predict the differences between actions necessary to avoid jeopardy (reasonable and prudent alternatives that would be part of the baseline) and actions required to avoid adverse modification (reasonable and prudent alternatives that would be considered incremental effects since they would be attributable solely to critical habitat). Although we do not currently have a regulatory definition of adverse modification, we rely on the statutory definition in light of the *Gifford Pinchot* ruling; this provides some guidance for distinguishing the different standards for determining jeopardy and adverse modification. Adverse modification is aimed at preventing significant impairment of the conservation value of critical habitat to allow for spotted owl recovery. The Service's jeopardy analyses for this species have also relied heavily on assessing the effects to habitat. See *Gifford Pinchot Task Force*, 378 F.3d at 1065-67 (upholding use of habitat as a proxy for the species in spotted owl jeopardy analyses). Thus, as described above, modification of habitat can have adverse effects both on spotted owls and on spotted owl critical habitat. As a consequence, the project modifications, conservation measures, changes in behavior, or other commitments the Service seeks in order to minimize those habitat-based impacts are often similar, whether we are consulting on effects to spotted owls or to critical habitat.

Potential commitments that may be applied to avoid both jeopardy and adverse modification include, but are not limited to: reducing the amount of habitat affected by a project; modifying a project to reduce the impact to each acre of affected habitat (e.g., conducting a thinning instead of a clearcut); reducing the impacts to habitat close to known spotted owl nesting areas; reducing

impacts to habitat in areas that are important for spotted owl connectivity across the landscape, etc.

Occupancy

For the purposes of conducting a jeopardy analysis, it is important to assess whether the action area is occupied by the listed species at the time of the consultation. The Service conducts a jeopardy analysis if the proposed action may affect the listed species, which is more likely within occupied habitat. The Service conducts an adverse modification analysis if an action may affect designated critical habitat regardless of present occupancy by the listed species. This is one of the key determinants of incremental impacts of a critical habitat designation.

All 11 of the CHUs and 63 of the 64 subunits of proposed revised critical habitat are presently occupied by the spotted owl. The one exception is subunit NCO-3 (Joint Base Lewis-McChord in Washington, which is composed entirely of Federal lands)—it appears to be presently entirely unoccupied by spotted owls. Although the other 63 subunits are all occupied by the spotted owl at the population scale, small interspersed portions within those subunits may be currently unoccupied by the spotted owl.

While spotted owl surveys occur in all the proposed CHUs, they are not conducted evenly throughout the range or within CHUs. When we consult on activities potentially affecting spotted owls and their habitat, more often than not there are no current survey data to inform our analysis. In such cases, we may rely on historical survey data, if any exists. In practice, to avoid the cost of conducting spotted owl surveys, the consulting action agency often assumes spotted owl habitat within a project area is occupied if the localized habitat conditions are suitable for resident spotted owls and survey data are out of date.

Current Habitat Condition

All of the subunits contain a forested mosaic that includes a wide range of habitat quality and includes some small interspersed portions that are either younger forest or are not currently forested. These small interspersed portions of younger forest are typically the result of past timber harvest or wildfire. They contain characteristics conducive to fully developing the physical or biological features essential to the conservation of the spotted owl (they are of suitable elevation, climate, and forest community type), but may currently be lacking some element of the PCEs such as large trees or dense canopies that are associated with nesting habitat.

We have determined that within the boundaries of the proposed revised critical habitat designation those areas of younger forests are essential to the conservation of the species because they fulfill at least one of two essential functions: population connectivity and space for population growth. Because the primary threat to the spotted owl at the time of listing was habitat loss and degradation, conservation and recovery of the species in some portions of its range is dependent on development of additional habitat to allow for population expansion. Therefore, portions of the habitat mosaic in some critical habitat subunits proposed for

designation consist of younger and/or partially-harvested forest but are essential to conservation of the species because they are capable of developing the PCEs that support nesting, roosting, or foraging by spotted owls that will be necessary for population expansion.

Rangewide, the proposed revised critical habitat is comprised of approximately 4.6% younger forests that are essential to the conservation of the species, and where individual timber harvests may occur. (For analysis purposes we used a 40-acre minimum patch size to determine such areas, because areas smaller than 40 acres are not likely to have individual planned timber harvests. Based on our experience, harvests in areas smaller than 40 acres would likely be incorporated within a larger planning and consultation process). In particular, of the 63 critical habitat subunits proposed for designation, four (NCO-5, ORC-3, WCC-1 and WCS-6) contain proportionally greater areas of younger forests that are essential to the conservation of the species (10.03%, 10.29%, 12.58% and 10.42%, respectively) because they can develop additional habitat necessary to support viable spotted owl populations in the future. These areas of younger forest may or may not presently be occupied by spotted owls. These areas are important for the purposes of distinguishing potential effects of the designation, because they represent cases wherein section 7 consultations may not be necessary but for the designation of critical habitat. In other words, impacts and resulting costs associated with consultation in these areas may be solely an incremental effect of the designation.

Other Factors

Within the proposed revised critical habitat, the baseline conditions (without critical habitat) vary by the management/ownership because of varying project types, current conservation plans or regulatory requirements, Federal nexuses, practices occurring on these lands, and spotted owl occupancy. These parameters determine what changes to planned activities will occur and what type of consultation will be necessary in differing areas. As described below, the Service anticipates that the primary incremental effects of the designation will be: (1) possible reductions in timber volume in some limited portions of the landscape; and (2) the increased work effort to consult (either informally or formally) on the effects of proposed actions on critical habitat, either in addition to the action's effects to the species where a project "may affect" spotted owls, or because a consultation on the effects of a proposed action on the species would not otherwise be necessary (because the project does not reach the "may affect" level).

II. Anticipated Incremental Effects

A. Federal Lands Other Than Department of Defense Lands

The majority of spotted owl consultations under section 7 of the Act occur between the Service and the Forest Service and/or the BLM. These agencies manage approximately 19.4 and 2.7 million acres, respectively, of forest land within the range of the spotted owl. On these lands, the vast majority of consultations on proposed projects affecting spotted owls and spotted owl critical habitat are timber sales or timber-management projects. These consultations involve individual projects, batched actions, or programmatic actions for an entire program of work (e.g., road repair, habitat restoration, or timber harvest) in a single analysis. Differing timber-sale

designs may serve different purposes, including commodity extraction (timber), habitat restoration, hazard-tree removal, building or maintenance of roads, recreational development, etc. Activities on Federal lands always have a Federal nexus and routinely reach the “may affect” standard resulting in consultations considering the impacts to the spotted owl, to any other affected listed species, and to designated critical habitat where it may be affected.

In addition, we also consult on transportation projects on State (and Federal) lands when there is a Federal nexus (e.g., Federal Highway Administration funding). These projects routinely remove spotted owl habitat elements in thin strips along roadways so that maintenance or widening goals can be achieved. In some instances a relatively small block of habitat may also be removed. We are also currently working with applicants on at least three consultations on energy-transportation projects and their associated rights-of-way that could affect spotted owl proposed revised critical habitat. These energy projects include one natural-gas pipeline and two electricity-transmission power lines, all of which require the complete removal of forest structure within their rights-of-way. The natural-gas pipeline would require an approximately 100-foot-wide right-of-way corridor where all trees would initially be removed, but then allowed to regrow to original forested habitat conditions over time. The electricity-transmission projects would require an approximately 250-foot-wide right-of-way corridor where all trees would be removed and not be allowed to regrow to original habitat conditions; these areas would remain cleared. These rights-of-way would resemble long, narrow, clearcuts.

The incremental effects on an individual project of designating revised critical habitat will vary depending on where on the landscape a project is located. Different land allocations and management areas have differing baseline standards for forest management. Where more restrictive standards apply, designating critical habitat is less likely to affect the types of projects that would be proposed or resulting minimization measures; where more lenient standards apply, designating critical habitat is more likely to lead to more restrictive timber-project designs and additional administrative processes. The occupancy of spotted owls in the vicinity of a project will also routinely affect the type of activity and type of consultation necessary, which, in turn, influences the magnitude of the incremental effects. Where spotted owl survey data are lacking, the BLM and Forest Service routinely assume an area is occupied in lieu of conducting costly, multi-year surveys. Incremental effects may also be affected by the quality of habitat where the project takes place, and whether or not habitat is considered presently occupied by spotted owls. As stated above, approximately 4.6% of the proposed critical habitat is composed of younger forests that are essential to the conservation of the species where individual timber harvest may occur.

The all-or-nothing nature of the road building/maintenance projects and for energy-transportation projects set them apart from the other projects we consult on. Their project goals require complete forest removal, thereby precluding opportunities to request or negotiate for minimizing the impacts to spotted owls by modifying the harvest prescriptions. Instead, in such cases we strive to minimize impacts to spotted owls and critical habitat through early involvement in the planning process that allows us to recommend those routes that have the least impact on spotted owls and still meet the project’s goals. Because the impacts to spotted owl habitat are so stark,

we routinely conduct formal consultations on these projects unless they are entirely in younger forests.

At the scale energy-transportation projects are planned, it would be highly unlikely for there to be impacts to spotted owl critical habitat but not to spotted owls (e.g., a project limited entirely to younger forest). Therefore, we anticipate consultations will be formal in nature, will require effects on spotted owls to be minimized to the extent possible (thus likely minimizing impacts to critical habitat as well), and, assuming a finding of no adverse modification, would have very few incremental effects to the project beyond including an additional adverse-modification analysis in the consultations.

(1) Consultations in occupied habitat

We have entered into a streamlined consultation agreement with the BLM and Forest Service that provides for detailed discussions prior to their submission of a biological assessment for purposes of conducting section 7 consultation under the Act. This pre-consultation process includes discussions and negotiations on project design and how to best implement the project while minimizing impacts to the spotted owl and its critical habitat. During this informal consultation period, the Service and the action agency often develop project modifications that reduce the impacts of the proposed action to the affected species and/or its designated critical habitat. These measures may include timing restrictions on project implementation, modifications to harvest locations based on underlying land-use allocations, modification of tree-retention provisions near nest sites or high-quality habitat, reductions in proposed harvest prescriptions to retain forest-stand function, etc. While not all of these measures are applicable as provisions designed to reduce impacts to critical habitat (e.g., timing restrictions specific to spotted owl nesting chronology), most conservation measures for the species are likely to benefit critical habitat, too. Therefore, where consultation would already occur, critical habitat designation would result in very little additional staff effort to the existing baseline process or restrictions to the actual proposed action.

While reasonable and prudent alternatives could substantially change a proposed project and affect the economic gains from a timber project, a determination that a project would result in jeopardy or adverse modification with respect to spotted owls is an extremely rare event because: (1) the Northwest Forest Plan (NWFP) guides the development of BLM and Forest Service actions in a manner that considers the conservation needs of the spotted owl, and (2) the consultation-streamlining procedures in place within the range of the spotted owl are likely to elevate such types of actions for resolution before a formal consultation occurs. Our consultation-streamlining process mandates that the action agency and the Service collaborate on the effects of a proposed action prior to the submission of a biological assessment. As a consequence, impacts that may rise to the level of jeopardy or adverse modification are unlikely to ever be included in a biological assessment or biological opinion under this interagency effort.

Incremental Effects of Critical Habitat in Areas Managed for Late-Successional Habitat

Timber-management projects on Federal lands within the range of the spotted owl will vary in their design depending on the land-use allocation they are in and on the management plan under which they are administered. For example, projects located within a NWFP late-successional reserve (LSR) will be designed to accelerate the development of older, more-complex forests for the benefit of many late-successional species, including the spotted owl. Guidelines for management in LSRs, whether in spotted owl habitat or in younger forest, are generally more restrictive than our management recommendations in the Revised Recovery Plan and those outlined in the preamble to the proposed critical habitat designation. One exception would include timber management after a fire. The Revised Recovery Plan (Recovery Action 12 (RA 12)) recommends:

In lands where management is focused on development of spotted owl habitat, post-fire silvicultural activities should concentrate on conserving and restoring habitat elements that take a long time to develop (e.g., large trees, medium and large snags, downed wood).

In the NWFP LSRs provide for salvage logging after fire events greater than 10 acres in size that would likely be inconsistent with RA 12, identified above. Otherwise, we don't anticipate requesting any project modifications to proposed projects in LSRs. While we do not expect that substantive changes to a project would be required to avoid adverse modification to critical habitat, in LSRs that are occupied or assumed occupied by the spotted owl the critical habitat designation will trigger an adverse modification analysis in addition to the baseline jeopardy analysis. As referenced above, the cooperative nature of inter-agency consultations makes jeopardy and/or adverse modification determinations for the spotted owl extremely rare. By minimizing the impacts of proposed projects to the spotted owl and its habitat we believe it is likely we've also minimized the impacts to the proposed critical habitat network, since many (but not all) of the minimization actions overlap both the species and its important habitat. Therefore, we expect the addition of an adverse modification analysis to both existing and future consultations to be a relatively minor administrative burden of an additional 4-6 hours per consultation between all Federal staff working on the consultation.

Transportation projects would be designed as linear clearcuts in that all vegetation would likely be removed. Because there is little opportunity to modify these projects where we've made a finding of no adverse modification (maintenance needs are site-specific and all vegetation must be removed), there are minimal incremental effects beyond adding an additional 4-6 hours per consultation between all Federal staff working on the consultation to include an adverse modification analysis to the necessary consultation.

In Congressionally Reserved land allocations (e.g., National Parks and wilderness areas), there is generally little or no timber management beyond, potentially, removal of hazard trees or fuels reduction to protect structures and road maintenance, in addition to fire-management activities, including "let-burn" approaches. Management guidelines for Congressionally Reserved lands are more conservative than our recommendations for critical habitat management, so we do not

anticipate requesting any changes of proposed management as a result of a critical habitat designation, and we would not anticipate reaching an adverse modification determination. In parks and wilderness we are likely to consult programmatically; where we do consult, the designation of critical habitat would likely add an adverse-modification analysis to an existing consultation. However, we do not expect it to change an informal to a formal consultation. Total incremental effects would likely be about 4-6 hours of staff time for both the action agency and the Service.

Incremental Effects of Critical Habitat in Other Management Designations

Outside of LSRs, proposed timber sales may be designed to maximize timber extraction within the NWFP guidelines, including green-tree retention, coarse-wood retention, etc. Where spotted owl habitat would be harvested within proposed critical habitat in these land-use allocations, we would likely request a modification to the prescriptions in an effort to retain and improve spotted owl habitat to better meet critical habitat goals.

More recently, timber sales in all of these non-reserved areas that are occupied by spotted owls have been generally designed following the recommendations of the Revised Recovery Plan, which call for using ecological-forestry techniques to help create better spotted owl habitat more quickly than if the forest was left alone while retaining existing spotted owls at their nests. These ecological-forestry recommendations are consistent with the activities we also recommend within critical habitat in the proposed revised rule to help develop higher-quality spotted owl habitat. Therefore, we would not be likely to request significant changes in the project design due to critical habitat.

In these cases, habitat-manipulating projects in areas presently occupied or assumed by the Federal agency to be occupied would trigger formal consultation on spotted owls, and where they overlap with the revised critical habitat, would need to include an additional adverse modification analysis. By minimizing the impacts of proposed projects to the spotted owl and its habitat we believe it is likely we've also minimized the impacts to the proposed critical habitat network, since many (but not all) of the minimization actions overlap both the species and its important habitat. Therefore, we expect the addition of an adverse modification analysis to both existing and future consultations to be a relatively minor administrative burden of an additional 4-6 hours per consultation between all Federal staff working on the consultation.

Because there is little opportunity to modify road-maintenance or road-construction projects during consultation (maintenance needs are site-specific and all vegetation must be removed) where no adverse modification results, there are minimal incremental effects beyond adding an additional 4-6 hours per consultation between all Federal staff working on the consultation to include an adverse modification analysis to the necessary consultation.

(2) Consultations in unoccupied spotted owl habitat.

Habitat-manipulation projects within unoccupied habitat often trigger formal consultation because of the impacts to the recovery potential of the species, dispersal, and reduced segregation from barred owls; however, in unoccupied spotted owl habitat outside of LSRs the

designation of critical habitat may have more of an impact on the design of proposed timber sales. The NWFP guidelines anticipated that most of the timber volume from Federal land would come from these lands, although some provisions (e.g., downed wood and leave trees) were included to assist species remaining after harvest. Since critical habitat is designated to help conserve (recover) the species, the designation of critical habitat in unoccupied spotted owl habitat may result in the Service requesting that timber sales in these areas be designed to help retain existing habitat and speed the development of spotted owl habitat and late-successional characteristics (including after wildland fire) instead of to maximize the extraction of timber. These ecological-forestry techniques may include smaller pockets of tree removal to create openings, but they would likely be significantly different than a traditional matrix timber-harvest prescription. This would be an incremental effect of critical habitat. In addition to this possible substantive effect of the designation, additional staff time in the timber-planning process would be required to conduct the consultation. The amount of additional staff time would depend on the stand type, initial prescriptions, and level of informal consultation or pre-consultation, and therefore is difficult to quantify. However, we expect the addition of an adverse-modification analysis to both existing and future consultations to be a relatively minor administrative burden of an additional 4-6 hours per consultation between all Federal staff working on the consultation.

Because current spotted owl survey data are not available for large parts of the species' range the action agencies, in concert with the Service's level one team members, may assume spotted owl occupancy or make predictions about the likelihood of a project area supporting territorial spotted owls. In an effort to analyze the incremental effects to timber harvest activities in unoccupied spotted owl habitat we combined the known spotted owl occupancy data from 1993 – 1996 with a map of the spotted owl habitat within the proposed critical habitat layer. Using these data we determined that within the spotted owl proposed critical habitat designation approximately 6.5 percent of the spotted owl habitat is likely to be unoccupied by territorial spotted owls. The modeling process we used for the proposed critical habitat designation was designed to maximize the amount of high-quality habitat that would support nesting spotted owls which is likely why so little presumed unoccupied habitat is included in the proposed designation.

Because there is little opportunity to modify road-maintenance or road-construction projects during consultation (maintenance needs are site-specific and all vegetation must be removed) where no adverse modification results, there are minimal incremental effects beyond adding an additional 4-6 hours per formal consultation between all Federal staff working on the consultation to include an adverse modification analysis to the necessary consultation.

(3) Consultations in unoccupied areas of essential younger forest

Federal projects entirely in unoccupied areas that are not presently spotted owl habitat, but are areas of younger forest essential to the conservation of the species due to their potential to develop into suitable habitat, may not trigger any consultation if not for the designation of critical habitat, since activities in unoccupied areas or areas that are not presently suitable nesting, roosting, foraging, or dispersal habitat for spotted owls rarely meet the "may affect" standard for consultation. Changes in project design could be significant in that a timber sale

could go from regeneration harvest to one more consistent with the restoration-ecology recommendations of the Revised Recovery Plan and revised critical habitat designation. This would be an incremental effect of critical habitat. Alternatively, if action agencies regularly manage these unoccupied areas, whether or not they are critical habitat, by pre-commercial and commercial thinning prescriptions, then there would be no incremental effect of the proposed designation.

In addition, if a project included only those areas of younger forest, the baseline consultation process may be completed by documenting the project would have no effect on listed species. Overlaying designated critical habitat would increase the consultation workload from a “no effect” determination to, potentially, a formal consultation that would require many hours of staff time, and therefore would also be an incremental effect of the designation.

However, just as presently suitable habitat and areas of younger forest exist in a mosaic across the landscape, timber-harvest projects often include a wide variety and cross section of the habitat within a localized area or watershed. Thus, except in areas where there are large expanses of unoccupied younger forest, it is likely that the effects of timber-harvest projects within most such areas would be included within a larger consultation effort that would include other areas of critical habitat as well. When included as part of a larger consultation on the larger landscape, which would most likely be the case for relatively small areas of younger forest within the habitat mosaic, the activities on these areas would likely be included as part of a formal consultation that already considers the effects of the project on critical habitat and, therefore, would add very little, if any, administrative effort to the overall consultation process.

Road-maintenance or road-construction projects could conceivably affect small parcels of younger forest essential to the conservation of the species without affecting existing spotted owl habitat or individual spotted owls. Depending on the severity of the impacts (adverse effects or effects that are not likely to be adverse), the presence of spotted owl critical habitat would trigger either a formal or informal consultation, respectively. While difficult to quantify, this could involve many hours of staff time to complete, and therefore be an incremental effect of the designation.

(4) Reinitiation of consultations on Federal lands

Where the Federal action agency has retained discretionary involvement or control over the project, existing consultations on projects that may affect the proposed spotted owl critical habitat will need to be reinitiated once critical habitat has been designated. By minimizing the impacts of proposed projects to the spotted owl and its habitat we believe it is likely we've also minimized the impacts to the proposed critical habitat network, since many (but not all) of the minimization actions overlap both the species and its important habitat. Therefore, we expect the addition of an adverse-modification analysis to both existing consultations in most cases to be a relatively minor administrative burden of an additional 4-6 hours per consultation between all Federal staff working on the consultation.

(5) Potential project modifications

(a) Due to the presence of the listed species. The spotted owl protections and minimization and conservation measures triggered by the consultation process (which largely occur during the pre-consultation phase consistent with our streamlined-consultation guidance) include such parameters as:

- Restrictions on the timing of activities to avoid disturbing spotted owls during critical nesting periods;
- Planning timber sales to avoid existing spotted owl sites;
- Planning timber sales to minimize the likelihood of exacerbating barred owl and spotted owl interactions, particularly at existing spotted owl sites;
- Minimizing the impacts to existing spotted owl nesting, roosting, and foraging habitat at the localized scale and dispersal habitat at the landscape scale (including overall connectivity between populations); and
- Following the recommendations of the Revised Recovery Plan for the Northern Spotted Owl, including conserving known spotted owl sites, retaining older, more-complex stands on the landscape, and following ecological-forestry techniques when conducting timber harvest in areas important to spotted owls. Due to the conservation mandate of critical habitat, our recommendations on actions in critical habitat in the matrix would likely be to change the focus from timber production to development of spotted owl habitat. Following the Revised Recovery Plan's RA 12 recommendation, our recommendations for post-fire salvage management would potentially shift from extraction of timber resources to "conserving and restoring habitat elements that take a long time to develop (e.g., large trees, medium and large snags, downed wood)." The incremental effects would not be dependent on the occupancy status of the stands.

The above measures may be applied in areas known or assumed to be occupied by spotted owls, or in areas of suitable habitat whether occupied by spotted owls or not, and may result in the action agency modifying its proposed action. Less often they may be included as mandatory terms and conditions. Such measures are likely to be agreed to during the pre-consultation phase of the process as outlined in our consultation-streamlining guidance. Conservation recommendations are a standard section of our Biological Opinions and may include surveying for spotted owls or barred owls in particular areas, testing the effects of different harvesting techniques on habitat development, etc., but these are not mandatory and are also usually negotiated up-front.

(b) Due to the designation of critical habitat. The conservation measures related specifically to spotted owl critical habitat that are often raised during the consultation process include following the recommendations of the Revised Recovery Plan for the Northern Spotted Owl by implementing ecological-forestry techniques when conducting timber harvest in areas important to spotted owls to more quickly develop late-successional conditions than would otherwise be achieved if these areas were left unmanaged. We advocate following the management recommendations for restoration management in the Revised Recovery Plan, just as we do when consulting on projects affecting spotted owls, making these measures a subset of the process

mentioned above for spotted owls. In other words, in spotted owl habitat that is occupied, assumed occupied, or where there are impacts that could affect the species, the conservation measures that apply to critical habitat are consistent with those that apply to the listed species (i.e., part of baseline effects). The only exception of a measure we'd likely seek for the sake of spotted owl critical habitat that we would not otherwise be seeking to minimize effects to spotted owls is to follow RA 12 in unoccupied matrix; conserve and restore habitat elements that take a long time to develop. The designation of critical habitat is what would change our recommendations to make these lands more "focused on the development of spotted owl habitat," consistent with the conservation mandate of critical habitat.

(c) Incremental effect of critical habitat. The primary scenarios for when critical habitat conservation measures or project modifications would constitute on-the-ground incremental effects are either in projects planned within critical habitat in unoccupied spotted owl habitat in areas where regeneration harvest timber sales were anticipated by the NWFP or in non-LSR undergoing post-fire salvage.

The highest potential for administrative incremental effects due to the designation of spotted owl critical habitat is likely to be in an unoccupied, non-reserved allocation that is young forest where an individually-planned timber harvest (not part of a larger-scale planning effort and consultation) is likely to occur such that spotted owl-specific provisions would not be necessary. We estimate that approximately 4.6 % of the proposed critical habitat meets this latter description.

(6) Summary of Federal Lands

On non-DOD Federal lands, we conclude that the highest potential for on-the-ground incremental effects due to the designation of spotted owl critical habitat is likely to be in unoccupied spotted owl habitat (1) in areas where regeneration-harvest timber sales were anticipated by the NWFP and (2) in post-fire salvage situations in non-LSR allocations.

We conclude that the highest potential for administrative incremental effects due to the designation of spotted owl critical habitat is likely to be in younger forest in a non-reserved land allocation where an individually-planned timber harvest (not part of a larger-scale planning effort and consultation) is likely to occur. We estimate that approximately 4.6 % of the proposed critical habitat meets this latter description. In those portions of the designation, formal consultation may occur as a result of the designation where no consultation would be required under the jeopardy standard. In addition, in certain circumstances, there might still have been an informal consultation, and the effect of designation might be to require formal consultation instead. The likelihood of either of these possibilities is reduced because (a) the designation process will minimize the amount of young forest in the critical habitat network, and (b) many of these activities would be included in consultations on larger scale (e.g., landscape or watershed) projects.

B. Federal Department of Defense Lands

Currently, Joint Base Lewis-McChord is the one unoccupied subunit of proposed revised critical habitat. The base currently does not consult on proposed actions relative to effects on the spotted owl, but would likely need to if critical habitat were designated on the base. The Service predicts the additional workload for Joint Base Lewis-McChord would entail two informal and two formal consultations each year to address the effects of forest management on designated critical habitat. Depending on the covered activities, we estimate that these consultations could take up to 200 hours of staff time each for the Service and for the base annually. While it is difficult to assess the impacts on these future projects since we rarely conduct consultations with the base, this subunit primarily is expected to provide connectivity between the Olympic Peninsula and the Washington Cascades, as well as to provide some limited demographic support. While higher-quality habitat assists with spotted owl connectivity, we would not likely be seeking the same amounts of nesting or roosting habitat needed to support reproducing spotted owls as we would in subunits designed for demographic support. We have not identified any substantive changes from the current management, which produced the current conditions on the base, necessary to meet the conservation goal and contribution of this subunit.

The base is currently in the process of developing a new INRMP, and therefore, the Service has not yet determined whether it qualifies for exemption under section 4(a)(3) of the Act. Since we do not yet know whether the base will meet the exemption criteria, it is prudent to evaluate whether the critical habitat designation would result in any incremental effects on the installation.

C. Non-Federal Lands

(1) Effects on Private and State Land with an HCP or SHA

Private and State-managed lands within proposed critical habitat fall into two categories: (1) lands with a Habitat Conservation Plan (HCP) or Safe Harbor Agreement (SHA), and (2) lands without an HCP or SHA. HCPs and SHAs are incorporated into ESA section 10 permits issued by the Service. On that basis, they would be subject to the requirements of section 7(a)(2) of the Act. For HCPs or SHAs currently in effect that may affect spotted owl critical habitat, reinitiation of formal intra-Service consultation may be required.

Service staff in California and Washington have reviewed the HCPs and SHAs that would be affected by the proposed revised spotted owl critical habitat. The results of their preliminary analysis suggest that the activities covered under these permits are not likely to result in adverse modification of critical habitat; however, we will provide you with additional information if this assessment changes. There are no HCPs or SHAs in Oregon that will be affected by the proposed revised spotted owl critical habitat. Thus, we do not anticipate any incremental effects associated with HCPs or SHAs attributable to the designation of critical habitat other than formalizing our adverse modification analysis.

(2) Effects on Private or State Lands without an HCP or SHA

Other activities affecting spotted owl critical habitat on non-Federal lands would not be subject to the requirements of section 7 of the Act unless a Federal nexus (permit, funding, etc.) is involved. Absent the need for a permit under section 10 of the Act, it is anticipated that the activities by most private timberland owners would not have any Federal nexus and, therefore, would not be subject to the requirements of section 7 consultation. However, if take of a listed species by a proposed non-Federal action is anticipated, an incidental-take permit issued by the Service is required under section 10 of the Act. That permit action by the Service would be subject to consultation under section 7 of the Act, including the prohibition of adverse modification of critical habitat. By minimizing the impacts of proposed actions under an HCP or SHA to the spotted owl and its habitat, we believe it is likely we will also minimize the impacts to the proposed critical habitat network, since many (but not all) of the minimization actions overlap both the species and its important habitat. In those cases, the critical habitat analysis included in the internal (i.e., limited to the Service) section 7 consultation on the permit action would involve a similar level of additional staff effort as referenced earlier in this document (i.e., 2 to 3 hours), but would not result in any additional administrative costs to the permit applicant.

We expect that for a proposed action on private lands to result in a finding of adverse modification (i.e., that it would likely substantially reduce the conservation value of spotted owl critical habitat to such an extent that it would affect the ability of critical habitat to serve its intended recovery role), it would likely have to significantly alter large areas or restrict spotted owl connectivity through such areas. In light of our history of consultations, we believe that an adverse-modification finding is unlikely: in over 20 years of conducting consultations on the spotted owl, we have never had such a case. Nonetheless, should this occur, to avoid adverse modification we would most likely recommend reducing the scale of impacts to spotted owl habitat in the vicinity of areas important for connectivity or near population strongholds. In this rare event, there would potentially be some cost to the landowner in terms of reduced potential harvest.

D. Potential Future Conditions

(1) Potential for Range Contraction

The above discussion describes the current state of section 7 consultation on the effects of timber management to spotted owls across the three-State range of the proposed revised critical habitat. While we believe it is likely the spotted owl will persist across its range given the protections provided by listing, as well as the conservation measures currently being implemented and those recommended by the Revised Recovery Plan, the influence of the barred owl on the spotted owl could conceivably cause some sort of range contraction in the future. If this were to occur in designated spotted owl critical habitat, such that presently occupied areas were to become unoccupied, it is possible that Federal land managers and HCP or SHA applicants may no longer need to consult on the effects of a proposed action on spotted owls under the jeopardy standard, but they would still be required to consult on the effects of a proposed action to spotted owl critical habitat. This could effectively reduce the baseline against which the impact of the designation is measured, or, put another way, could potentially increase the incremental effect of

critical habitat under such a scenario. However, the extent of any hypothetical future range contraction, the extent of additional workload for new adverse modification analyses, and the impact of management changes that would then be attributable solely to the designation are speculative at this time.

In the case of an HCP or SHA on a species other than the spotted owl (because this scenario assumes no spotted owl is present, so there would be no potential take under section 10 of the Act, and no incidental take statement would be necessary), the consultation on that HCP or SHA would be a formal consultation for the covered species, and adding in an analysis on spotted owl critical habitat would not be a significant burden, although it may require more time than adding a critical habitat analysis to a formal consultation that included spotted owl. We believe it is extremely unlikely that any HCPs or SHAs initiated after critical habitat was designated would result in adverse modification of spotted owl critical habitat.

Under a range-contraction scenario, on Federal lands the trigger for consultation could be more easily met than on non-Federal lands. In the potential absence of spotted owls, we would expect a higher administrative economic effect caused by the designation of critical habitat, since informal and formal consultations might need to be initiated that would otherwise not be necessary. The extent of the additional administrative burden is impossible to predict as it would vary widely depending on the size of a hypothetical range contraction. The substantive effects resulting from a critical habitat designation in what would be unoccupied habitat would be the same as described above in the Federal Lands discussion. With that said, we do not anticipate that a future range contraction is a reasonably likely scenario.

(2) Potential for Future Revision of Management Plans

(a) Forest Service. The Forest Service has begun the process of revising its Land and Resource Management Plans (which outline the management of, usually, individual National Forests) with the Wenatchee-Okanagan National Forests, and has plans to continue these revisions through most of the range of the spotted owl in the coming decade or more. These revisions could modify the current land-use allocations (e.g., change late-successional reserve to matrix), which could greatly alter both the intended management on those specific areas and also the effect of having designated critical habitat within those areas. It is not possible for us to predict where or how these changes will align with the proposed revised spotted owl critical habitat, except to assume areas of designated critical habitat will continue to be in some sort of reserve or conservation-management status.

(b) Bureau of Land Management. In 2008, the BLM revised its resource-management plans for western Oregon (where the large majority of its lands occur within the range of the spotted owl). Due to legal challenges, the BLM announced on March 9, 2012 that it was initiating the revision of their resource management plans in western Oregon. While we expect BLM to take into account the final critical habitat designation, it would be premature to predict the how management goals and objectives in their revision (including any potential land allocations) would correspond to spotted owl critical habitat. Until these revisions are complete the BLM

will be managing their lands within the range of the spotted owl under the NWFP (per solicitor's email).

III. Conclusion

In summary, the incremental effects of designating critical habitat for the spotted owl are determined by the effect of a proposed action on spotted owl habitat, the location of the proposed action relative to a land-use allocation, the occupancy status, and the design of the proposed action (see Table 1). We expect that any potential incremental effects of the critical habitat designation would be due to: (1) an increased workload for action agencies and the Service to conduct re-initiated consultations for ongoing actions in newly designated critical habitat (areas proposed for designation that are not already included within the extant designation); (2) including an analysis of the effects to critical habitat for new projects occurring in occupied areas of designated critical habitat; and (3) potential project alterations in unoccupied critical habitat and in post-fire salvage situations.

Table 1 –Potential types of modifications to project design and consultation procedures resulting from designation of spotted owl critical habitat in different land ownerships, land allocations, habitat conditions, and occupancy scenarios. Not all consultations or timber-management goals are exactly the same across the range of the species.

Land Allocation	Presently spotted owl habitat?	Occupied?	Baseline Management Recommendations	Potential Changes in Management due to CH Designation	Baseline Consultation Type	Potential Changes to Consultations due to CH Designation	Potential Incremental Effect
Federal– LSR	Yes	Yes or No	Retention or Development of late-successional forest characteristics	None	Likely LAA/ Biological Opinion	Minor (add Adv Mod analysis)	Minor (+4-6 hours staff time)
Federal– LSR	No	No	Development of late-successional forest characteristics	None	Likely NLAA/ or No Effect	Likely NLAA	Yes
Federal Non reserved	Yes	Yes	Ecological forestry to benefit spotted owls	None	LAA	Minor (add Adv Mod analysis)	Minor (+4-6 hours staff time)
Federal Non reserved	Yes	No	Variable – Ecological forestry to commercial timber harvest	Ecological forestry to benefit spotted owls	LAA	Minor (add Adv Mod analysis)	Yes
Federal matrix	No	No	Pre-Commercial timber sale/ thinning	Thinning using ecological forestry techniques to develop habitat	NLAA/ No Effect	NLAA or LAA	Yes
HCP	Variable	Variable	As agreed upon	If Adverse Modification, Request Retention or Development of late-successional	LAA/ Biological Opinion	Reinitiation of Biological Opinion	Yes

Land Allocation	Presently spotted owl habitat?	Occupied?	Baseline Management Recommendations	Potential Changes in Management due to CH Designation	Baseline Consultation Type	Potential Changes to Consultations due to CH Designation	Potential Incremental Effect
				forest characteristics			
Non-Federal	Yes	Yes	Variable depending on goals	Request Retention or Development of late-successional forest characteristics	HCP with internal Biological Opinion	None	Yes
Non-Federal	Yes	No	Variable	None	Unlikely – lack of Federal nexus	None	No
Non-Federal	No	No	Variable	None	Unlikely – lack of Federal nexus	None	No

APPENDIX C | CONTACTS

EXHIBIT C-1. PUBLIC ENTITY REPRESENTATIVES CON DURING OUTREACH AND DATA COLLECTION EFFORT

NAME	TITLE	AGENCY
FEDERAL GOVERNMENT		
Tracy Beck	Director of Natural Resources, Region 6	United States Forest Service
Elisabeth Grinspoon	Regional Social Scientist, Region 6	United States Forest Service
Barnie Gyant	Deputy Director of Ecosystem Management, Region 5	United States Forest Service
Debbie Hollen	Assistant Director, Region 6	United States Forest Service
Patricia Krueger	Threatened and Endangered Species Coordinator, Region 5	United States Forest Service
Joe Sherlock	Assistant Regional Silviculturist, Region 5	United States Forest Service
Ray Davis	North Umpqua Ranger District, Umpqua National Forest, Region 6	United States Forest Service
Elaine Rybak	Threatened and Endangered Species Wildlife Biologist, Program Assistant, Region 6	United States Forest Service
Bruce Hollen	Threatened and Endangered Wildlife Lead, Washington and Oregon	United States Bureau of Land Management
Chris Cadwell	Forester/Resource Analyst, Oregon State Office	United States Bureau of Land Management
Lee Folliard	Forest Resources Branch Chief, Portland Office	United States Bureau of Land Management
Carolina Hooper	Plans Forester, Tillamook Resource Area	United States Bureau of Land Management
Gregory Schmidt	Official U.S. Fish and Wildlife Service Liaison to California Department of Transportation, Regions 1,2,3	United States Fish and Wildlife Service
David Leal	Official U.S. Fish and Wildlife Service Liaison to Oregon Department of Transportation	United States Fish and Wildlife Service
Emily Teachout	Official U.S. Fish and Wildlife Service Liaison to Washington State Department of Transportation	United States Fish and Wildlife Service
Mike Jewell	Regulatory Branch/Division Chief, Sacramento District	United States Army Corps of Engineers
Shawn Zinszer	Deputy Chief, Regulatory Branch, Portland District	United States Army Corps of Engineers

NAME	TITLE	AGENCY
Maryann Baird	Threatened and Endangered Species Coordinator, Seattle Regulatory District	United States Army Corps of Engineers
Jeff Laufle	Seattle Environmental Branch	United States Army Corps of Engineers
Laurie Lee Jenkins	Regional Climate Change Liaison, Pacific West Region	National Parks Service
STATE OF WASHINGTON		
Lenny Young	Department Supervisor, Office of the Commissioner of Public Lands	Washington Department of Natural Resources
Aaron Everett	State Forester & Federal Policy Liaison	Washington Department of Natural Resources
Julie Sackett	Division Manager, Forest Resources and Conservation	Washington Department of Natural Resources
Lauren Burnes	Northern Spotted Owl Recovery Coordinator	Washington Department of Natural Resources
Darin Cramer	Division Manager, Forest Practices	Washington Department of Natural Resources
Jennifer Quan	Lands Division Manager	Washington Department of Fish and Wildlife
Joseph Buchanan	Forest Wildlife Unit Leader	Washington Department of Fish and Wildlife
Marion Carey	Director, Environmental and Engineering Programs	Washington State Department of Transportation
Angela Burrell	Energy Policy Research Analyst, Energy Office	Washington Department of Commerce
STATE OF OREGON		
Kevin Birch	Director, Forest Resources Planning Program	Oregon Department of Forestry
Mike Bordelon	State Forest Division Chief	Oregon Department of Forestry
Jim Paul	Assistant Director	Oregon Department of State Lands
Ken Cannon	Aquatic Biology Program Coordinator	Oregon Department of Transportation
Todd Cornett	Facility Siting Analyst	Oregon Department of Energy
STATE OF CALIFORNIA		
Joe Croteau	Environmental Scientist	California Department of Fish and Game
Chris Browder	Deputy Chief, Timber Harvest Plan Administration	California Department of Forestry and Fire Protection
Jay Harris	Senior Environmental Scientist	California Department of State Parks
Annette Clark	Senior Transportation Planner, Specialist Policy and Programming Coordinator Office of Projects/Plans, Coordination Division of Transportation Planning Office	California Department of Transportation
Richard York	Senior Biologist	California Energy Commission

**EXHIBIT C-2. PRIVATE AND NON-PROFIT ENTITY REPRESENTATIVES CONSULTED DURING
OUTREACH AND DATA COLLECTION EFFORT**

NAME	COMPANY/ENTITY	GROUP REPRESENTED
Galen Shuler	Green Diamond Resource Company	Large Private Landowners
Kevin Godbout	Weyerhaeuser	Large Private Landowners
Steve Barnowe-Meyer	Weyerhaeuser	Large Private Landowners
Jim Johnston	Weyerhaeuser	Large Private Landowners
Tony Melchiors	Weyerhaeuser	Large Private Landowners
Bob Meier	Rayonier	Large Private Landowners
Bob Monahan	N/A	Small Private Landowners
Kris Kreps	Kreps Ranch	Small Private Landowners
Rick Dunning	Washington Farm Forestry Association	Industry Association
Cindy Mitchell	Washington Forest Protection Association	Industry Association
Tom Partin	American Forest Resources Council	Industry Association
Cameron Krauss	Swanson Group	Small Mills/Manufacturers
Don Harwicke	Swanson Group	Small Mills/Manufacturers
Dee Sanders	Trinity River Lumber Company	Small Mills/Manufacturers
Jason Spadaro	SDS Lumber	Large Mills/Manufacturers and Large Private Landowners
Ken Wienke	Boise Cascade	Large Mills/Manufacturers
Mark Haggerty	Headwaters Economics	Independent Research Group

APPENDIX D | SENSITIVITY OF RESULTS TO DISCOUNT RATE

418. This appendix summarizes the costs of NSO critical habitat designation quantified in Chapters 4 and 7 of this report. It presents potential incremental impacts overall and by economic activity—including Federal timber management project modifications, Federal timber management administrative costs, and linear project administrative costs—assuming real discount rates of three percent and seven percent under the three alternative scenarios described in Chapter 4.³⁰⁸ Then, it summarizes potential undiscounted incremental impacts by year for each economic activity. These details are provided in accordance with OMB guidelines for developing benefit and cost estimates. OMB directs the analysis to: “include separate schedules of the monetized benefits and costs that show the type and timing of benefits and costs, and express the estimates in this table in constant, undiscounted dollars.”³⁰⁹

D.1 SCENARIO 1 - ADMINISTRATIVE COSTS ONLY

419. Exhibit D-1 summarizes the overall potential incremental impacts under Scenario 1 (administrative costs only). This scenario assumes minimal or no changes in Federal timber harvest from projected levels will result from critical habitat designation. Exhibit D-2 summarizes potential incremental administrative impacts to Federal timber harvest management and Exhibit D-3 summarizes potential incremental administrative impacts to linear projects. Finally, Exhibit D-4 summarizes potential undiscounted incremental impacts by year for each economic activity.

³⁰⁸ A more detailed discussion of how to calculate present and annualized values, as well as the relevant discount rates, is provided in Chapter 2 of this report.

³⁰⁹ Office of Management and Budget, Circular A-4, September 17, 2003, p. 18. The reference to “constant” dollars indicates that the effects of general price level inflation (the tendency of all prices to increase over time) should be removed through the use of an inflation adjustment index.

EXHIBIT D-1. SUMMARY OF TOTAL POTENTIAL INCREMENTAL IMPACTS BY UNIT (\$2011), 2012-2031

UNIT	PRESENT VALUE (7 PERCENT)		PRESENT VALUE (3 PERCENT)		ANNUALIZED (7 PERCENT)		ANNUALIZED (3 PERCENT)	
	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
East Cascades North	-\$187,000	-\$336,000	-\$248,000	-\$447,000	-\$18,700	-\$33,700	-\$18,700	-\$33,700
East Cascades South	-\$166,000	-\$298,000	-\$224,000	-\$402,000	-\$14,900	-\$26,900	-\$14,900	-\$26,900
Inner California Coast Ranges	-\$164,000	-\$295,000	-\$221,000	-\$398,000	-\$14,700	-\$26,500	-\$14,700	-\$26,500
Klamath East	-\$165,000	-\$297,000	-\$223,000	-\$400,000	-\$14,800	-\$26,600	-\$14,800	-\$26,600
Klamath West	-\$166,000	-\$298,000	-\$223,000	-\$401,000	-\$14,900	-\$26,800	-\$14,900	-\$26,800
North Coast Olympics	-\$484,000	-\$682,000	-\$653,000	-\$920,000	-\$43,100	-\$60,800	-\$43,100	-\$60,800
Oregon Coast	-\$165,000	-\$297,000	-\$223,000	-\$400,000	-\$14,800	-\$26,600	-\$14,800	-\$26,600
Redwood Coast	-\$168,000	-\$302,000	-\$226,000	-\$406,000	-\$15,400	-\$27,800	-\$15,400	-\$27,800
West Cascades Central	-\$165,000	-\$297,000	-\$223,000	-\$401,000	-\$14,700	-\$26,500	-\$14,700	-\$26,500
West Cascades North	-\$168,000	-\$301,000	-\$226,000	-\$407,000	-\$14,900	-\$26,800	-\$14,900	-\$26,800
West Cascades South	-\$165,000	-\$297,000	-\$223,000	-\$401,000	-\$14,800	-\$26,600	-\$14,800	-\$26,600
TOTAL	-\$2,160,000	-\$3,700,000	-\$2,910,000	-\$4,980,000	-\$196,000	-\$335,000	-\$196,000	-\$335,000
<u>Notes:</u> All estimates are rounded to three significant digits and may not sum due to rounding.								

EXHIBIT D-2. SUMMARY OF POTENTIAL INCREMENTAL ADMINISTRATIVE IMPACTS TO FEDERAL TIMBER MANAGEMENT BY UNIT (\$2011), 2012-2031

UNIT	PRESENT VALUE (7 PERCENT)		PRESENT VALUE (3 PERCENT)		ANNUALIZED (7 PERCENT)		ANNUALIZED (3 PERCENT)	
	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
East Cascades North	-\$162,000	-\$291,000	-\$219,000	-\$394,000	-\$14,300	-\$25,700	-\$14,300	-\$25,700
East Cascades South	-\$162,000	-\$291,000	-\$219,000	-\$394,000	-\$14,300	-\$25,700	-\$14,300	-\$25,700
Inner California Coast Ranges	-\$162,000	-\$291,000	-\$219,000	-\$394,000	-\$14,300	-\$25,700	-\$14,300	-\$25,700
Klamath East	-\$162,000	-\$291,000	-\$219,000	-\$394,000	-\$14,300	-\$25,700	-\$14,300	-\$25,700
Klamath West	-\$162,000	-\$291,000	-\$219,000	-\$394,000	-\$14,300	-\$25,700	-\$14,300	-\$25,700
North Coast Olympics	-\$476,000	-\$668,000	-\$644,000	-\$903,000	-\$42,000	-\$58,900	-\$42,000	-\$58,900
Oregon Coast	-\$162,000	-\$291,000	-\$219,000	-\$394,000	-\$14,300	-\$25,700	-\$14,300	-\$25,700
Redwood Coast	-\$162,000	-\$291,000	-\$219,000	-\$394,000	-\$14,300	-\$25,700	-\$14,300	-\$25,700
West Cascades Central	-\$162,000	-\$291,000	-\$219,000	-\$394,000	-\$14,300	-\$25,700	-\$14,300	-\$25,700
West Cascades North	-\$162,000	-\$291,000	-\$219,000	-\$394,000	-\$14,300	-\$25,700	-\$14,300	-\$25,700
West Cascades South	-\$162,000	-\$291,000	-\$219,000	-\$394,000	-\$14,300	-\$25,700	-\$14,300	-\$25,700
TOTAL	-\$2,100,000	-\$3,580,000	-\$2,830,000	-\$4,840,000	-\$185,000	-\$316,000	-\$185,000	-\$316,000
Notes: All estimates are rounded to three significant digits and may not sum due to rounding.								

EXHIBIT D-3. SUMMARY OF POTENTIAL INCREMENTAL ADMINISTRATIVE IMPACTS TO LINEAR PROJECTS BY UNIT (\$2011), 2012-2031

UNIT	PRESENT VALUE (7 PERCENT)		PRESENT VALUE (3 PERCENT)		ANNUALIZED (7 PERCENT)		ANNUALIZED (3 PERCENT)	
	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
East Cascades North	-\$25,000	-\$44,900	-\$29,400	-\$52,800	-\$4,430	-\$7,960	-\$4,420	-\$7,950
East Cascades South	-\$3,670	-\$6,600	-\$4,390	-\$7,900	-\$646	-\$1,160	-\$645	-\$1,160
Inner California Coast Ranges	-\$1,950	-\$3,500	-\$2,090	-\$3,760	-\$443	-\$797	-\$443	-\$797
Klamath East	-\$2,940	-\$5,290	-\$3,610	-\$6,490	-\$480	-\$863	-\$478	-\$860
Klamath West	-\$3,430	-\$6,170	-\$4,130	-\$7,430	-\$591	-\$1,060	-\$589	-\$1,060
North Coast Olympics	-\$7,620	-\$13,700	-\$9,590	-\$17,200	-\$1,060	-\$1,910	-\$1,060	-\$1,910
Oregon Coast	-\$2,940	-\$5,290	-\$3,610	-\$6,490	-\$480	-\$863	-\$478	-\$860
Redwood Coast	-\$5,860	-\$10,500	-\$6,750	-\$12,100	-\$1,150	-\$2,060	-\$1,140	-\$2,060
West Cascades Central	-\$3,100	-\$5,570	-\$3,850	-\$6,930	-\$443	-\$797	-\$443	-\$797
West Cascades North	-\$5,530	-\$9,940	-\$7,200	-\$12,900	-\$623	-\$1,120	-\$623	-\$1,120
West Cascades South	-\$3,080	-\$5,540	-\$3,750	-\$6,740	-\$492	-\$885	-\$488	-\$876
TOTAL	-\$65,100	-\$117,000	-\$78,300	-\$141,000	-\$10,800	-\$19,500	-\$10,800	-\$19,400
<u>Notes:</u> All estimates are rounded to three significant digits and may not sum due to rounding.								

EXHIBIT D-4. SUMMARY OF POTENTIAL INCREMENTAL IMPACTS BY YEAR BY ACTIVITY (UNDISCOUNTED, \$2011), 2012-2031

YEAR	PROJECT MODIFICATION IMPACTS TO FEDERAL TIMBER MANAGEMENT		ADMINISTRATIVE IMPACTS TO FEDERAL TIMBER MANAGEMENT		IMPACTS TO LINEAR PROJECTS		TOTAL	
	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
2012	\$0	\$0	-\$185,000	-\$316,000	-\$11,900	-\$21,300	-\$197,000	-\$337,000
2013	\$0	\$0	-\$185,000	-\$316,000	-\$10,800	-\$19,300	-\$196,000	-\$335,000
2014	\$0	\$0	-\$185,000	-\$316,000	-\$10,800	-\$19,300	-\$196,000	-\$335,000
2015	\$0	\$0	-\$185,000	-\$316,000	-\$9,710	-\$17,500	-\$195,000	-\$333,000
2016	\$0	\$0	-\$185,000	-\$316,000	-\$8,380	-\$15,100	-\$193,000	-\$331,000
2017	\$0	\$0	-\$185,000	-\$316,000	-\$2,740	-\$4,920	-\$188,000	-\$321,000
2018	\$0	\$0	-\$185,000	-\$316,000	-\$2,740	-\$4,920	-\$188,000	-\$321,000
2019	\$0	\$0	-\$185,000	-\$316,000	-\$2,740	-\$4,920	-\$188,000	-\$321,000
2020	\$0	\$0	-\$185,000	-\$316,000	-\$2,740	-\$4,920	-\$188,000	-\$321,000
2021	\$0	\$0	-\$185,000	-\$316,000	-\$2,740	-\$4,920	-\$188,000	-\$321,000
2022	\$0	\$0	-\$185,000	-\$316,000	-\$2,740	-\$4,920	-\$188,000	-\$321,000
2023	\$0	\$0	-\$185,000	-\$316,000	-\$2,740	-\$4,920	-\$188,000	-\$321,000
2024	\$0	\$0	-\$185,000	-\$316,000	-\$2,740	-\$4,920	-\$188,000	-\$321,000
2025	\$0	\$0	-\$185,000	-\$316,000	-\$2,740	-\$4,920	-\$188,000	-\$321,000
2026	\$0	\$0	-\$185,000	-\$316,000	-\$2,740	-\$4,920	-\$188,000	-\$321,000
2027	\$0	\$0	-\$185,000	-\$316,000	-\$2,740	-\$4,920	-\$188,000	-\$321,000
2028	\$0	\$0	-\$185,000	-\$316,000	-\$2,740	-\$4,920	-\$188,000	-\$321,000
2029	\$0	\$0	-\$185,000	-\$316,000	-\$2,740	-\$4,920	-\$188,000	-\$321,000
2030	\$0	\$0	-\$185,000	-\$316,000	-\$2,740	-\$4,920	-\$188,000	-\$321,000
2031	\$0	\$0	-\$185,000	-\$316,000	-\$2,740	-\$4,920	-\$188,000	-\$321,000
TOTAL	\$0	\$0	-\$3,700,000	-\$6,320,000	-\$92,600	-\$166,000	-\$3,790,000	-\$6,490,000
Notes:								
All estimates are rounded to three significant digits and may not sum due to rounding.								

D.2 SCENARIO 2 - POSITIVE ECONOMIC IMPACT

420. Exhibit D-5 summarizes the overall potential incremental impacts under Scenario 2 (positive economic impact). This scenario contemplates an increase in Federal timber harvest from projected levels due to critical habitat designation. Exhibit D-6 summarizes potential incremental project modification impacts to Federal timber management. The potential incremental administrative costs are identical to those described above, under Scenario 1. Finally, Exhibit D-7 summarizes potential undiscounted incremental impacts by year for each economic activity.

EXHIBIT D-5. SUMMARY OF TOTAL POTENTIAL INCREMENTAL IMPACTS BY UNIT (\$2011), 2012-2031

UNIT	PRESENT VALUE (7 PERCENT)		PRESENT VALUE (3 PERCENT)		ANNUALIZED (7 PERCENT)		ANNUALIZED (3 PERCENT)	
	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
East Cascades North	\$1,270,000	\$3,820,000	\$1,720,000	\$5,170,000	\$108,000	\$335,000	\$108,000	\$335,000
East Cascades South	\$605,000	\$2,090,000	\$819,000	\$2,830,000	\$52,800	\$184,000	\$52,800	\$184,000
Inner California Coast Ranges	\$3,760,000	\$9,960,000	\$5,080,000	\$13,500,000	\$331,000	\$879,000	\$331,000	\$879,000
Klamath East	\$664,000	\$2,240,000	\$898,000	\$3,020,000	\$58,200	\$197,000	\$58,200	\$197,000
Klamath West	\$1,970,000	\$5,520,000	\$2,670,000	\$7,460,000	\$174,000	\$486,000	\$174,000	\$486,000
North Coast Olympics	-\$533,000	-\$113,000	-\$720,000	-\$152,000	-\$47,800	-\$10,400	-\$47,700	-\$10,400
Oregon Coast	\$1,570,000	\$4,490,000	\$2,120,000	\$6,070,000	\$138,000	\$396,000	\$138,000	\$396,000
Redwood Coast	-\$157,000	\$194,000	-\$210,000	\$264,000	-\$15,000	\$16,500	-\$15,000	\$16,500
West Cascades Central	-\$66,700	\$411,000	-\$89,500	\$555,000	-\$6,190	\$36,100	-\$6,190	\$36,100
West Cascades North	-\$298,000	-\$160,000	-\$403,000	-\$216,000	-\$26,600	-\$14,300	-\$26,600	-\$14,300
West Cascades South	\$1,440,000	\$4,180,000	\$1,950,000	\$5,660,000	\$127,000	\$369,000	\$127,000	\$369,000
TOTAL	\$10,200,000	\$32,600,000	\$13,800,000	\$44,100,000	\$893,000	\$2,870,000	\$893,000	\$2,870,000
<u>Notes:</u> All estimates are rounded to three significant digits and may not sum due to rounding.								

**EXHIBIT D-6. SUMMARY OF POTENTIAL INCREMENTAL PROJECT MODIFICATION IMPACTS TO FEDERAL TIMBER MANAGEMENT BY UNIT
(\$2011), 2012-2031**

UNIT	PRESENT VALUE (7 PERCENT)		PRESENT VALUE (3 PERCENT)		ANNUALIZED (7 PERCENT)		ANNUALIZED (3 PERCENT)	
	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
East Cascades North	\$1,600,000	\$4,010,000	\$2,170,000	\$5,420,000	\$142,000	\$354,000	\$142,000	\$354,000
East Cascades South	\$903,000	\$2,260,000	\$1,220,000	\$3,050,000	\$79,700	\$199,000	\$79,700	\$199,000
Inner California Coast Ranges	\$4,050,000	\$10,100,000	\$5,480,000	\$13,700,000	\$357,000	\$894,000	\$357,000	\$894,000
Klamath East	\$961,000	\$2,400,000	\$1,300,000	\$3,250,000	\$84,800	\$212,000	\$84,800	\$212,000
Klamath West	\$2,270,000	\$5,680,000	\$3,070,000	\$7,680,000	\$200,000	\$501,000	\$200,000	\$501,000
North Coast Olympics	\$148,000	\$371,000	\$200,000	\$501,000	\$13,100	\$32,700	\$13,100	\$32,700
Oregon Coast	\$1,860,000	\$4,660,000	\$2,520,000	\$6,290,000	\$164,000	\$411,000	\$164,000	\$411,000
Redwood Coast	\$145,000	\$362,000	\$196,000	\$490,000	\$12,800	\$32,000	\$12,800	\$32,000
West Cascades Central	\$230,000	\$576,000	\$311,000	\$778,000	\$20,300	\$50,800	\$20,300	\$50,800
West Cascades North	\$3,030	\$7,570	\$4,090	\$10,200	\$267	\$668	\$267	\$668
West Cascades South	\$1,740,000	\$4,350,000	\$2,350,000	\$5,880,000	\$153,000	\$384,000	\$153,000	\$384,000
TOTAL	\$13,900,000	\$34,800,000	\$18,800,000	\$47,000,000	\$1,230,000	\$3,070,000	\$1,230,000	\$3,070,000
Notes: All estimates are rounded to three significant digits and may not sum due to rounding.								

EXHIBIT D-7. SUMMARY OF POTENTIAL INCREMENTAL IMPACTS BY YEAR BY ACTIVITY (UNDISCOUNTED, \$2011), 2012-2031

YEAR	PROJECT MODIFICATION IMPACTS TO FEDERAL TIMBER MANAGEMENT		ADMINISTRATIVE IMPACTS TO FEDERAL TIMBER MANAGEMENT		IMPACTS TO LINEAR PROJECTS		TOTAL	
	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
2012	\$1,230,000	\$3,070,000	-\$185,000	-\$316,000	-\$11,900	-\$21,300	\$891,000	\$2,870,000
2013	\$1,230,000	\$3,070,000	-\$185,000	-\$316,000	-\$10,800	-\$19,300	\$893,000	\$2,870,000
2014	\$1,230,000	\$3,070,000	-\$185,000	-\$316,000	-\$10,800	-\$19,300	\$893,000	\$2,870,000
2015	\$1,230,000	\$3,070,000	-\$185,000	-\$316,000	-\$9,710	-\$17,500	\$895,000	\$2,880,000
2016	\$1,230,000	\$3,070,000	-\$185,000	-\$316,000	-\$8,380	-\$15,100	\$897,000	\$2,880,000
2017	\$1,230,000	\$3,070,000	-\$185,000	-\$316,000	-\$2,740	-\$4,920	\$907,000	\$2,880,000
2018	\$1,230,000	\$3,070,000	-\$185,000	-\$316,000	-\$2,740	-\$4,920	\$907,000	\$2,880,000
2019	\$1,230,000	\$3,070,000	-\$185,000	-\$316,000	-\$2,740	-\$4,920	\$907,000	\$2,880,000
2020	\$1,230,000	\$3,070,000	-\$185,000	-\$316,000	-\$2,740	-\$4,920	\$907,000	\$2,880,000
2021	\$1,230,000	\$3,070,000	-\$185,000	-\$316,000	-\$2,740	-\$4,920	\$907,000	\$2,880,000
2022	\$1,230,000	\$3,070,000	-\$185,000	-\$316,000	-\$2,740	-\$4,920	\$907,000	\$2,880,000
2023	\$1,230,000	\$3,070,000	-\$185,000	-\$316,000	-\$2,740	-\$4,920	\$907,000	\$2,880,000
2024	\$1,230,000	\$3,070,000	-\$185,000	-\$316,000	-\$2,740	-\$4,920	\$907,000	\$2,880,000
2025	\$1,230,000	\$3,070,000	-\$185,000	-\$316,000	-\$2,740	-\$4,920	\$907,000	\$2,880,000
2026	\$1,230,000	\$3,070,000	-\$185,000	-\$316,000	-\$2,740	-\$4,920	\$907,000	\$2,880,000
2027	\$1,230,000	\$3,070,000	-\$185,000	-\$316,000	-\$2,740	-\$4,920	\$907,000	\$2,880,000
2028	\$1,230,000	\$3,070,000	-\$185,000	-\$316,000	-\$2,740	-\$4,920	\$907,000	\$2,880,000
2029	\$1,230,000	\$3,070,000	-\$185,000	-\$316,000	-\$2,740	-\$4,920	\$907,000	\$2,880,000
2030	\$1,230,000	\$3,070,000	-\$185,000	-\$316,000	-\$2,740	-\$4,920	\$907,000	\$2,880,000
2031	\$1,230,000	\$3,070,000	-\$185,000	-\$316,000	-\$2,740	-\$4,920	\$907,000	\$2,880,000
TOTAL	\$24,600,000	\$61,400,000	-\$3,700,000	-\$6,320,000	-\$92,600	-\$166,000	\$18,100,000	\$57,600,000
<u>Notes:</u>								
All estimates are rounded to three significant digits and may not sum due to rounding.								

D.3 SCENARIO 3 - NEGATIVE ECONOMIC IMPACT

421. Exhibit D-8 summarizes the overall potential incremental impacts under Scenario 3 (negative economic impact). This scenario contemplates a decrease in Federal timber harvest from projected levels due to critical habitat designation. Exhibit D-9 summarizes potential incremental project modification impacts to Federal timber management. The potential incremental administrative costs are identical to those described above, under Scenario 1. Finally, Exhibit D-10 summarizes potential undiscounted incremental impacts by year for each economic activity.

EXHIBIT D-8. SUMMARY OF TOTAL POTENTIAL INCREMENTAL IMPACTS BY UNIT (\$2011), 2012-2031

UNIT	PRESENT VALUE (7 PERCENT)		PRESENT VALUE (3 PERCENT)		ANNUALIZED (7 PERCENT)		ANNUALIZED (3 PERCENT)	
	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
East Cascades North	-\$3,400,000	-\$8,360,000	-\$4,590,000	-\$11,300,000	-\$302,000	-\$741,000	-\$302,000	-\$741,000
East Cascades South	-\$1,970,000	-\$4,810,000	-\$2,660,000	-\$6,500,000	-\$174,000	-\$425,000	-\$174,000	-\$425,000
Inner California Coast Ranges	-\$8,270,000	-\$20,600,000	-\$11,200,000	-\$27,800,000	-\$730,000	-\$1,810,000	-\$730,000	-\$1,810,000
Klamath East	-\$2,090,000	-\$5,100,000	-\$2,820,000	-\$6,890,000	-\$184,000	-\$450,000	-\$184,000	-\$450,000
Klamath West	-\$4,710,000	-\$11,700,000	-\$6,370,000	-\$15,800,000	-\$416,000	-\$1,030,000	-\$416,000	-\$1,030,000
North Coast Olympics	-\$780,000	-\$1,420,000	-\$1,050,000	-\$1,920,000	-\$69,200	-\$126,000	-\$69,200	-\$126,000
Oregon Coast	-\$3,890,000	-\$9,610,000	-\$5,260,000	-\$13,000,000	-\$343,000	-\$848,000	-\$343,000	-\$848,000
Redwood Coast	-\$458,000	-\$1,030,000	-\$618,000	-\$1,390,000	-\$41,000	-\$91,700	-\$41,000	-\$91,700
West Cascades Central	-\$626,000	-\$1,450,000	-\$846,000	-\$1,960,000	-\$55,400	-\$128,000	-\$55,400	-\$128,000
West Cascades North	-\$174,000	-\$316,000	-\$235,000	-\$427,000	-\$15,500	-\$28,200	-\$15,500	-\$28,200
West Cascades South	-\$3,640,000	-\$8,990,000	-\$4,930,000	-\$12,200,000	-\$322,000	-\$794,000	-\$322,000	-\$794,000
TOTAL	-\$30,000,000	-\$73,300,000	-\$40,500,000	-\$99,100,000	-\$2,650,000	-\$6,480,000	-\$2,650,000	-\$6,480,000
<u>Notes:</u> All estimates are rounded to three significant digits and may not sum due to rounding.								

**EXHIBIT D-9. SUMMARY OF POTENTIAL INCREMENTAL PROJECT MODIFICATION IMPACTS TO FEDERAL TIMBER MANAGEMENT BY UNIT
(\$2011), 2012-2031**

UNIT	PRESENT VALUE (7 PERCENT)		PRESENT VALUE (3 PERCENT)		ANNUALIZED (7 PERCENT)		ANNUALIZED (3 PERCENT)	
	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
East Cascades North	-\$3,210,000	-\$8,020,000	-\$4,340,000	-\$10,800,000	-\$283,000	-\$708,000	-\$283,000	-\$708,000
East Cascades South	-\$1,810,000	-\$4,510,000	-\$2,440,000	-\$6,100,000	-\$159,000	-\$398,000	-\$159,000	-\$398,000
Inner California Coast Ranges	-\$8,100,000	-\$20,300,000	-\$11,000,000	-\$27,400,000	-\$715,000	-\$1,790,000	-\$715,000	-\$1,790,000
Klamath East	-\$1,920,000	-\$4,800,000	-\$2,600,000	-\$6,490,000	-\$170,000	-\$424,000	-\$170,000	-\$424,000
Klamath West	-\$4,550,000	-\$11,400,000	-\$6,140,000	-\$15,400,000	-\$401,000	-\$1,000,000	-\$401,000	-\$1,000,000
North Coast Olympics	-\$296,000	-\$741,000	-\$401,000	-\$1,000,000	-\$26,200	-\$65,400	-\$26,200	-\$65,400
Oregon Coast	-\$3,720,000	-\$9,310,000	-\$5,030,000	-\$12,600,000	-\$329,000	-\$821,000	-\$329,000	-\$821,000
Redwood Coast	-\$290,000	-\$725,000	-\$392,000	-\$980,000	-\$25,600	-\$63,900	-\$25,600	-\$63,900
West Cascades Central	-\$461,000	-\$1,150,000	-\$623,000	-\$1,560,000	-\$40,600	-\$102,000	-\$40,600	-\$102,000
West Cascades North	-\$6,050	-\$15,100	-\$8,180	-\$20,500	-\$534	-\$1,340	-\$534	-\$1,340
West Cascades South	-\$3,480,000	-\$8,700,000	-\$4,700,000	-\$11,800,000	-\$307,000	-\$767,000	-\$307,000	-\$767,000
TOTAL	-\$27,800,000	-\$69,600,000	-\$37,600,000	-\$94,100,000	-\$2,460,000	-\$6,140,000	-\$2,460,000	-\$6,140,000
Notes: All estimates are rounded to three significant digits and may not sum due to rounding.								

EXHIBIT D-10. SUMMARY OF POTENTIAL INCREMENTAL IMPACTS BY YEAR BY ACTIVITY (UNDISCOUNTED, \$2011), 2012-2031

YEAR	PROJECT MODIFICATION IMPACTS TO FEDERAL TIMBER MANAGEMENT		ADMINISTRATIVE IMPACTS TO FEDERAL TIMBER MANAGEMENT		IMPACTS TO LINEAR PROJECTS		TOTAL	
	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
2012	-\$2,460,000	-\$6,140,000	-\$185,000	-\$316,000	-\$11,900	-\$21,300	-\$2,650,000	-\$6,480,000
2013	-\$2,460,000	-\$6,140,000	-\$185,000	-\$316,000	-\$10,800	-\$19,300	-\$2,650,000	-\$6,480,000
2014	-\$2,460,000	-\$6,140,000	-\$185,000	-\$316,000	-\$10,800	-\$19,300	-\$2,650,000	-\$6,480,000
2015	-\$2,460,000	-\$6,140,000	-\$185,000	-\$316,000	-\$9,710	-\$17,500	-\$2,650,000	-\$6,470,000
2016	-\$2,460,000	-\$6,140,000	-\$185,000	-\$316,000	-\$8,380	-\$15,100	-\$2,650,000	-\$6,470,000
2017	-\$2,460,000	-\$6,140,000	-\$185,000	-\$316,000	-\$2,740	-\$4,920	-\$2,640,000	-\$6,460,000
2018	-\$2,460,000	-\$6,140,000	-\$185,000	-\$316,000	-\$2,740	-\$4,920	-\$2,640,000	-\$6,460,000
2019	-\$2,460,000	-\$6,140,000	-\$185,000	-\$316,000	-\$2,740	-\$4,920	-\$2,640,000	-\$6,460,000
2020	-\$2,460,000	-\$6,140,000	-\$185,000	-\$316,000	-\$2,740	-\$4,920	-\$2,640,000	-\$6,460,000
2021	-\$2,460,000	-\$6,140,000	-\$185,000	-\$316,000	-\$2,740	-\$4,920	-\$2,640,000	-\$6,460,000
2022	-\$2,460,000	-\$6,140,000	-\$185,000	-\$316,000	-\$2,740	-\$4,920	-\$2,640,000	-\$6,460,000
2023	-\$2,460,000	-\$6,140,000	-\$185,000	-\$316,000	-\$2,740	-\$4,920	-\$2,640,000	-\$6,460,000
2024	-\$2,460,000	-\$6,140,000	-\$185,000	-\$316,000	-\$2,740	-\$4,920	-\$2,640,000	-\$6,460,000
2025	-\$2,460,000	-\$6,140,000	-\$185,000	-\$316,000	-\$2,740	-\$4,920	-\$2,640,000	-\$6,460,000
2026	-\$2,460,000	-\$6,140,000	-\$185,000	-\$316,000	-\$2,740	-\$4,920	-\$2,640,000	-\$6,460,000
2027	-\$2,460,000	-\$6,140,000	-\$185,000	-\$316,000	-\$2,740	-\$4,920	-\$2,640,000	-\$6,460,000
2028	-\$2,460,000	-\$6,140,000	-\$185,000	-\$316,000	-\$2,740	-\$4,920	-\$2,640,000	-\$6,460,000
2029	-\$2,460,000	-\$6,140,000	-\$185,000	-\$316,000	-\$2,740	-\$4,920	-\$2,640,000	-\$6,460,000
2030	-\$2,460,000	-\$6,140,000	-\$185,000	-\$316,000	-\$2,740	-\$4,920	-\$2,640,000	-\$6,460,000
2031	-\$2,460,000	-\$6,140,000	-\$185,000	-\$316,000	-\$2,740	-\$4,920	-\$2,640,000	-\$6,460,000
TOTAL	-\$49,100,000	-\$123,000,000	-\$3,700,000	-\$6,320,000	-\$92,600	-\$166,000	-\$52,900,000	-\$129,000,000
Notes:								
All estimates are rounded to three significant digits and may not sum due to rounding.								