

**Comments on the Draft Economic Analysis of Critical Habitat
Designation for the Northern Spotted Owl**

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Prepared for:
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This report was prepared by Ernie Niemi of Natural Resource Economics, Inc., which is solely responsible for its content. Natural Resource Economics, Inc. specializes in rigorous economic analysis of all aspects of the relationship between ecosystems and the economy.

This report reflects the author's general knowledge of the relationship between the forests and the economy in Oregon, Washington, and northern California, as well as information derived from government agencies, private statistical services, the reports of others, interviews of individuals, or other sources believed to be reliable. This report summarizes the results of the analysis to date. Review of additional information may result in revision of the report's presentation of facts and opinions.

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I. BACKGROUND AND SUMMARY

This report assesses whether a draft economic analysis prepared by the U.S. Fish and Wildlife Service (Service) is sufficiently comprehensive and accurate to support pending decisions by the Secretary of Interior (Secretary) regarding which areas should be designated as critical habitat for the Northern Spotted Owl (NSO).

A. Background

In response to a petition citing persistent declines in its population, the Service listed the NSO under the Endangered Species Act (ESA) as a threatened species on 26 June 1990. It subsequently designated critical habitat for the NSO, which has important implications for the species' conservation because the ESA requires each federal agency to insure that any action that is funded, authorized, or carried out by the agency is not likely to result in the destruction or adverse modification of the designated critical habitat.

Earlier this year, the Service issued a proposed rule to revise the designation to include 13,961,684 acres of critical habitat on federal, state, and private lands in Washington, Oregon, and northern California.¹ The proposed rule recommends that designated critical habitat should be subject to active management, including logging, but the details of this directive, including the impacts on the level of logging, and its scientific merit, remain uncertain..

The Service also has issued a draft "*Economic Analysis of Critical Habitat Designation for the Northern Spotted Owl*" (*Draft Analysis*).² The *Draft Analysis* has important implications because the ESA directs the Secretary 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 result in the extinction of the species concerned."

Thus, the primary purpose of the *Draft Analysis* is to provide the Secretary with information to assist in determining whether the benefits of excluding particular areas from the designation outweigh the benefits of including those areas. The Service is evaluating 4,570,476 acres for exclusion, it will evaluate additional acreage proposed by the public, and the Secretary has indicated he will give strong consideration to excluding the maximum acreage consistent with applicable law and science.

A secondary purpose of the *Draft Analysis* is to provide the Secretary and the public with information that complies with *Executive Order 12866: Regulatory Review and Planning*,

¹ 77 FR 14062; March 8, 2012.

² Industrial Economics, Inc. 29 May 2012. Available at <http://www.fws.gov/oregonfwo/Species/Data/NorthernSpottedOwl/Documents/DraftEconAnalysis.5.2.9.12.3.pdf>

which specifies standards for economic analyses of regulatory actions.³ To meet these requirements, the *Draft Analysis* also must comply with Office of Management and Budget (OMB) *Circular A-4*, which provides guidance for Executive Order 12866.

B. Summary of Findings

The *Draft Analysis* falls far short of its goal: to provide the Secretary with a sound, unbiased basis for determining if the economic benefits of excluding any area from the designation outweigh the economic benefits of including it. Instead, it provides a poorly informed, incomplete, and biased description of these benefits. Consequently, the *Draft Analysis* does not provide a reasonable basis for any determination by the Secretary to exclude any area from the final designation.

In particular, this review of the *Draft Analysis* describes specific errors that render it unsuitable to be the basis for any decision by the Secretary about excluding areas from the final designation:

a. The *Draft Analysis* narrowly focuses on how the designation of critical habitat would affect the timber industry, disregarding its other effects on the economy.

The *Draft Analysis* has an almost singular focus: determining the potential increase in timber production that might be realized from logging some lands included in the designation and from excluding other lands so they would be logged more intensively.⁴ This focus emphasizes the tail and ignores the dog, for the final designation will affect the economy of Washington, Oregon, and northern California in many ways more important than timber. Extensive evidence confirms that timber constitutes a small percentage of the total value of goods and services provided by forests in this region. With its limited focus and pro-timber bias, the *Draft Analysis* cannot provide the Secretary with a solid foundation for weighing the full economic benefits of designating lands against the full economic benefits of excluding them.

b. The *Draft Analysis* misconstrues the designation's timber-related benefits. The *Draft Analysis* measures the benefits of increased timber production with one eye closed, looking only at the market value of the additional logs and ignoring the costs of producing them. Extensive evidence indicates that, with any increase in timber production, the total cost to taxpayers may exceed the logs' market value. Moreover, increased timber production often has been associated with deteriorating indicators of socio-economic well-being in nearby rural communities. If the Secretary, relying on the *Draft Analysis*, adopts a final rule designating critical habitat for the NSO expecting that it will yield economic benefits by increasing timber production, the actual outcome may be the reverse.

d. The *Draft Analysis* fails to comply with the requirements of Executive Order 12866. This executive order requires the Secretary, before adopting a final rule

³ Available at <http://www.archives.gov/federal-register/executive-orders/pdf/12866.pdf>.

⁴ "The *Draft Analysis* also addresses the designation's potential impact on wildfire management, but only "in the context of timber management activities" It also considers road construction and linear projects, but only as a minor part of its presentation. (*Draft Analysis*, p. ES-5).

designating critical habitat for the NSO, to describe for the public and base his decision on “the best reasonably available...economic...information concerning the need for and consequences of the intended regulation.”⁵ The *Draft Analysis* overlooks far too much of the best, readily available economic information to provide a full picture of the economic consequences of excluding areas from the designation. This conclusion is reinforced by comparing the *Draft Analysis* against the requirements of OMB Circular A-4, which provides guidance for complying with Executive Order 12866. This guidance requires the Secretary to “consider any important ancillary benefits and countervailing risks” before making any decision to exclude areas from the designation, using “the same standards of information and analysis quality that apply to” the analysis of timber-related impacts.⁶ In stark contrast, The *Draft Analysis* arbitrarily focuses on how the designation (or exclusion) of different areas would affect timber production, and applies dramatically different standards of information and analysis to describe the other important ancillary benefits of designation. Thus, the Secretary would violate Executive Order 12866 if he were to rely on the *Draft Analysis* as the basis for a decision to exclude any area from the designation.

⁵ Executive Order 12866, Section 1(7).

⁶ OMB Circular A-4, p. 26.

II. THE *DRAFT ANALYSIS*: OVERVIEW

The general analytical approach exhibited in the *Draft Analysis* is similar to, and builds on, the approach used in the economic analysis supporting the 2008 designation of critical habitat for the NSO.⁷ Indeed, the *Draft Analysis* states (p. ES-9), “The 2008 Economic Analysis provided a comprehensive assessment of baseline impacts related to NSO conservation and recovery; we do not fully reconstruct that baseline characterization here, but rather focus on incremental effects.” The 2008 economic analysis, however, focused almost exclusively on how the designation of critical habitat for the NSO would affect the timber industry. This focus was so narrow that it concluded (p. ES-3), “Impacts associated with timber management [account] for 99.84 percent of forecast baseline impacts....” It reached this conclusion by not considering any impacts other than those on timber production and on linear projects, such as pipelines. With these 2008 findings as its foundation, the *Draft Analysis* similarly focuses on the timber industry and disregards the designation’s non-timber-related, economic benefits.

Summary Assessment of the *Draft Analysis*

Objective. The objective of the *Draft Analysis* is to provide information the Secretary can use to determine if the benefits of excluding particular areas from the designation outweigh the benefits of including those areas in the designation. In addition, this information is intended to satisfy the Service’s obligations under Executive Orders 12866, “Regulatory Review and Planning,” and President Obama’s memorandum of 28 February 2012 directing the Secretary of Interior to publish “a full analysis of the economic impacts of the proposed rule.

Information Sources. To develop this information, the authors of the *Draft Analysis* consulted with representatives of federal agencies, state agencies, and the timber industry. The *Draft Analysis* does not indicate that they consulted with representatives of other industries that might be affected by the designation, or with experts to determine the potential impacts on the economy that would materialize through non-commercial pathways.

Baseline. The *Draft Analysis* recognizes an obligation, under OMB Circular A-4, to define a baseline, against which to determine the designation’s incremental economic effects, that incorporates 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.” Nonetheless, it defines a baseline that incorporates a limited discussion of some changes in the timber industry, such as 20-year changes in logging and employment, but not a full discussion of trends in milling capacity, average wages, the integration of this region’s timber industry with its counterparts in the Southeast and Canada, or other factors that might affect the designation’s costs and benefits. Moreover, it adopts as its baseline assumptions incorporated in the economic analysis prepared to support the now-discredited 2008 designation of critical habitat for the NSO.

⁷ Entrix, Inc. 2008. *Final Economic Analysis of Critical habitat Designation for the Northern Spotted Owl*. U.S. Fish and Wildlife Service. July 14.

The *Draft Analysis* does not discuss at all the trends in other industries, such as outdoor recreation, fishing, or municipal/industrial water-use that might be indirectly affected by the proposed designation. Nor does it discuss regulations or policies that might be implemented by the Service or other government entities and that might affect the designation's economic costs and benefits. For example, it makes no mention of programs being considered to mitigate the costs private landowners might realize if their lands are included in the final designation, or steps Congress, the states, and local governments might take to sustain the financial strength of the region's counties.⁸ The *Draft Analysis* also does not discuss important trends in other factors that might affect the designation's economic costs and benefits. For example, it does not discuss the historical, negative correlation between the concentration of the timber industry in a community and indicators of its socio-economic well-being. It does not describe the national economic outlook and how recovery from the Great Recession would affect timber harvest, timber-related employment, total employment, county revenues, or other economic indicators. It does not describe the outlook for the value of non-timber goods and services – such as the sequestration of carbon and high-quality water, and recreational opportunities – that society derives from the region's mature and old-growth forests.

Ancillary benefits of designation. The *Draft Analysis* identifies several, but not all of the ancillary benefits of including lands in the designation of critical habitat for the NSO, and it makes an effort to quantify only one: the potential increase in timber production from federal lands. It justifies this decision by asserting that, "The majority of any economic impacts on Federal lands would be expected to result from potential changes in timber harvest." It offers no substantiation for this assertion, however. Indeed, it provides no quantitative information regarding any ancillary benefits other than timber production.

Ancillary benefits of exclusion. The *Draft Analysis* identifies several ancillary benefits of excluding lands from the designation of critical habitat for the NSO, but it makes an effort to quantify only one: excluding some lands would allow increased timber production. It offers no justification for this focus.

Uncertainty and Error. The *Draft Analysis* concedes that it relies on severe imperfections in the information it uses to describe the designation's potential effects on timber production, and it takes steps, such as offering a range of estimates, it considers appropriate to develop findings and convey to the Secretary and the public the uncertainty and risk of error in these findings. It does not, however, discuss why it did not take similar steps to describe the non-timber benefits of designation.

Local focus. The *Draft Analysis* strives to present data and findings at the lowest resolution possible. For example, it describes timber production and other variables for individual counties. This disaggregation misrepresents the realities of the forest-economy relationship that would be affected by the designation. The ultimate effects of a change in timber production on federal lands in a county might materialize across

⁸ For example, on 10 February 10, 2010, the Washington Forest Practices Board directed the Department of Natural Resources to form a Northern Spotted Owl Implementation Team with responsibilities that include assessing potential voluntary incentives for private landowners to achieve NSO-related conservation goals.

markets extending throughout the region and beyond. For example, an increase in the value of timber produced in one county might result in a decrease in the value of timber produced on federal lands in another county or on non-federal lands. The *Draft Analysis* generally acknowledges this possibility, but does not convey its potential magnitude. The *Draft Analysis* does not communicate at all the spatial dimensions of other potential economic effects of designation or exclusion. It does not, for example, mention that logging activities that introduce sediment to streams could affect the earnings and employment of businesses downstream, or that the availability of unroaded, natural landscapes on federal forests can affect economic activity and earnings in both proximate and distant communities, including metropolitan areas.

Wildfire risks. The *Draft Analysis* views the designation's potential impacts on wildfire risks largely through a timber lens: more logging will reduce the risks. It does not investigate or address other ways in which the designation might reduce them. For example, it does not discuss the correlation between roads and fire ignitions, or the potential for the designation to reduce wildfire risks by inducing the closing of some roads, preventing the construction of others, or restoring riparian forests.

The following discussion describes the contents of the *Draft Analysis*' individual sections.

Executive Summary

The Executive Summary does not describe economic consequences of the proposed designation other than those associated (a) with administrative costs of implementing the designation of critical habitat for the NSO, (b) timber, and (c) linear projects, such as pipelines. Its efforts to quantify the economic benefits of the designation, as well as the potential benefits of excluding lands from the designation, however, consider only timber. Its discussion of "Analysis Results," states (ES-9 – ES-11):

"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. ... 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.

"... 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.... 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, [we present] our qualitative conclusions concerning potential timber harvest impacts to private lands, and...the conclusion that zero timber harvest impacts are likely to occur on State

lands. Finally, [we note] the potential incremental administrative effects related to linear projects.

Chapter 1 – Introduction

This chapter expresses the fundamental objectives of the *Draft Analysis* (p. 1-1): “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....” It also summarizes past federal actions, which include:

- **26 June 1990.** The Service listed the NSO as a threatened species.
- **15 January 1992.** The Service designated 6,887,000 acres of federal land as critical habitat for the NSO
- **2008.** The Service issued a Recovery Plan and, based on it, revised the designation to 5,337,839 acres of federal lands. Both actions were challenged in court. The Inspector General of the Department of Interior reported that the integrity of the decision-making process for the Recovery Plan was potentially jeopardized by improper political influence.
- **2010.** The Court remanded the 2008 designation of critical habitat for the NSO and ordered the Service to develop a final rule to revise the designation of critical habitat by 15 November 2012.
- **2012.** The Service published the current proposed rule revising the designation of critical habitat for the NSO on 8 March and the *Draft Analysis* on 29 May.⁹

Chapter 2 – Framework for the Analysis

This chapter explains (p. 2-7) that the *Draft 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.”

It offers contradictory views of what must be considered in defining the baseline, however. It reports (p. 2-1) that the analytical guidelines expressed in OMB Circular A-4 require a forward-looking baseline that represents the “best assessment of the way the world would look absent the proposed action.” It further interprets (p. 2-7) this guideline as requiring the baseline to incorporate “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

⁹ In addition, President Obama, on 28 February 2012, issued a memorandum directing the Secretary of Interior to publish “a full analysis of the economic impacts of the proposed rule, including job impacts; ... consider excluding private lands and State lands from the final revised critical habitat...; develop clear direction, as part of the final rule, for evaluating logging activity in areas of critical habitat...; give careful consideration to providing the maximum exclusion from the final revised critical habitat...; and...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....” Retrieved 22 June 2012 from <http://www.whitehouse.gov/the-press-office/2012/02/28/presidential-memorandum-proposed-revised-habitat-spotted-owl-minimizing->.

affected industries.” Despite these guidelines, though, the *Draft Analysis* takes a far more static approach (p. 2-2): “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.” In other words, instead of defining a baseline that looks forward to evaluate the future economic effects of the proposed designation in the context of other reasonably foreseeable changes in the world, the *Draft Analysis* adopts a baseline that looks only at what exists today.

Having an appropriate baseline scenario is important because the *Draft Analysis* measures the economic impacts of the proposed designation of critical habitat for the NSO as the incremental changes that would occur if it were implemented, relative to the baseline. It distinguishes between direct and indirect costs, and between direct and ancillary benefits. Direct costs are the administrative costs of managing critical habitat and implementing conservation efforts to avoid potential destruction or adverse modification of critical habitat. Indirect impacts are changes in economic behavior arising from the designation’s interactions with other federal, state, and local actions, and include the costs of habitat conservation plans, time delays of projects in critical-habitat areas, regulatory uncertainty, and stigma on private property. Nowhere, however, does the *Draft Analysis* account for the costs, direct or indirect, of producing specific benefits, namely the costs of producing more increased timber from lands that would be included in or excluded from the designation.

The *Draft Analysis* distinguishes between direct and ancillary benefits of the designation. The direct benefits are the contributions the designation of critical habitat would make to the conservation of the NSO. Ancillary benefits are favorable economic outcomes that are typically unrelated, or secondary, to the statutory purpose of the designation. The *Draft Analysis* focuses on only one ancillary benefit of the proposed designation: increases in the supply of timber from federal lands.

Insofar as possible, the *Draft Analysis* describes (p. 2-15) the economic effects of the designation “at the lowest resolution possible, given available data.” This focus means the analysis generally disregards impacts that might materialize outside the individual areas proposed for critical habitat designation.

This chapter also explains the sources of information incorporated into the analysis: “The primary sources of information for this report are communications with, and data provided by, personnel from the Service..., personnel from other Federal agencies, State governments and timber industry representatives.” It does not indicate that the Service sought or obtained information from representatives of sectors of the economy other than the timber industry. Nor does it indicate that the Service sought or obtained information from scientists or economists with knowledge of the non-timber aspects of the forest-economy relationship that might be affected by the designation.

Chapter 3 – Background

In this chapter, the *Draft Analysis* clarifies its response to the guidelines of OMB Circular A-4, which require describing the baseline scenario by considering “appropriate... factors that have the potential to affect economic costs and benefits, such as the rate of regional economic growth in potentially affected industries.” Specifically, it considers

only timber-related trends to be appropriate, limiting (p. 3-1) its discussion of the baseline to “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.” In fact, however, it does not consider recent trends at all. Instead, it compares data from 1989-90 and 2009-2010, overlooking important secular and cyclical market trends, as well as changes in federal forest-management policy that have occurred during that period.

Chapter 4: Timber Impacts – Federal Lands

This chapter offers (p. 4-1), the *Draft Analysis*’ only justification for its focus on timber:

“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.”

Nowhere, however, does the *Draft Analysis* provide any substantiation for this conclusion. It offers no evidence that shows it attempted to quantify the full suite of economic impacts that would result from designating federal lands as critical habitat for the NSO, and no evidence that timber-related impacts constitute the “majority” of the impacts. Instead, this conclusion appears out of thin air, suggesting that it is totally arbitrary.

This chapter ranks subunits of federal lands for their susceptibility to timber-related impacts based on the concentration of non-reserved lands under the Northwest Forest Plan (NWFP). It does so concluding that, the greater the concentration of non-reserved lands, the greater the likelihood that the designation would have an incremental impact on logging. It then estimates the amount of timber that would be harvested from each subunit with and without the proposed designation of critical habitat for the NSO, takes the difference as the designation’s impact on timber harvest, and multiplies this amount times the estimated market price of the timber. The result represents the value of the designation’s potential impact on the flow of timber from the different subunits. The *Draft Analysis* defines this value as the economic benefits of increased timber production.

The *Draft Analysis* does not consider the costs of producing the timber. This serious error of omission invalidates its conclusions regarding the economic consequences of increased timber production.

The *Draft Analysis* acknowledges (p. 4-20) that the calculation of the value of increased timber production necessarily embodies several major sources of uncertainty and potential error. In defining baseline harvest volumes, for example, uncertainty and error can arise from using harvest projections developed in 1995 on BLM lands, even though actual harvests since then have deviated from the projections; applying estimates derived from one set of lands to another set as a “blunt analytic instrument;” recognizing that its projected harvests on Forest Service lands “may overstate or understate the actual harvest;” and assuming that harvests would remain stable over 20 years, even though the BLM expects harvest volume on previously logged lands to “increase by approximately 20 percent in the second decade” and harvest volume from thinning “may decrease over time.” Because of these limitations, the *Draft Analysis* warns readers that its “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.”

To estimate the proposed designation’s potential incremental effects on timber production, the *Draft Analysis* attempts (pp. 4-24, ff.) to account for additional sources of uncertainty and error. These include “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.” Furthermore, the analysis employs data for younger forests on the matrix lands that do not distinguish between the moist forests on the west side of the Cascades and the dry forests on the east side. The data also do not allow the *Draft Analysis* to discriminate between younger “stands that may be commercially viable versus those that are not.” Because of these data characteristics, the *Draft Analysis* concludes (p. 4-30), “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.”

In response to these and other sources of uncertainty and error, the *Draft Analysis* estimates a range of incremental impacts on harvest value, using different scenarios. This effort recognizes that “No one scenario is a precise prediction of what might happen in the future.” It justifies this analytical effort and approach, however, because, even though they embody considerable uncertainty and error, “these scenarios serve to bracket potential outcomes and thereby inform decision-makers who must make final decisions under the Endangered Species Act.”

The *Draft Analysis* employs two alternative scenarios to quantify the proposed designation’s potential impacts on the volume and value of timber harvested from federal lands. One assumes the designation would cause the volume and value to increase; the other assumes it would cause them to decrease. The first scenario embodies an assumption (pp. 4-29 ff.) that the designation, coupled with the implementation of “ecological forest practices, as envisioned by the Franklin/Johnson Moist Forest restoration strategy,” would “produce about two-thirds of the per-acre timber yields anticipated by the NWFP.” Under this scenario, the proposed designation would increase the average value of timber produced on federal lands by \$1,230,000 – \$3,070,000 per year. The second scenario assumes that the proposed designation would cause forest managers to reduce the level and, hence, the value, of timber harvested from federal lands. Under this scenario, the proposed designation would decrease the average value of timber produced on federal lands by \$2,460,000 – \$6,140,000 per year. Of the 13,961,684 acres proposed for designation, the *Draft Analysis* considers changes in timber harvest practices on 1,389,787 acres of Forest Service and BLM land, approximately 10 percent of the total.

The *Draft Analysis* does not apply similar research techniques and assumptions to investigate non-timber benefits of designating lands or excluding lands from the designation.

Chapter 5: Timber Impacts – State and Private Lands

In this chapter, the *Draft Analysis* concludes that the designation of critical habitat for the NSO likely would have no impact on timber harvests from state lands, but it might reduce harvests on 307,000 of the 1.3 million acres of private lands proposed for designation. It provides no estimate of these potential reductions, however. Hence, the *Draft Analysis* does not quantify the potential timber-related benefits of excluding private lands from the designation.

Chapter 6 – Regional Impacts

In this chapter, the *Draft Analysis* describes the potential changes in employment and local government revenues that would accompany the estimated increases or decreases in timber harvest that would result from implementing the proposed designation of critical habitat for the NSO. It does so by comparing, by county, timber harvest and timber industry employment in 2009-2010 with what existed in 1989-90. It does not provide any rationale for choosing these two endpoints, however, nor does it investigate or explain the analytical significance of doing so. In particular, it does not attempt to distinguish between changes in timber-related employment stemming from structural factors, such as changes in logging on federal lands; from market factors, such as increased competition in the timber industry between the Pacific Northwest, the Southeast, and Canada; or from cyclical factors, such as reductions in demand for wood products that have accompanied movement from the cyclical peak conditions in 1989-90 to the severely depressed conditions of 2009-2010. It also does not recognize that the logging levels of 1989-90 were an inflated aberration subsequently found to be illegal by federal courts, as well as ecologically unsustainable and socially unacceptable.

This chapter also presents recent information on federal land payments counties have received from programs with historical links to commercial receipts, primarily from timber sales in federal lands. It does not, however, provide a full explanation of these payments, of the factors other than timber sales that influence them, or of the alternative sources of revenue available to counties.

From the information presented in this chapter, the *Draft Analysis* concludes that the 23 counties in the region have varying sensitivity “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.” Nowhere in this chapter, however, does it explicitly define the characteristics of this sensitivity or exactly how future changes in timber harvests or timber-industry employment would affect socioeconomic conditions in the counties. Nor does it demonstrate that a change in timber harvest resulting from including a county’s lands in the designation, or excluding them, would boost socioeconomic conditions in the county. Indeed, it recognizes (p. 6-9) that “timber-related jobs in a certain county are not necessarily closely correlated with the amount of timber being harvested in that specific county.” It does discuss how county revenues would be affected by federal land payments, but acknowledges that these payments are dependent on factors other than timber harvest, such as Congressional decisions to continue, expand, or contract payments to the counties from the Treasury. In sum, it asserts that counties have some sensitivity to timber harvests, industry employment, and Federal land payments, but it leaves undefined what is sensitive to what and never describes how the sensitivity materializes.

Contrary to the guidelines of OMB Circular A-4, this presentation does not describe regulations and policies the Service and other government entities might implement to affect timber harvest, timber-related employment, or county revenues. Nor does it describe trends, other than the jump in some variables from 1989-1990 to 2009-2010, in factors that have the potential to affect the economic costs and benefits of designating critical habitat for the NSO.

Chapter 7 – Potential Impacts to Linear Projects

In this chapter, the *Draft Analysis* (p.7-1) “considers the potential for linear projects [such as pipelines] to be affected by critical habitat designation for the NSO.” It concludes the designation of critical habitat for the NSO would increase the administrative costs associated with the projects, but would not alter the projects, themselves.

Chapter 8 – Potential Economic Benefits

In this chapter, the *Draft Analysis* (p. 8-1) “contemplates other potential economic benefits resulting from possible conservation efforts.” It first considers the economic value of benefits the NSO, itself, would realize from the designation and concludes (p. 8-1) that, because the “extent to which critical habitat designation for the NSO may improve the species’ population is unknown” it is impossible to estimate the economic value of this improvement.

The *Draft Analysis* also recognizes that the designation may yield additional benefits, ancillary to the direct, conservation benefits for the NSO, including these:

- 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
- Improved water quality generating human and ecological health benefits

The *Draft Analysis* provides a short (one paragraph each) qualitative discussion of three types of ancillary benefits. The first is public safety benefits that might result from improved timber management practices, such as thinning, that may reduce property damage from catastrophic events, such as wildfire, drought and insect damage. The second is improved water quality that might result if adjustments in riparian buffers resulting from the designation of critical habitat for the NSO reduce sedimentation in streams and reduce water treatment costs and have human or ecological health benefits. The third is aesthetic benefits that might result if the designation of critical habitat for the NSO yields a more aesthetically appealing forest landscape.

The *Draft Analysis* does not attempt to quantify any of these ancillary benefits, however, using this rationale (p. 8-9): “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 *Draft Analysis* offers no substantiation for this decision, however, nor does it explain its implications or why it decided to quantify one ancillary benefit, an increase in timber production, but not others.

III. DEFICIENCIES IN THE *DRAFT ANALYSIS*: UNJUSTIFIED FOCUS ON TIMBER

This section describes one of the major deficiencies in the *Draft Analysis*: its narrow focus on the timber industry as an indicator of the economic consequences of designating critical habitat for the NSO or of excluding areas from the designation. This deficiency renders the *Draft Analysis* too incomplete and too inaccurate to provide the public with a full understanding of the economic consequences of designating critical habitat for the NSO, or to serve as an acceptable basis for any decision by the Secretary to exclude an area from the designation.

The *Draft Analysis* quantifies and monetizes only one type of indirect economic impact of the proposed designation of critical habitat for the NSO: timber production. It considers two scenarios (pp. 4-29 ff.). The first scenario embodies an assumption that the designation, coupled with the implementation of “ecological forest practices, as envisioned by the Franklin/Johnson Moist Forest restoration strategy,” would “produce about two-thirds of the per-acre timber yields anticipated by the NWFP.” Under this scenario, the proposed designation would increase the average value of timber produced on federal lands by \$1,230,000 – \$3,070,000 per year. The second scenario assumes that the proposed designation would cause forest managers to reduce the level and, hence, the value, of timber harvested from federal lands. Under this scenario, the proposed designation would decrease the average value of timber produced on federal lands by \$2,460,000 – \$6,140,000 per year.

The Service presents this information in pursuit of its objective to assist the Secretary in weighing the benefits of designation lands against the benefits of excluding them from the designation. Thus, it apparently anticipates that the potential increase in the value of timber production under the first scenario will assist the Secretary in determining to designate federal lands where increased logging might occur, and the potential decrease in the value of timber production under the second scenario will assist the Secretary in determining to exclude from the designation federal lands where it would impede logging.

The *Draft Analysis*’ focus on timber overlooks many other, economically important goods and services that might be affected by designation or exclusion. There is good reason to believe that the value of those effects may equal or exceed the projected change in the value of timber production. Hence, the *Draft Analysis* fails to satisfy the Service’s obligation to provide the public with a full, unbiased description of the potential economic consequences of designation or exclusion. And, if the Secretary relies solely on this information from the *Draft Analysis*, any decision to exclude an area from the designation cannot represent a full, unbiased weighing of the economic benefits of designation against the economic benefits of exclusion.

The *Draft Analysis*, itself, identifies several aspects of the forest-economy relationship in the Pacific Northwest that likely could be affected positively by the proposed designation of critical habitat for the NSO. It asserts (Exhibit 8-1) that the designation, by triggering “improved timber management practices, such as partial cutting, thinning, adaptive management, and monitoring” on federal matrix lands would yield these ancillary benefits: (a) reduced wildfire threats; (b) reduced impacts of droughts; (c) reduced threat of insect damage to stands; (d) reduced property damage due to these

risk reductions; and (e) aesthetic improvements generating increased quality or quantity of recreational activities. Increased protections for riparian areas resulting from the designation would yield improved water quality generating human and ecological health benefits. If it induces Washington to strengthen and align its requirements for the conservation of NSO habitat, the designation would (a) reduce the impacts of droughts; (b) reduce the threat of insect damage to stands; (c) reduce property damage due to these risk reductions; and (d) yield aesthetic improvements generating increased quality or quantity of recreational activities.

The Services' definition and treatment of these ancillary benefits of the designation, however, have several deficiencies. The *Draft Analysis* appears, for example, to double-count benefits when it lists both actions that reduce risks of droughts, insects, or wildfire and the reductions in property damage that would result from the lower risks. It does not acknowledge the scientific uncertainty on the effectiveness of thinning and fuel reduction to provide the claimed benefits; some studies show treatments can increase, not decrease, fire risks for up to three decades. Other studies confirm that reducing fire risks near structures and communities, not in more distant forested areas, is the most effective strategy for protecting lives and property. More important are errors that omit benefits from the analysis. Some of these occur within the confines of the *Draft Analysis'* list of ancillary benefits. It does not, for example, recognize that increased riparian protections can reduce wildfire threats,¹⁰ or yield other benefits. A report published by the same firm that prepared the *Draft Analysis*, for example, summarizes literature that documents multiple, economically important benefits resulting from riparian forests, including: improved forest aesthetics, increased value of nearby property, improved quantity and quality of wetland areas, improved quality of water and fish habitat in streams, and increased quantity and quality of recreational opportunities.¹¹ The *Draft Analysis* also omits some aesthetic benefits. It recognizes that aesthetic improvements can enhance the value of recreational activities, but fails to see that they also can yield economic benefits for nearby residents and even individuals passing on a nearby road.¹²

¹⁰ The summary of a workshop on riparian/stream ecosystems and fire concluded, as one of the "Final Truths," that, "It was recognized that riparian zones play an important role affecting fire on the landscape. Under some conditions, riparian/stream ecosystems act as fire breaks halting the spread of wildland fires on the landscape. In other cases riparian zones have been used by fire suppression forces as safety zones, burn out points, and water sources." Kauffman, B.J. 2001. *Workshop on the Multiple Influences of Riparian/Stream Ecosystems on fires in Western Forest Landscapes*. Rocky Mountain Forest and Range Experiment Station. July. Retrieved 24 June 2012 from <http://www.stream.fs.fed.us/publications/PDFs/Riparian%20Fire%20Final.pdf>.

¹¹ Paterson, R.W., and K.J. Boyle. 2005. *Costs and Benefits of Riparian Forest Management: A Literature Review*. 13 December. Retrieved 24 June 2012 from http://www.frc.state.mn.us/documents/council/MFRC_Costs&Benefit_Riparian_Management_2005-12-13_Report.pdf.

¹² Oregon recommends that a stewardship forest-management plan consider not just the aesthetic effects of forest-management practices that accrue to the landowner but also those that accrue to nearby lands and roads. Oregon State University, Oregon Department of Forestry, Oregon Tree Farm Program, and Oregon Forest Resources Institute. 2011. *Oregon Forest Stewardship Planning Guidelines*. January. Retrieved 24 June from <http://www.oregon.gov/ODF/privateforests/docs/StewardshipPlanGuidelines.pdf?ga=t>. See also the value estimates in, Loomis, J. 2005. Updated Outdoor Recreation Use Values on National Forests and Other Public Lands. General Technical Report No. PNW-GTR-658. U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. October. Retrieved April 20, 2009, from http://www.fs.fed.us/pnw/pubs/pnw_gtr658.pdf.

The most important errors of omission, however, occur when the *Draft Analysis* overlooks entire categories of ancillary benefits of designation and readily available data regarding potential benefits other than increased timber production. The following paragraphs introduce the Service to literature regarding these categories, in general, and specifically regarding carbon sequestration, water quality, and outdoor recreation.

General

A general introduction to the categories of goods and services that might be affected by the designation, or by a decision to exclude lands from the designation, is provided by a summary of environmental and economic issues associated with forests in the Pacific Northwest.¹³ Representative statements include:

“The decisions that led to the reductions in federal timber harvests in the Pacific Northwest affect the output of both nonwood and wood products. Nonwood products include wildlife, fish used commercially and for recreation, outdoor recreation not tied specifically to fish and wildlife, water, amenities such as scenic landscapes, and a wide variety of minor forest products, including berries, ornamental greens, and mushrooms. **In many cases production of these nonwood products competes in the forest with production of wood products.**” (p. 146 Bold emphasis added to highlight the report’s conclusion that economic benefits from increased timber production in the region often are offset by economic costs imposed on other sectors of the economy.)

“Streams that emerge from or run through Pacific Northwest forests support important regional fisheries. Commercial fishing is limited mainly to anadromous species; sport fishing encompasses anadromous and nonanadromous inland fishing. Most of these fisheries depend on cold, clear water. Spawning usually requires silt-free, gravelly streambeds.” (p. 153)

“In 1987, fishing contributed about 11% of the total personal income in an Oregon coastal area made up of five complete counties and coastal portions of two others (Radtke and Davis 1988). The timber industry accounted for about 15% and tourism for about 7% of the area’s total personal income at that time.” (p. 154)

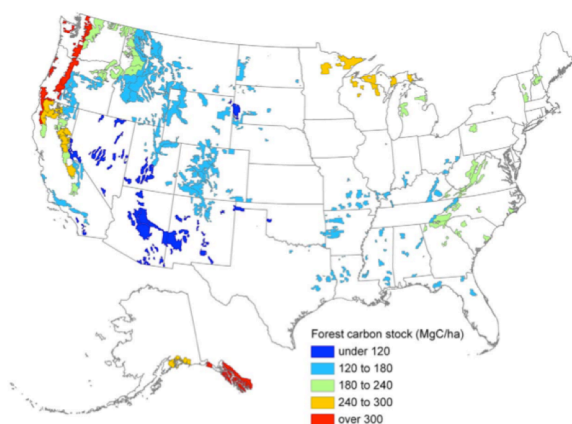
“Changes in future backcountry forest recreation opportunities on federal land will depend on the rules adopted for old-growth and late-successional reserves, other than designated wilderness areas, for which rules are clear. Rules similar to those that now apply to designated wilderness areas will lead to a set of results that are different from those that will result from rules that are less restrictive. Presumably there will be more opportunities for backcountry and wilderness-type recreation as a result of the cutbacks in federal timber harvests than would otherwise be the case.” (p. 157)

Carbon Sequestration

The forests being considered for designation as critical habitat for the NSO remove carbon dioxide from the atmosphere and, through photosynthesis convert it to vegetative compounds that are stored in a process known as carbon sequestration. In concept, the calculation of the value of any change in the amount of sequestered carbon

¹³ National Research Council, Committee on Environmental Issues in Pacific Northwest Forest Management. 2000. *Environmental Issues in Pacific Northwest Forest Management*. National Academies Press. See also ECONorthwest. 2006. *The Economic Benefits of Old-Growth Forests in the Pacific Northwest: An Overview*. Earthjustice, Seattle, Washington. October, for a description of economically important goods and services derived from the region’s forests.

Figure 1. Federal Forests in the Pacific Northwest Exhibit the Highest Carbon Stocks



Source: Heath et al. (2011)

resulting from designating or excluding lands is a product of the change in the volume of stored carbon times the value per unit, taking into account the timing of the change.

The map in Figure 1 shows that the greatest sequestration of carbon, represented by the amount of biomass, also occurs on the forests likely to be included in the proposed designation of critical habitat for the NSO.¹⁴ The Service should have no more difficulty finding scientists in the region who can describe the amount of carbon sequestered, with vs. without the designation, than it had finding representatives of the timber industry to help it estimate the designation's impacts on timber

production. Several entities have developed tools to calculate the change in carbon stored in forests under different management regimes.¹⁵

Estimates of the value of sequestered carbon also are readily available to the Service. One comes from the efforts of representatives from several federal agencies, who estimated that reducing atmospheric carbon dioxide reduces economic costs stemming from the resulting changes in climate by about \$30 per ton of carbon dioxide.¹⁶ This amount equates to about \$110 per ton of carbon sequestered by forests included in the proposed designation. Others, however, have noted weaknesses in the approach used to generate these estimates,¹⁷ or concluded a higher value is warranted. One notable effort by the U.K. government, for example, recommends assigning a value of more than \$80 per ton carbon dioxide currently removed from the atmosphere, with the value rising to more than \$200 per ton over the next 30 years. Accounting for these higher values when calculating the value of carbon sequestered by forests in the region seems appropriate,

¹⁴Heath, L.S., J.E. Smith, C.W. Woodall, D.L. Azuma, and K.L. Waddell. 2011. "Carbon Stocks on Forestland of the United States with Emphasis on USDA Forest Service Ownership." *Ecosphere*. 2(1) pp. 1-21. Retrieved 24 June 2012 from http://www.fs.fed.us/nrs/pubs/jrnl/2011/nrs_2011_heath_001.pdf. The resolution of the map does not reveal carbon stocks on federal forests interspersed with private lands.

¹⁵ See, e.g., "The Forest Sector Carbon Calculator" developed by scientists at Oregon State University: <http://landcarb.forestry.oregonstate.edu/>.

¹⁶ U.S. Interagency Working Group on Social Cost of Carbon. 2010. *Technical Support Document: Social Cost of Carbon for Regulatory Impact Analysis under Executive Order 12866*. Retrieved 24 June 2012 from www.epa.gov/oms/climate/regulations/scc-tds.pdf. The report provides estimates that range from about \$5 to \$35 per ton, but the lower values reflect higher discount rates than seem appropriate for this calculation.

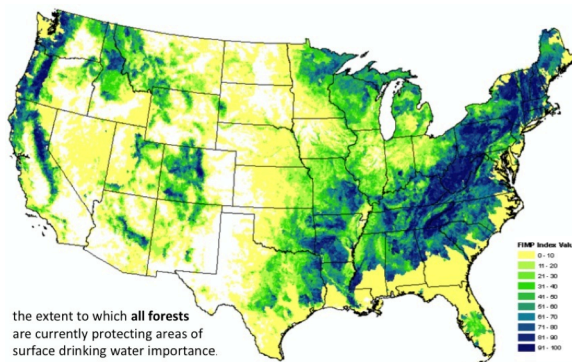
¹⁷ Kopp, R.E., and B.K. Mignone. 2012. "The U.S. Government's Social Cost of Carbon Estimates after Their First Two Years: Pathways for Improvement." *Economics*. Vol. 6, 2012-15. May 4. <http://dx.doi.org/10.5018/economics-ejournal.ja.2012-15>.

insofar as they avoid some weaknesses in the lower estimates. In particular, they account for some important costs excluded from the lower estimates. These include costs associated with acidification that occurs when atmospheric carbon dioxide dissolves in the oceans, and the subsequent harm to marine coral reefs, fisheries resources.¹⁸ The higher numbers also account for the risk that increasing concentrations of atmospheric carbon dioxide and other greenhouse gases could have catastrophic outcomes. Folding these costs into the accounting can dramatically increase the expected costs of climate change, and the benefits of removing from the atmosphere the carbon dioxide that drives it.¹⁹

Water

The forests included in the proposed designation of critical habitat for the NSO collect, store, purify, cool, and produce water vital to the ecosystems and economies of Washington, Oregon, and northern California. Figure 2 illustrates these important water-related services, showing the extent to which forests currently protect important sources of drinking water.²⁰ The darkest blue indicates areas with the highest levels of water supply and protection. Overall, the map shows that forested areas in the area covered by the proposed designation serve as important surface sources of drinking water.

Figure 2. Forests Are A Widespread Source of Drinking Water in the Pacific Northwest



Source: U.S. Forest Service. 2012. "Forests to Faucets."

The *Draft Analysis* overlooks the economic importance of the designation's potential impacts on water. It also provides no information about how excluding any area from the designation would affect water-related values. This omission is especially important, as a large body of research suggests that increased logging likely would have a negative effect on the quality of water in streams, and it may affect the quantity of water.

Numerous studies have estimated the quantity of sediment from timber-production activities. One study, for example, determined that clearcuts can generate an additional one ton of

¹⁸ See, e.g., Cooley, S.R. and S.C. Doney. 2009. "Anticipating Ocean Acidification's Economic Consequences on Commercial Fisheries." *Environmental Research Letters*.

¹⁹ See, e.g., Stern, N. 2006. *Stern Review on the Economics of Climate Change*. HM Treasury; and Gerst, M.D., R.B. Howarth, and M.E. Borsuk. 2010. Accounting for the Risk of Extreme Outcomes in an Integrated Assessment of Climate Change." *Energy Policy*. 38(8): 4540-4548.

²⁰ U.S. Forest Service. 2012. "Forests to Faucets." Retrieved 2 June 2011 from http://www.fs.fed.us/ecosystemservices/FS_Efforts/forests2faucets.shtml.

sediment, and clearcuts plus roads can generate 3.5 tons per acre per year for about 25 years.²¹ Other studies have found that debris slides linked to logging and roads can accelerate erosion rates 30–300 times the background rate; the levels of erosion from roads and clearcuts were nearly equal on the west side of the Cascade Range in Oregon; and erosion rates on harvested areas in the Klamath Mountains of southwest Oregon were 7 times, and those on landings were 100 times those on undisturbed areas.²²

Other studies have quantified the value of sediment in streams. Work completed by the USDA Economic Research Service, for example, quantifies the economic harm per ton of sediment for the thirteen types of damage shown in Figure 3.²³ It then calculates the average economic harm per ton of sediment in streams, by county. Figure 4 illustrates, for counties in Oregon, the harm sediment imposes on reservoir services, navigation, water-based recreation, marine fisheries, freshwater fisheries, municipal industrial, steam electric, irrigation ditches, flood damages, soil productivity, road ditches, and municipal water treatment.

The *Draft Analysis* offers no explanation for why it does not use this and similar information to estimate the economic harm that would accompany any increase in timber production resulting from either the inclusion of some lands in the designation or the exclusion of other lands from it. There is no obvious reason why the Service did not follow research steps analogous to those it used to quantify the benefits of increased timber production to quantify the water-related benefits. Such steps would entail reviewing the existing literature and consulting with scientists in the region to describe the amount of sediment that would be generated with the increased logging described in the *Draft Analysis*, with vs. without the designation, then multiplying this amount times the estimates of the harm per ton of sediment, such as those available from Hansen and Ribaud (2008), and accounting for the timing of harm and for the uncertainty in the data.

Timber production also can affect the amount and timing of runoff from the region's forests. As fog filters through the forests of this region, water vapor condenses on the trees' limbs and needles and drops to the earth, where it adds to supplies of ground and surface water. The large trees of old-growth forests are especially productive relative to

²¹ Grant, G.E. and A.L. Wolff. 1991. "Long-Term Patterns of Sediment Transport After Timber Harvest, Western Cascade Mountains, Oregon, USA." Presented at Sediment and Stream Water Quality in a Changing Environment: Trends and Explanation in Vienna. IAHS. 203.

²² Gucinski, H. M.J. Furniss, R.R. Ziemer, and M.H. Brookes. 2001. *Forest Roads: a Synthesis of Scientific Information*. Gen. Tech. Rep. PNW- GTR-509. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. See also, Forman, R.T.T., and L.E. Alexander. 1998. "Roads and Their Major Ecological Effects." *Annual Review of Ecological Systems*. 29: 207-31; Frissell, C.A. and S.C. Trombulak. 2000. "Review of ecological effects of roads on terrestrial and aquatic communities." *Conservation Biology*. 14: 18-30; Jones, J.A. F.J. Swanson, B.C. Wemple, and K.U. Snyder. 2000. "Effects of Roads on Hydrology, Geomorphology, and Disturbance Patches in Stream Networks." *Conservation Biology*. 14:76-85; and Wemple, B.C., J.A. Jones, and G.E. Grant. 1996. "Channel network extension by logging roads in two basins...." *J Am. Water Resources Assoc.* 32: 1195.

²³ Hansen, L., and M. Ribaud. 2008. *Economic Measures of Soil Conservation Benefits: Regional Values for Policy Assessment*. Technical Bulletin 1922. USDA, Economic Research Service. Retrieved 19 June 2012 from <http://www.ers.usda.gov/Publications/TB1922/TB1922.pdf>.

the smaller trees of younger forests because they have greater area on which fog can condense.²⁴

Figure 3. Types and Values of Economic Harm from Sediment in Streams

Category of Harm	Damages due to^a	Range of Values^b (\$ per ton)
Reservoir services	More sediment in reservoirs	0 to \$1.38
Navigation	Shipping industry additional damages from groundings	0 to \$5.00
Water-based recreation	Dirtier fresh water for recreation	0 to \$8.81
Irrigation ditches and channels	Increased cost of removing sediment and aquatic plants from irrigation channels	\$0.01 to \$1.02
Road drainage ditches	More damage to and flooding of roads	\$0.20
Municipal water treatment	Higher sediment removal costs for water-treatment plants	\$0.04 to \$1.45
Flood damages	Increased flooding and damage from flooding	\$0.10 to \$0.77
Marine fisheries	Diminished catch rates for marine commercial fisheries	0 to \$0.93
Freshwater fisheries	Diminished catch rates for freshwater commercial fisheries	0 to \$0.12
Marine recreational fishing	Increased catch rates for marine recreational fishing	0 to \$1.57
Municipal & industrial water use	Increased damages from salts and minerals dissolved from sediment	\$0.07 to \$1.47
Steam powerplants	Increased plant growth on heat exchangers	\$0.04 to \$1.05
Soil productivity	Increased losses in soil productivity	\$0.37 to \$1.21

Source: Hansen and Ribaud (2008).

^a Economic harm represents loss of consumer surplus or producer.

^b Values in dollars of 2000.

²⁴ Franklin, J.F. and T.A. Spies. 1991. "Composition, Function, and Structure of Old-Growth Forests." In *Wildlife and Vegetation of Unmanaged Douglas-Fir Forests*. Edited by L.F. Ruggiero, K.B. Aubry, A.B. Carey, and M.H. Huff. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station.

Figure 4. Average Economic Harm^a per Ton of Sediment in Streams, by Oregon County (\$^b)

County	Harm	County	Harm
Baker	3.8	Lake	5.6
Benton	7.1	Lane	7.3
Clackamas	7.2	Lincoln	7.1
Clatsop	7.1	Linn	7.2
Columbia	7.1	Malheur	5.5
Coos	7.1	Marion	7.1
Crook	3.7	Morrow	3.4
Curry	7.1	Multnomah	7.3
Deschutes	4.9	Polk	7.1
Douglas	7.1	Sherman	3.5
Gilliam	3.3	Tillamook	7.1
Grant	4.2	Umatilla	3.6
Harney	5.5	Union	4.0
Hood River	3.9	Wallowa	4.1
Jackson	7.2	Wasco	3.7
Jefferson	4.1	Washington	7.2
Josephine	7.1	Wheeler	3.5
Klamath	5.3	Yamhill	7.1

Source: Hansen and Ribaud (2008).

^a Economic harm represents loss of consumer surplus or producer surplus from the impacts of sediment on reservoir services, navigation, water-based recreation, marine fisheries, freshwater fisheries, municipal industrial, steam electric, irrigation ditches, flood damages, soil productivity, road ditches, and municipal water treatment.

^b Values in dollars of 2000.

The overall impact can be substantial. Fog precipitation contributes 8 – 34 percent of water used by coastal redwoods in forests near the Klamath River, for example.²⁵ Annual precipitation reaching the earth under trees in an old-growth forest near the Oregon coast was 20 inches greater than in a nearby clearing.²⁶ And, within the Bull Run watershed that supplies drinking water for much of the Portland metropolitan area, the condensed fog constituted 30 percent of the total precipitation that reached the earth under old-growth trees, and the total precipitation was 25 – 29 percent higher on lands with old-growth forests than on adjacent lands with young trees in an area that had been

²⁵ Research reported in Keppeler, Elizabeth. 1998. "The Summer Flow and Water Yield Response to Timber Harvest." In *Proceedings of the Conference on Coastal Watersheds: The Caspar Creek Story*. Edited by Robert Ziemer. U.S. Department of Agriculture, Forest Service, Pacific Southwest Research Station. Pgs. 35-43.

²⁶ Isaac, L.A. 1946. "Fog Drip and Rain Interception in Coastal Forests. US Department of Agriculture, Forest Service, Pacific Northwest Forest and Range Experiment Station, described in Harr, R.D. 1983. "Potential for Augmenting Water Yield Through Forest Practices in Western Washington and Western Oregon." *Water Resources Bulletin* 19 (3): 383-393.

logged eleven years earlier.²⁷ The increased precipitation apparently influenced stream flows, which declined less during late summer in a stream near old-growth forest than in streams near logged areas.

Figure 5 provides illustrative values of incremental increases in stream flows on national forests in the Pacific Northwest and California.

Timber production also can increase stream flows in a manner that has negative economic consequences. Logged areas and timber-related roads can accelerate runoff during storms, increasing erosion and increasing downstream flooding. Research conducted on the west side of the Oregon Cascade Mountains, for example, found “Forest harvesting has increased peak discharges [of runoff water] by as much as 50% in [small] basins and 100% in large basins over the past 50 years.”²⁸

Figure 5. Value of Incremental Changes in Streamflow on National Forests (2003 dollars per acre-foot of water per year)

	Pacific Northwest	California
Aggregate marginal value	\$24	\$66
Hydroelectric generation	\$12	\$14
Instream recreation	\$10	\$10
Waste dilution	\$1	\$1
Ecosystem functions	\$21	\$64

Source: Brown, T.C. 2004. *The Marginal Economic Value of Streamflow from National Forests*. U.S. Forest Service, Rocky Mountain Research Station. Discussion Paper. DP-04-1, RMRS-4851. December 28.

The *Draft Analysis* provides no explanation for why the Service opted not to consider the relationship between timber production and the water-related benefits derived from the region’s forests. This introduction to research clearly demonstrates, however, both the importance of incorporating these benefits into the economic analysis of the proposed designation and the extent of the information that was readily available to the Service as it prepared the *Draft Analysis*. This flaw in the analysis should be corrected before the Secretary makes any determination regarding the potential exclusion of an area from the designation.

²⁷ Harr, R.D. 1982. “Fog Drip in the Bull Run Municipal Watershed, Oregon.” *Water Resources Bulletin*. 18(5):785:789.

²⁸ Jones, J.A. and G.E. Grant. 1996. “Peak Flow Responses to Clearcutting and Roads in Small and Large Basins, Western Cascades, Oregon.” *Water Resources Research* 32 (4): 959-974.

Forest Recreation

The abundant opportunities for outdoor recreation underlie the decisions of many households and businesses to locate in Washington, Oregon, and northern California.²⁹ Business and political leaders throughout the region recognize the importance of outdoor recreation. Labeling them the “New Pillars of the Western Economy,” the Western Governors’ Association, for example, recently emphasized the economic importance of outdoor recreation and its companion, tourism, because of the competitive advantage they provide western communities and businesses.³⁰

The outdoor recreation industry also is a large and growing component of the region’s economic structure. Research recently completed by the Outdoor Industry Foundation documents the industry’s economic importance and provides information the Service can use to describe the potential economic benefits of including in or excluding lands from the designation.³¹ The data for Oregon, for example, show that retail sales of goods and services related to active outdoor recreation total about \$4.8 billion annually, and directly and indirectly generate about \$310 million in annual state tax revenue, and support about 73,000 jobs. More than one-third of the state’s adult population goes camping each year, and more than 40 percent go hiking.

Opportunities for outdoor recreation on federal lands make important contributions to the quality of life for residents of the Pacific Northwest. Evidence for this conclusion comes from several sources. When economists assessed the potential economic consequences of curtailing recreation, timber, range, or mineral programs on nine national forests in the Snake River Basin to protect critical habitat for endangered sockeye salmon, for example, they found that society valued the forgone recreational resources 3-to-4 times more than the sum of the forgone timber, grazing, and mining.³² Additional analysis, conducted throughout the interior Columbia River Basin, found the services associated with unroaded areas, camping spots, fishing holes, and so forth, provided 89 percent of the total value of all commodities and services derived from those lands in 1995, whereas the value of timber was only 11 percent of the total.³³

²⁹ See, e.g., Whitelaw, E. (ed). 2003. *A Letter from Economists to President Bush and the Governors of Eleven Western States Regarding the Economic Importance of the West’s Natural Environment* 3 December; and Rasker, R. (ed) Letter to President Obama regarding the economic importance of the West’s public lands. 30 November.

³⁰ Western Governors’ Association. 2012. *The West’s Competitive Advantage: Landscapes, Open Lands and Unique History*. Retrieved 25 June 2012 from http://www.westgov.org/component/joomdoc/doc_download/1598-the-wests-competitive-advantage-landscapes-open-lands-and-unique-history.

³¹ Outdoor Industry Foundation. 2012. *The Active Outdoor Recreation Economy*. Retrieved 12 June 2012 from http://www.outdoorindustry.org/images/researchfiles/RecEconomy_State%20final403.pdf.

³² Haynes, R.W., N.A. Bolon, and D.T. Hormachea. 1992. *The Economic Impact on the Forest Sector of Critical Habitat Delineation for Salmon in the Columbia and Snake River Basin*. U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. General Technical Report. PNW- GTR-307. November.

³³ Haynes, R.W. and A.L. Horne. 1997. “Chapter 6: Economic Assessment of the Basin.” In *An Assessment of Ecosystem Components in the Interior Columbia Basin and Portions of the Klamath and Great Basins, Volume IV*. Edited by T.M. Quigley and S.J. Arbelbide. General Technical Report PNW- GTR-405. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. June.

Numerous entities, including the Oregon Business Council,³⁴ and various researchers³⁵ have concluded that quality-of-life factors play an important role in local economies. When asked in a survey of Oregonians conducted by the Oregon Business Council if they thought tighter environmental protections would help or hurt the state's economic outlook, three-quarters said it would help. Subsequent research has reached similar findings. This sentiment may be at odds with decisions to increase timber production on lands included in the critical habitat designated for the NSO, or on lands excluded from the designation in an attempt to promote more intensive logging. It is impossible to tell from the *Draft Analysis*, however. By measuring only the value of the timber and ignoring the tradeoffs for the rest of the economy, the *Draft Analysis* offers a starkly incomplete and seriously biased portrait of the proposed designation's costs and benefits.

³⁴ Oregon Business Council. 1993. *Oregon Values and Beliefs: Summary*. May.

³⁵ See, e.g., Johnson, K.M. and C.L. Beale. 1994. "The Recent Revival of Widespread Population Growth in Nonmetropolitan Areas of the United States." *Rural Sociology* 69 (4): 655-667.

IV. DEFICIENCIES IN THE *DRAFT ANALYSIS*: MISREPRESENTATION OF TIMBER-RELATED IMPACTS

The *Draft Analysis* supports the conclusion that the Secretary can increase the economic benefits of the designation by including lands in the designation so they will be managed for greater timber production, or by excluding lands so they can be logged more heavily. Specifically, it estimates that increased logging on some federal lands included in the designation would, on average, increase the market value of timber produced on federal lands by \$1,230,000 – \$3,070,000 per year, and increased logging on federal lands excluded from the designation would increase the market value of timber produced on federal lands by \$2,460,000 – \$6,140,000 per year. It also concludes that excluding private lands from the designation would yield economic benefits by allowing them to be logged more heavily.

These conclusions don't tell the whole story, however. They rest on an assumption that the market value of any increase in timber production represents the sum total of its economic effects. This view totally overlooks the costs of timber production. That is, the *Draft Analysis* considers the *gross* benefits of timber production, i.e., the market value of the logs produced, but it does not consider the costs, subtract the costs from the gross benefits, and measure the *net* benefits (or, if the costs exceed the gross benefits, the *net* costs). Substantial research not discussed in the *Draft Analysis* shows that the economic benefits indicated by the market value of increased timber production, especially on federal lands, likely would be more than offset by the economic costs of producing the timber. Some of these costs, which would materialize outside the timber industry as externalities, or spillovers on other industries, households, and communities, are addressed in the preceding section of these comments. Other costs would materialize within the timber industry itself, and in the communities in which it operates. The following discussion considers these two types of costs: the direct and indirect costs of producing timber, including subsidies to the timber industry, and the negative effects of timber production on the social well-being of communities.

Timber-Production Costs

The total costs to taxpayers of timber production include the expenditures incurred by the industry plus subsidies from taxpayers to the timber industry. Some subsidies to logging on federal lands occur directly. The extent of these subsidies became known 2-3 decades ago as growing concern about the effects of logging on the NSO and other species induced researchers to take a hard look at the economics of logging. They found that, for many national forests, the value of the timber produced fell short of the costs of producing it.³⁶ The extent of the subsidies was substantial: nearly \$178 million in fiscal year 1995.³⁷

³⁶ See, e.g., Barlow, T.J., G.E. Helfand, T.W. Orr, and T.B. Stoel, Jr. 1980. *Giving Away the National Forests: An Analysis of U.S. Forest Service Timber Sales Below Cost*. Washington, DC: Natural Resources Defense Council. June; Gorte, R.W. 1984. *Summary of Recent Reports on Forest Service Timber Sale Costs and Revenues*. Congressional Research Service, Report for Congress 84-799 ENR. 8 November; and Gorte, R.W. 2004. *Below-Cost Timber Sales: An Overview*. Congressional Research Service, Report for Congress. 21 July.

³⁷ Wilderness Society. 1997. *Financial Losses from Logging on National Forests, FY 1995: Preliminary Summary*. The Wilderness Society. January.

Some dismiss the significance of producing timber on federal worth less than the costs of producing it, arguing that this outcome merely reflects the inefficiencies of federal land managers. Others, though, observe that the costs of timber production on federal lands are higher than on private lands because land managers must account for more of the environmental and social consequences of timber production. The latter argument seems more persuasive, if only because federal lands often must be managed to compensate for the environmental and social effects of private timber production, as evidenced by the concentration on federal forestlands of efforts to conserve the NSO. Moreover, a 2004 review found that the costs of producing timber on the national forests have continued to exceed the benefits, despite repeated efforts to improve the efficiencies of the agency's timber-sale programs.³⁸ This trend likely will continue, insofar as much of the highest value forests have already been logged, diminishing the revenue per unit of cost.

Other subsidies occur less directly. One of these can materialize because employment in the timber industry can vary substantially in response to changes in season, with layoffs occurring in the winter, and to changes in economic conditions, with layoffs occurring when national housing starts decline. Historically, the industry did not pay premiums covering the full costs of unemployment insurance for workers subjected to this variable employment patterns. As a consequence, workers and business owners in other industries had to make up the difference, in effect paying a tax to subsidize the timber industry. During the 1980s, this subsidy totaled almost \$200 million in Oregon.³⁹

These characteristics of timber production on federal lands in the region create a high likelihood that a full examination of the costs and benefits of timber production would conclude that increased timber production would generate net economic benefits much smaller than the gross economic benefits reported in the *Draft Analysis*. Moreover, such an examination might find that the costs of increased timber production would outweigh the benefits.

Costs Imposed on Communities

The *Draft Analysis*' examination of the designation's regional economic impacts reaches this conclusion (p. 6-8): "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." It is impossible to know what this conclusion really means, however, for the *Draft Analysis* never defines in what ways these counties may be more sensitive, or what consequences their sensitivity would cause them to experience in response to future changes in timber harvests, industry employment, and federal land payments. Prior to making its conclusion, the

³⁸ Gorte, R.W. 2004. *Below-Cost Timber Sales: An Overview*. Congressional Research Service, Report for Congress. 21 July.

³⁹ Niemi, E. and E. Whitelaw. 1995. *The Full Economic Costs of Proposed Salvage Logging on Federal Lands* (Preliminary Report). Pacific Rivers Council. March. Retrieved 26 June 2012 from <http://pacificrivers.org/science-research/resources-publications/the-full-economic-costs-of-proposed-salvage-logging-on-federal-lands/download>.

Draft Analysis does not say, for example, if excluding land in a county from the designation to increase the amount of timber harvested on them would improve socioeconomic conditions in the county, or worsen them.

The *Draft Analysis* eventually recognizes that it presents no basis for its conclusion, and acknowledges that an increase in timber harvest in a county would not necessarily have a discernible impact on the county's timber-related employment. For example, it states (p. 6-9) that "timber-related jobs in a certain county are not necessarily closely correlated with the amount of timber being harvested in that specific county." It also recognizes that the timber industry is a small part of the economy of this region:

"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. 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. Although the region lost 5,726 timber-related jobs between 1998 and 2007, it added 45,555 new non-timber jobs." (pp. 6-9 and 6-10, footnote references omitted)

These two statements call into question what the *Draft Analysis* means when it says that conclusion that a county's socioeconomic conditions are potentially sensitive to timber harvest. Additional questions accompany the *Draft Analysis*' observation that increased logging on federal lands might be offset by reduced logging elsewhere:

"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 critical habitat designation. As such, this analysis cannot evaluate the potential effects related to the timber industry as a whole." (p. 6-10)

This observation is important, because it raises the possibility that, although a decision by the Secretary to exclude some lands from the designation might result in increased timber production on those lands, the responses of other participants in the timber market might diminish or even reduce to zero the overall, market-wide impact on timber harvest, timber-related employment, and federal land payments. These are important issues, too important to cover with the statement that the analysis "cannot evaluate the potential effects related to the timber industry as a whole." Tools and data exist for the Service to make such an evaluation, and it should do so before the Secretary makes any determination regarding the final rule to designate critical habitat for the NSO, or to exclude land from the designation.

The inadequacy of its treatment of the designation's regional impacts arises, in large part, because the *Draft Analysis* presents a superficial account of the relationship between timber production and the economy in this region and a misleading history of how that relationship has evolved. For example, the *Draft Analysis* makes no mention of the considerable research that has found a negative correlation between timber production and indicators of socio-economic well-being other than timber-related employment and federal land payments. Some of the major findings of this research are available to the Service in a summary report from the National Research Council (bold emphasis added

to highlight the negative effects of timber production not recognized in the *Draft Analysis*):⁴⁰

“Several studies have examined the relationship between the percentage of people employed in timber producing and processing industries and indicators of well-being such as income, percent living in poverty, and housing conditions. Counties with a higher proportion of such jobs relative to other counties are referred to as timber dependent.

“Heberlein et al. (1994) reviewed eight studies by Drielsma (1984), Elo and Beale (1984), Kusel and Fortmann (1991), Bliss et al. (1992) Howze et al. (1993), Lee and Cubbage (1993), Force et al. (1993), and Overdevest and Green (1994) and presented a meta-analysis of the relationship between varying levels of timber dependence and measures of community well being. The studies covered the Northeast, the Pacific Northwest, the Southeast, and the entire nation as a whole. Those studies reported relationships between the proportion of timber jobs and 134 measures of socioeconomic well being.

“The majority of the relationships between increasing timber dependency as measured by the proportion of timber-related jobs and social and economic well-being indicated that well-being went up as timber dependency went down. **In most cases, timber dependency seemed to hurt rather than help communities.** This analysis found that timber-dependent counties (and by extension, communities) tend to have higher unemployment, lower income, more poverty, and lower levels of education in comparison with counties with greater economic diversity. They also have older, lower-value housing that tends to be seasonal, with fewer new houses. Timber-dependent counties tend to have lower birth rates, higher death rates, greater age dependency, higher infant mortality, and lower growth rates than other counties. Some evidence points to poorer health care, fewer churches and more arrests.”

The *Draft Analysis* also overlooks the results of research that has found a positive relationship between the health of local economies and the presence of unlogged, unroaded federal forests. Again the National Research Council makes some of this research available to the Service (Bold emphasis added to highlight the negative effects of timber production not recognized in the *Draft Analysis*.):

“A second set of research linked management variables with social and economic well being. Rudzitis and colleagues have been studying the effects of wilderness preservation on community well being. Wilderness is a special designation of federal land in which management practice is restricted to protect the area from timber cutting and motorized vehicle access. Wilderness designation has been controversial because of its presumed negative effect on local timber harvesting jobs. Thus, lower levels of economic well being might be expected in communities located near wilderness areas. However, the available data show that is not the case. Rudzitis and Johansen (1991) found that the unemployment rate in wilderness counties (counties that either contain or are adjacent to counties that contain federally managed wilderness areas) is well below the national average. Adjacency to protected lands like wilderness actually serves as an attraction for new residents in an area. Rudzitis (1993) later found that wilderness counties showed population growth of 24%, 6 times faster than the nonmetropolitan counties nationally and twice as fast as nonmetropolitan counties in the west (Rudzitis 1993). Wilderness attracts people of greater economic means and thereby increases the level of socioeconomic indicators of well being. The migrants to these counties are more likely than long-term residents to be college graduates and have professional occupations and higher incomes. Four out of five migrants to wilderness counties rated scenery, outdoor recreation, and environmental quality

⁴⁰ National Research Council, Committee on Environmental Issues in Pacific Northwest Forest Management. 2000. *Environmental Issues in Pacific Northwest Forest Management*. National Academies Press. p. 163.

as the most important reasons to move (Rudzitis and Johansen 1991). These studies suggest that wilderness and amenity protection can have a positive influence on certain measures of community well being, although in-migration brings its own difficulties (Brown 1993).” (p. 163-64)

“Force and co-workers (1993) examined community-level data over time for a single community (Orofino, Idaho) to explore this concern. They used government, media, industry, and personal sources from as far back as 1920 and showed that social unrest, disasters, and nontimber development have a more profound effect on community well being than do changes in forest harvest and mill production. They also found that the number of employees and churches decreased and the number of arrests increased as harvesting on national forests increased. Those findings are consistent with the results of other county-level, cross-sectional analyses.” (p. 164)

“Force et al. (1994) extended their analysis to four resource-dependent communities—communities dependent on timber, mining, fishing, and tourism. They examined the joint effects of local resource production (volumes of wood, minerals or fish, number of employees in resource-dependent industries, and product values), local historical events, and societal trends to determine the effects on four indicators of community social change (size, structure, cohesion, and anomie¹). In only 5 of 20 cases (in a matrix of four social change variables by five communities) did resource production correlate with social indicators. When it did, the effect was sometimes an inverse relationship between resource production and well being. In Prineville, (the timber-dependent community) resource production had no effect on measures of community size, structure, or cohesion beyond the effect of local historical events and societal trends. However, increasing numbers of divorces (one indicator of anomie), did exhibit a direct relationship with increased timber cutting independent of social trends and local historical events. **Thus, the in-depth statistical analysis of communities over time also fits the general conclusion that timber dependency is associated with lower levels of certain measures of social and economic well-being.**” (p. 165)

“The signs of economic diversification evident in economic trend data can be easily overlooked, because the logging culture permeates the Pacific Northwest. Log trucks and mills are obvious, but small businesses and home-based employment are not.... Rural economic diversification in the Pacific Northwest is most directly affected by the availability of transportation and proximity to population centers.” (p. 166)

“Mobility and the information age are allowing more people to move to rural communities. Cromartie (1994) notes the growing importance of the private service sector in the West: “Much evidence indicates that nonmetropolitan areas in the West are beginning to benefit from the location of high paying, producer services.” High-end producer services, such as engineering, accounting, and legal services, which were once found exclusively in metropolitan areas, are increasingly moving to nonmetropolitan areas. Egan (1994) quotes a mill owner in Medford Oregon ‘people moving to southern Oregon from California are not all retirees, as the stereotype has it. They are bringing in jobs with them.’” (p. 168)

“Fuguitt and Beale (1993) show that the North Pacific coast region had the third highest rate of in-migration of elderly among any of 26 U.S. regions (the Southwest and the Florida peninsula were first and second). Elderly who migrate from predominantly urban areas to the Pacific Northwest have expectations for a high quality of life, and access to amenity-based resources are a pre-eminent value sought (Fuguitt and Beale 1993, Salazar et al. 1986).

“In-migration by retirees brings new income into rural economies in the form of retirement income earned elsewhere. The growing importance of transfer payments in nonmetropolitan areas is changing the traditional dynamic of employment stability in the region and contributing to rural economic diversification. Over the 20 years from 1971 to 1991, nonlabor income increased from 26% of total personal income to 34%. In-migration of retirees also

leads to new jobs in the residential, health-care, retail, and amenity-related sectors. They can infuse new ideas and vitality into a community through volunteer work and entrepreneurial activities. This population creates the demand for high-quality community infrastructure, such as hospitals, transportation, and recreation activities. (pp. 168-69)

These research findings emphasize the significance of the *Draft Analysis*' singular focus on measuring the benefits of timber production and disregarding the potential negative effects of increased logging on indicators of well-being in, and immigration to rural communities. Unless and until it corrects this deficiency, neither the Secretary nor the public should place any confidence in the *Draft Analysis*' findings.

The *Draft Analysis* compounds its misleading analysis of the relationship between timber production and the economy by defining trends in the relationship based on a simplistic comparison of current conditions, using data for 2009-2010, with those prior to the listing of the NSO as a threatened species, represented by data from 1989-1990. This comparison embodies a fundamental analytical error that confounds long-run trends in the timber-economy relationship with short-run swings in the national economy. The 1989-1990 period generally represented a peak in the economic cycle; 2009-2010 represents conditions near the bottom of the worst economic collapse since the Great Depression. A recent review tentatively finds, for example, that "The annual harvests from 2008 through 2010 were the lowest since the Great Depression, with 2.7 billion board feet harvested in 2009."⁴¹ The timber industry is highly sensitive to national economic conditions. Hence, it is reasonable to expect that much of the difference in timber production and timber-related employment described in the *Draft Analysis* reflects the peak-to-trough swing in the national economy and has little, if anything to do with how the listing of the NSO and the subsequent designation of critical habitat for the NSO have affected the timber harvest, the value of timber harvest, timber-related employment, or the importance counties place on federal land payments.

Its failure to discern between secular trends and cyclical swings thus renders essentially meaningless the *Draft Analysis*' discussion of the background against which to evaluate the potential regional impacts of the proposed designation. It has not explained what, if anything, the peak-to-trough swing means for the regional economic impacts of potential increases in timber production over the next 20 years. To rectify this error, the Service should disassemble the secular and cyclical factors that affect the timber-economy relationship, make explicit its assumptions about how each will evolve in the future, and evaluate the proposed designation's regional impacts in this context.

Extensive information exists to help the Service with this task. Some of this information provides a history of how the timber-economy relationship evolved before and since the listing of the NSO as a threatened species.⁴² It explains, for example, that any

⁴¹ Gale, C.B., C.E. Keegan III, E.C. Berg, J. Daniels, G.A. Christensen, C.B. Sorenson, T.A. Morgan, and P. Polzin. 2012. *Oregon's Forest Products Industry and Timber Harvest, 2008: Industry Trends of the Great Recession through 2010 (Draft)*. Retrieved 25 June 2012 from <http://www.bber.umn.edu/pubs/forest/fidacs/OR2008draft.pdf>

⁴² See, e.g., Niemi, E.G., M. Gall, and A. Johnston. 1999. *The Sky Did NOT Fall: The Pacific Northwest's Response to Logging Reductions*. Earthlife Canada and the Sierra Club of British Columbia. April. Retrieved 22 June 2012 from <http://pacificrivers.org/science-research/resources-publications/the-sky-did-not-fall-the-pacific-northwest2019s-response-to-logging-reductions/download>.

comparison of timber harvest, timber-related employment, federal land payments, and related variables, before and after the listing of the NSO, should account for the inflation of timber harvests on federal lands prior to the listing that resulted from illegal activity. In his 29 May 1991 ruling that banned new timber sales on 24 million acres on national forests in the range of the NSO, Judge Dwyer documented prolonged, systematic violations of the law:⁴³

“More is involved here than a simple failure by an agency to comply with its governing statute. The most recent violation of [the National Forest Management Act] exemplifies a deliberate and systematic refusal by the Forest Service and the [Fish and Wildlife Service] to comply with the laws protecting wildlife. This is not the doing of scientists, foresters, rangers, and others at the working levels of these agencies. It reflects decisions made by higher authorities in the executive branch of government.” (Dwyer 1991).

Because of the inflated logging, industry analysts and economists had, for several decades prior to Judge Dwyer’s ruling, known that the timber industry had been liquidating the stock of timber at rates so high that logging had outstripped sustainable levels and eventually would collapse.⁴⁴ Because of the unsustainable logging rates, harvests, timber-related employment, and federal land payments necessarily had further to fall than would have occurred absent the illegal behavior. A substantial portion of the decline in timber harvest, timber-related jobs, and federal land payments can be attributed to the illegal actions that caused the unsustainable rates of logging, not to actions to conserve the NSO or other resources.

The Service also should provide a detailed account of the structural changes in the timber industry that have occurred since Judge Dwyer’s ruling and, as it describes a baseline scenario for evaluating how the designation might affect the timber industry, it should explicitly explain its assumptions for the future structure of the industry. Toward this end, the Service should recognize that:

- The timber industry of the Pacific Northwest is closely integrated with its counterparts in other parts of the U.S. and Canada, so that changes in timber harvest here often have broad ripple effects across the national economy.⁴⁵ The Service should account fully for the ripple effects as it estimates the economic benefits of increased timber production. This accounting should include an examination of the potential effects that increased timber production on federal

⁴³ Seattle Audubon Society, et al. v. John L. Evans and Washington Contract Loggers Association, et al.

⁴⁴ See, e.g., Beuter, J.H., K.N. Johnson, and H.L. Scheurman. 1976. *Timber for Oregon's Tomorrow: An Analysis of Reasonably Possible Occurrences*. Oregon State University, School of Forestry. Research Bulletin 19. January; and Sessions, J., J. Beuter, B. Greber, K.N. Johnson, and G. Lettman. 1990. *Timber for Oregon's Tomorrow: The 1989 Update*. Forest Research Lab, College of Forestry, Oregon State University. May.

⁴⁵ See, e.g., National Research Council, Committee on Environmental Issues in Pacific Northwest Forest Management. 2000. *Environmental Issues in Pacific Northwest Forest Management*. National Academies Press. p. 159; and Sommers, P. 2001. *Monitoring Socioeconomic Trends in the Northern Spotted Owl Region: Framework, Trends Update, and Community Level Monitoring Recommendations*. U.S. Geological Service Forest and Rangeland Ecosystem Science Center, Cascadia Field Station, College of Forest Resources, Seattle, WA.

lands might have on market prices and, hence, on the revenues federal and other landowners receive for timber.⁴⁶

- Milling capacity in the western U.S. increased between 1995 and 2009, and more of the capacity is located in fewer, larger mills.⁴⁷ The Service should identify their location and specify its assumptions about which one(s) would process any increase in timber produced from federal lands as a result of increasing logging on lands included in the designation or of excluding lands from the designation so they can be logged more intensively.
- Once most legal challenges were resolved, federal land managers in the region have exceeded, met, or come close to meeting targets commensurate with funding provided by Congress. Figure 6 illustrates their performance. The Service should recognize this performance and discuss its implications. It should especially estimate the additional appropriations that would be required to increase timber production on federal lands, taking into account not just the direct costs of timber production but also the ancillary costs.
- The contracting mechanisms used for timber sales and forest work can be more important than the amount of timber harvested in determining local, timber-related employment.⁴⁸ The Service should describe alternative contracting mechanisms that might come into play with efforts to increase logging on federal lands, discuss the extent to which each would hinder or facilitate timber production, identify its assumptions about which mechanism will actually apply, and describe the implications for goods and services other than timber.
- Quantifiable job losses attributable to Judge Dwyer's ban on timber sales occurred in only a few places and for only a short time. Of the 38 counties and nine metropolitan areas in the spotted-owl region of Washington and Oregon, on the west side of the Cascades, all but two counties and each metropolitan area had higher total employment in 1996 than in 1990, the year before Judge Dwyer's ruling. These outcomes occurred despite the nation's economy entering a recession soon after Judge Dwyer's decision.⁴⁹ Before it reaches any conclusions about the designation's regional impacts, the Service should trace the actual changes in socio-economic conditions in the different counties since Judge Dwyer's ruling, discern the drivers of these changes, and explain how the designation of lands or the exclusion of lands from the designation would affect the evolution of socio-economic conditions in the future.

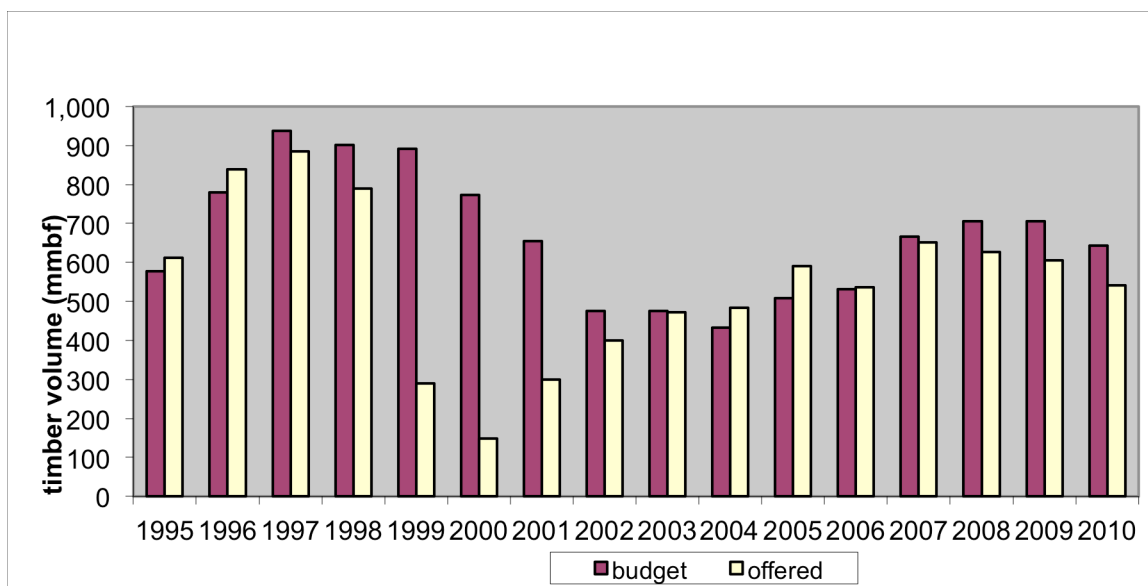
⁴⁶ See, e.g., Majumdar, S., D. Zhang, and Y. Zhang. 2010. "Estimating Regional Softwood Lumber Supply in the U.S. Using Seemingly Unrelated Regression." *Forest Products Journal*. Vol. 60, no. 7/8, pp. 709-714.

⁴⁷ Spelter, H., D. McKeever, and D. Toth. 2009. *Profile 2009: Softwood Sawmills in the United States and Canada*. U.S. Forest Service, Forest Products Laboratory. Research Paper FPL-RP-659. October. Retrieved 26 June 2012 from http://www.fpl.fs.fed.us/documnts/fplrp/fpl_rp659.pdf

⁴⁸ Danks, C., and R.W. Haynes. 2001. "Socioeconomic Research", in *Northwest Forest Plan Research Synthesis*, Gen. Tech. Rep. PNW-GTR-498, tech. eds. G.E. Perez and R.W. Haynes, U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station, Portland, OR.

⁴⁹ Niemi, E.G., M. Gall, and A. Johnston. 1999. *The Sky Did NOT Fall: The Pacific Northwest's Response to Logging Reductions*. Earthlife Canada and the Sierra Club of British Columbia. April.

Figure 6. Northwest Forest Plan Timber Sale Accomplishments, 1995–2010



Source: Forest Service and BLM Volume Offered under Northwest Forest Plan (FY 1995 – FY 2010), Region 5 & 6 PTSAR Report, and BLM Timber Sale Information System.

V. THE *DRAFT ANALYSIS* FAILS TO COMPLY WITH EXECUTIVE ORDER 12866, OMB CIRCULAR A-4, AND PRESIDENT OBAMA'S MEMORANDUM

The *Draft Analysis* clearly recognizes its obligation to satisfy the requirements of Executive Order 12866, the guidelines OMB has published regarding this order, and President Obama's 28 February 2012 memorandum to the Secretary of the Interior. It does not, however, meet this obligation.

Executive Order 12866 provides directions to the heads of federal agencies developing regulations, such as designating critical habitat for the NSO. These include:

- Each agency shall assess both the costs and the benefits of the intended regulation and, recognizing that some costs and benefits are difficult to quantify, propose or adopt a regulation only upon a reasoned determination that the benefits of the intended regulation justify its costs.
- Each agency shall tailor its regulations to impose the least burden on society....

These statements make clear the Secretary's obligation to assess the proposed designation's economic costs and benefits. The order is inclusive; it does not provide latitude to describe timber-related benefits of the designation but not others. The Secretary also must adopt a final designation only after comparing the costs and the benefits, even those difficult to quantify, and determining that, within the requirements of the ESA, it imposes the least burden on society.

In Circular A-4, OMB provides guidance for implementing Executive Order 12866. The *Draft Analysis* recognizes (p. 2-7) some elements of the guidance, namely the requirement that the baseline for the analysis look forward so it (a) represents the "best assessment of the way the world would look absent the proposed action;" and (b) 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." The discussion above demonstrates that the *Draft Analysis* does not comply with this guidance. It defines a static baseline that reflects a continuation of current rules and programs, rather than explicitly identifying expected trends in important variables and potential changes in rules and programs that might affect the benefits of including lands in the designation relative to the benefits of excluding them.

The *Draft Analysis* does not recognize or comply with many other elements of the guidance expressed on Circular A-4. In particular, the *Draft Analysis* does not provide the Secretary with sufficient information to weigh all the potential benefits of including or excluding lands from the final designation. Circular A-4 makes clear that the economic information made available to the Secretary should identify and discuss all the consequences of designation or exclusion that have economic importance, including those that can be quantified but not monetized as well as those that cannot be quantified:

- "It will not always be possible to express in monetary units all of the important benefits and costs. When it is not, the most efficient alternative will not necessarily be the one with the largest quantified and monetized net-benefit

estimate. In such cases, you should exercise professional judgment in determining how important the non-quantified benefits or costs may be in the context of the overall analysis. If the non-quantified benefits and costs are likely to be important, you should carry out a “threshold” analysis to evaluate their significance. ... In addition to threshold analysis you should indicate, where possible, which non-quantified effects are most important and why.” (p. 2)

- “A complete regulatory analysis includes a discussion of non-quantified as well as quantified benefits and costs. A non-quantified outcome is a benefit or cost that has not been quantified or monetized in the analysis. When there are important non-monetary values at stake, you should also identify them in your analysis so policymakers can compare them with the monetary benefits and costs. When your analysis is complete, you should present a summary of the benefit and cost estimates for each alternative, including the qualitative and non-monetized factors affected by the rule, so that readers can evaluate them.” (p. 3)
- “Sound quantitative estimates of benefits and costs, where feasible, are preferable to qualitative descriptions of benefits and costs because they help decision makers understand the magnitudes of the effects of alternative actions. However, some important benefits and costs (e.g., privacy protection) may be inherently too difficult to quantify or monetize given data and methods. You should carry out a careful evaluation of non-quantified benefits and costs.” (p. 26)
- “You should monetize quantitative estimates whenever possible. Use sound and defensible values or procedures to monetize benefits and costs, and ensure that key analytical assumptions are defensible. If monetization is impossible, explain why and present all available quantitative information. For example, if you can quantify but cannot monetize increases in water quality and fish populations resulting from water quality regulation, you can describe benefits in terms of stream miles of improved water quality for boaters and increases in game fish populations for anglers. You should describe the timing and likelihood of such effects and avoid double-counting of benefits when estimates of monetized and physical effects are mixed in the same analysis.” (p. 27)
- “If you are not able to quantify the effects, you should present any relevant quantitative information along with a description of the unquantified effects, such as ecological gains, improvements in quality of life, and aesthetic beauty. You should provide a discussion of the strengths and limitations of the qualitative information. This should include information on the key reason(s) why they cannot be quantified.” (p. 27)

Contrary to this guidance, the *Draft Analysis* does not indicate which, of those effects it did not quantify, are most important for the Secretary’s decision-making about whether to include or exclude lands from the final designation, and why. It does not carry out a careful evaluation of non-quantified benefits and costs, substituting instead a casual discussion that contains no evaluative information. It does not monetize quantitative results whenever possible, even though the preceding sections of these comments make clear that suitable information and research processes – comparable to those it used to monetize timber effects – are available for the Service to monetize the carbon-, water-, and recreation-related effects of including or excluding lands in the designation. After determining that it could not, or would not monetize these and other effects, the Service

does not explain why and present all quantitative information. Indeed, it presents no quantitative information at all for benefits other than increased timber production. The *Draft Analysis* utterly fails to present “any relevant quantitative information along with a description of the unquantified effects, such as ecological gains, improvements in quality of life, and aesthetic beauty.”

The *Draft Analysis* also fails to comply with this guidance from Circular A-4 regarding research methods:

- “As you design, execute, and write your regulatory analysis, you should seek out the opinions of those who will be affected by the regulation as well as the views of those individuals and organizations who may not be affected but have special knowledge or insight into the regulatory issues.” (p. 3)
- “You should not include transfers in the estimates of the benefits and costs of a regulation. Instead, address them in a separate discussion of the regulation’s distributional effects. Examples of transfer payments include... indirect taxes and subsidies” (p. 38)
- “Your estimates cannot be more precise than their most uncertain component. Thus, your analysis should report estimates in a way that reflects the degree of uncertainty and not create a false sense of precision.” (p. 40)
- “Use a numerical sensitivity analysis to examine how the results of your analysis vary with plausible changes in assumptions, choices of input data, and alternative analytical approaches. Sensitivity analysis is especially valuable when the information is lacking to carry out a formal probabilistic simulation. Sensitivity analysis can be used to find “switch points” -- critical parameter values at which estimated net benefits change sign or the low cost alternative switches.” (p. 41)
- “In general, experts can be used to quantify the probability distributions of key parameters and relationships.” (p. 41)
- “If benefit or cost estimates depend heavily on certain assumptions, you should make those assumptions explicit and carry out sensitivity analyses using plausible alternative assumptions.” (p. 42)
- “You should categorize or rank the qualitative effects in terms of their importance (e.g., certainty, likely magnitude, and reversibility). You should distinguish the effects that are likely to be significant enough to warrant serious consideration by decision makers from those that are likely to be minor.” (p. 45)

The *Draft Analysis* indicates that the authors did not seek out the opinions of those, except for representatives of the timber industry, who will be affected by the designation. They especially did not seek out the opinions of those who might be affected insofar as including lands in the designation, or excluding them would have consequences for the amount of carbon sequestered by the region’s forests, the quantity and quality of water produced by the forests, or the recreation industry that depends on forest-related recreational opportunities. They also do not indicate that they sought the opinions of those, in rural and metropolitan communities throughout the region, whose quality of life might be enhanced or diminished by designating or excluding lands from the designation. Similarly, the *Draft Analysis* indicates the authors not did they seek out the views of individuals and organizations who may not be affected but have special knowledge or insight that might help the Secretary weigh the benefits of including

specific areas in the designation against the benefits of excluding them. The *Draft Analysis* does not, for example, indicate that the authors sought the views of scientists or economists familiar with the relationship between forest-management alternatives and carbon sequestration, anticipated changes in climate, water quantity and quality, recreation, landslide risks, habitat for species other than the NSO, the recreational and commercial fishing industries, the spiritual and cultural values of specific forested areas, etc.

The *Draft Analysis* conducted sensitivity analysis regarding timber production only. It contains a limited investigation of alternative assumptions, but no discussion of switch points. The presentation does not justify the precision of the estimates of the timber benefits. The fundamental uncertainties in the underlying data—including their inability to distinguish the difference in forest conditions on the west and east sides of the Cascade Mountains—suggest that the level of precision represented in its estimates of the timber-related benefits is unwarranted.

The *Draft Analysis* does not categorize or rank the qualitative effects in terms of their importance, nor does it distinguish the effects that are likely to be significant enough to warrant serious consideration by the Secretary from those that are likely to be minor.

President Obama's 28 February 2012 memorandum to the Secretary of the Interior directs him to publish "a full analysis of the economic impacts of the proposed rule...." The deficiencies described above reveal that the *Draft Analysis* falls far short of this requirement.

In sum, the *Draft Analysis* falls far short of its obligation under Executive Order 12866, OMB Circular A-4, and President Obama's 28 February 2012 memorandum. The Service must correct these deficiencies before it can claim that it has provided the Secretary with an analysis that would support his weighing of the benefits of including lands in the designation against the benefits of excluding the lands from it.

VI. RECOMMENDATIONS

The discussion above demonstrates that the *Draft Analysis* fails to accomplish its objectives. It does not provide a comprehensive, unbiased description of the economic benefits and costs of including lands in the designation of critical habitat for the NSO, or the economic benefits and costs of excluding lands from the designation. Hence, it cannot serve as a comprehensive, unbiased basis for the Secretary to use when weighing the benefits of including lands in the designation against the benefits of excluding them. To correct this state of affairs, we offer the following recommendations:

1. The Secretary should not rely on the *Draft Analysis*, however amended, until he is sure that it provides the best reasonably available economic information concerning the consequences of the designation.
2. To repair the flaws in the *Draft Analysis*, and assure the Secretary that it provides the best reasonably available economic information concerning the consequences of the designation, the Service should take these steps, derived from OMB Circular A-4:
 - a. Measure the benefits and costs of the proposed designation against a baseline scenario that presents the Service's best assessment of the way the world would look over the next 20 years absent the proposed designation. Choosing the baseline may require consideration of a wide range of potential factors, including:
 - i. Evolution of the market(s) that would be affected by the designation.
 - ii. Changes in external factors affecting the designation's expected benefits and costs.
 - iii. Changes in regulations promulgated by the Service or other government entities that would affect the designation's economic consequences.
 - iv. The degree of compliance by regulated entities with other regulations that would affect the designation's economic consequences.
 - b. Look beyond the direct benefits and direct costs of the proposed designation and consider any important ancillary benefits and countervailing risks. The consideration of ancillary benefits should at least include the affected forests':
 - i. Regulation of atmosphere and climate, including sequestration of carbon.
 - ii. Production and regulation of water: improvements in water quality and quantity.
 - iii. Production of recreational opportunities: level of activity, expenditures, and consumer surplus.
 - iv. Regulation of disturbances: levels of flooding and wildfire, and the associated economic costs.
 - v. Production of habitat for species other than the NSO.
 - vi. Production of visual and other amenities that affect the quality of life for the region's residents.
 - vii. Production of spiritual and cultural values.

- viii. Formation and retention of soil.
 - ix. Biological control of pests and diseases.
 - x. Regulation of nutrients and pollution.
 - xi. Production of timber and other raw materials for commercial enterprise.
 - xii. Production of scientific and educational resources.
- c. Apply to the ancillary benefits and countervailing risks of the proposed designation the same standards of information and analysis quality that apply to direct benefits and costs.
 - d. Carry out a careful evaluation of the non-quantified benefits and costs of the proposed designation.
 - e. Monetize quantitative estimates whenever possible. Use sound and defensible values or procedures to monetize benefits and costs, and ensure that key analytical assumptions are defensible. If monetization is impossible, explain why and present all available quantitative information. For example, if increases in water quality and fish populations resulting from the designation cannot be monetized, describe benefits in terms of stream miles of improved water quality for boaters and increases in game fish populations for anglers. Describe the timing and likelihood of such effects and avoid double-counting of benefits.
 - f. If unable to quantify the effects, present any relevant quantitative information along with a description of the unquantified effects, such as ecological gains, improvements in quality of life, and aesthetic beauty. Provide a discussion of the strengths and limitations of the qualitative information. This discussion should include information on the key reason(s) why they cannot be quantified.
 - g. Categorize or rank the qualitative effects of the proposed designation in terms of their importance (e.g., certainty, likely magnitude, and reversibility). Distinguish the effects that are likely to be significant enough to warrant serious consideration by the Secretary from those that are likely to be minor. Explain the reasoning and information underlying this distinction.
 - h. Where the unquantified benefits or costs might affect the Secretary's determination, provide a clear explanation of the rationale behind his choice. The explanation could include detailed information on the nature, timing, likelihood, location, and distribution of the unquantified benefits and costs. Include a summary table that lists all the unquantified benefits and costs, and highlight (e.g., with categories or rank ordering) those the Service believes are most important (e.g., by considering factors such as the degree of certainty, expected magnitude, and reversibility of effects).
 - i. Analyze the important uncertainties connected with including lands in or excluding lands from the designation. Begin the analysis of uncertainty at the earliest possible stage in the analysis. Guide the treatment of uncertainty by the same principles of full disclosure and transparency that apply to other elements of the analysis.
 - j. Explain how the Service's analytical choices have affected the results.

- k. Report estimates in a way that reflects the degree of uncertainty and does not create a false sense of precision.
- l. Make explicit those assumptions that heavily influence estimates of benefits or costs, and carry out sensitivity analyses using plausible alternative assumptions. Describe switch points when feasible to do so.
- m. Quantify, to the extent feasible, all potential incremental benefits and costs of the designation. Report benefit and cost estimates within the following three categories: monetized; quantified, but not monetized; and qualitative, but not quantified or monetized.
- n. Disclose qualitatively the main uncertainties in each important input to the calculation of benefits and costs, addressing the uncertainties in the data as well as in the analytical results.
- o. Seek out the opinions of those who will be affected by the regulation as well as the views of those individuals and organizations who may not be affected but have special knowledge or insight into the regulatory issues. Secure these opinions so they become timely inputs to the design, execution, and communication of the analysis.
- p. Account for the full costs of timber production on federal or non-federal lands affected by the designation.
- q. Account for the full impacts of increased timber production on the socio-economic well-being of residents in affected communities.
- r. Produce an analysis that is credible, objective, realistic, and scientifically balanced.