

**PRELIMINARY ECONOMIC ANALYSIS**  
**Forest Practices Rule Making**  
**Affecting Northern Spotted Owl Conservation**

**OBJECTIVES**

The Forest Practices Board adopted an emergency rule affecting Northern Spotted Owl conservation at its November 9, 2005 meeting. The rule became effective on November 30, 2005. The Board now proposes to make this rule permanent. The objectives of this economic analysis are to determine whether the benefits of the proposed rules exceed the costs, and whether the compliance costs of the proposed rules will disproportionately affect the state's small businesses.

The Administrative Procedure Act (RCW 34.05)<sup>1</sup> requires completion of a Cost-Benefit Analysis (CBA) prior to rule adoption that demonstrates that probable benefits of the proposal exceed its probable costs and that it is the most cost-effective means of achieving the goal of the rule change. A Small Business Economic Impact Statement (SBEIS) is required by the Regulatory Fairness Act (RCW 19.85)<sup>2</sup> to consider the impacts of state administrative rules on small businesses, defined as those with 50 or fewer employees. An SBEIS compares the costs of compliance for small businesses with the cost of compliance for the ten percent of businesses that are the largest businesses required to comply with the proposed rules.

This economic analysis combines the SBEIS and the CBA and complies with the legislative requirements for these analyses as part of the rulemaking process.

**HISTORICAL CONTEXT**

The Forest Practices Board adopted rules on May 22, 1996 to protect Northern Spotted Owl habitat. Developing and adopting this rule took place over several years and involved extensive public review and comments. The rules:

- Identify “critical wildlife habitat” (state) for the Northern Spotted Owl. Forest practices applications proposed within these areas would be Class IV-Special, and would require additional environmental review under SEPA (State Environmental Policy Act). The rules do not prohibit harvesting.
- Provide SEPA guidance to DNR for threatened and endangered species, and specific SEPA guidance for the Northern Spotted Owl.
- Delineate 10 SOSEAs (“spotted owl special emphasis areas”) where critical wildlife habitat (state) is designated within circles around owl site centers (owl circles). Habitat goals (functions) are identified on maps for each SOSEA.
- Require SEPA review for the 70 acres of habitat around owl site centers outside SOSEAs. This applies during nesting season only, from March 1 to August 31.

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<sup>1</sup> For CBA requirements, see [Chapter 34.05.328 RCW - The Washington State Legislature](#).

<sup>2</sup> For SBEIS requirements, see [Chapter 19.85.040 RCW - The Washington State Legislature](#).

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- Provide a small parcel exemption from SEPA for landowners who own less than 500 acres in a SOSEA, if their proposed forest practice is not within 0.7 mile of a site center.
- Include two landscape planning processes: A landowner option plan (LOP) for landowners currently impacted by owls, and a Cooperative Habitat Enhancement Agreement (CHEA) for those not currently impacted by owls.
- Identify certain restrictions against disturbance around owl site centers inside SOSEAs during nesting season.

## **PROPOSED RULES SUMMARY**

The proposal affects WAC 222-10-041(4) and WAC 222-16-010 ( definition of Northern Spotted Owl site center”) as follows:

1. The definition of Northern Spotted Owl site center in WAC 222-16-010 is amended to create a temporary moratorium on the practice of “decertifying” status 1, 2 and 3 spotted owl sites. The moratorium will be in place until June 30, 2007. Decertifications recorded by the Washington Department of Fish and Wildlife before November 1, 2005 are not subject to this moratorium.
2. The last paragraph in WAC 222-10-041(4) is deleted. With the deletion of this paragraph, the determination of suitable spotted owl habitat acreage within a Spotted Owl Special Emphasis Area (SOSEA) does not include lands harvested under a DNR determination as described in WAC 222-10-041(6) or a habitat conservation plan (HCP) or other approved plan as listed in WAC 222-16-080(1)(h)(iv) and (6). For simplification, we are calling this provision “virtual habitat.”

In practice, the decertification process follows the survey protocol endorsed by the U.S. Fish and Wildlife Service for spotted owl sites that are no longer occupied. The protocol states that “if no responses have been obtained from an historical site after three years of survey (using established guidelines), the site may be considered unoccupied, barring other evidence to the contrary.” Unoccupied sites are changed to “status 5” and are not subject to forest practices rules pertaining to Northern Spotted Owls.

## **ECONOMIC ANALYSIS**

This economic analysis is in response to:

- The Administrative Procedure Act (APA), which requires agencies to assess whether probable benefits of a proposed new rule exceed its probable costs and whether the proposed rule change is the most cost-effective means of achieving the goal of the rule change; and
- The Regulatory Fairness Act (RFA), which requires that an SBEIS be prepared for proposed rules that will impose more than minor costs on businesses.

To comply with the APA and RFA this analysis identifies potentially affected industries, defines small and large businesses and determines if there is a disproportionate economic impact on small businesses, in which case the RFA requires that the cost imposed by the rule on small

businesses be reduced where legal and feasible to meet the rule’s objective. If steps are not taken to reduce the costs on small businesses, the agency must provide reasonable justification.

The proposed rules amend existing forest practices rules (Title 222 WAC). This analysis calculates benefits and costs and their effects on small businesses using the provisions of the forest practices rules in effect prior to the emergency rulemaking as the base case. The moratorium on decertification affects forestland identified as habitat within owl site centers (circles) and within SOSEA boundaries, excluding forestland that is in an HCP, owned by the federal government, or covered by a landowner option plan. Portions of a given circle that also fall within one or more other status 1, 2 or 3 circles are not considered decertified. For small forest landowners (owning less than 500 acres in a SOSEA) the effects of the proposed rules are limited to habitat within the inner 0.7-mile circle.

We were not able to identify affected habitat for the virtual habitat provision due to time and information constraints. Instead, we have included a case analysis of a relevant spotted owl circle to illustrate the effects of this provision. Methodology is discussed below.

### **Potentially Affected Industries**

The rule-complying community affected by the proposal is businesses that own or control the cutting rights on forestland or those with the right to dispose of the timber.

### **Small Businesses Versus Large Businesses**

The RFA defines a “small business” as one with 50 or fewer employees. Ownership acreage is generally a more appropriate metric for characterizing small businesses in the timber industry. Small businesses are identified in this economic analysis as those subject to the small parcel northern spotted owl exception provision in the rule, which states that: “Forest practices proposed on the lands owned or controlled by a landowner whose forest land ownership within the SOSEA is less than or equal to 500 acres and where the forest practice is not within 0.7 mile of a northern spotted owl site center shall not be considered to be on lands designated as critical habitat (state) for northern spotted owls.” All other private landowners are categorized as “large businesses” for purposes of this analysis.

### **Benefits and Costs Included in the Analysis**

To ensure compatibility between cost and benefit measurements, they are calculated on a per-acre basis, and are limited to direct costs and benefits. The costs of the rule change are measured as the potential loss of timber revenue, based on an estimate of the habitat acreage affected by the rulemaking. Benefits are defined as the value of protecting the habitat, based on the findings of a 1993 study done in Oregon that estimated the value to state residents of protecting Northern Spotted Owl habitat. This was the best information available to us, and we use it with the caveat that there are uncertainties regarding the application of it to this analysis. Methodology is further discussed below.

### **Compliance Cost for Businesses**

Compliance costs for small businesses, defined as landowners with less than 500 acres in a given SOSEA, are less than for large businesses in the aggregate, because the small parcel Northern

Spotted Owl exception provision in the rule limits the effects of the rule change to habitat within the inner 0.7-mile site circle.

### **Involvement of Concerned Stakeholders**

Before finalizing recommendations to the Forest Practices Board, DNR Executive Director of Regulatory Programs, Pat McElroy and DNR Forest Practices Division Manager, Lenny Young briefed Sherry Fox, Past President of the Washington Farm Forestry Association (WFFA), on proposed rule changes. WFFA's mission is to "protect the economic viability of the small forest landowner while providing forest resource benefits such as clean water, clean air, and fish and wildlife habitat."

### **METHODS OF ANALYSIS**

This analysis compares the costs and benefits of the rule changes on a per-acre basis. Costs are defined as the estimated timber harvest revenue that will not be harvested due to the rule change. Our calculations assume that potential harvest will be delayed indefinitely, though the situation beyond the proposal's sunset date of June 30, 2007 is unknown. Benefits are estimated based on willingness to pay for protecting spotted owl habitat. The effects on small businesses are highlighted where appropriate.

The following steps show the process for estimating costs related to the decertification provision:

- Step 1. Identify owl circles potentially affected by the rule change. The Washington Department of Fish and Wildlife provided a list of the northern spotted owl circles that were undergoing or had recently completed surveying in anticipation of decertification.
- Step 2. Analyze spotted owl circles identified in Step 1. Circles that are entirely or partially within SOSEAs were analyzed using GIS to determine ownership, management status (HCPs), and seral layer status.
- Step 3. Determine forest acreage affected by the rule change. Forest acreage affected by the rulemaking was determined based on the GIS analysis.
- Step 4. Estimate habitat acreage. Habitat acreage affected by the rulemaking was estimated based on Pierce et al.'s Washington State Spotted Owl Habitat Assessment Report<sup>3</sup>.
- Step 5. Estimate habitat that would have been harvested without the rule change. The acreage of habitat that would have been harvested was estimated.
- Step 6. Determine costs associated with a moratorium on decertification. Costs were calculated by multiplying lost harvest acreage by average per-acre timber harvest revenue for western and eastern Washington.

We did not estimate costs associated with the virtual habitat because of the difficulties in determining affected acreage. This is further discussed below.

Benefits of the decertification provision were estimated by applying the findings of the study by Loomis et al. that estimated the value of reducing fire hazards to old-growth forests in the Pacific Northwest<sup>4</sup>.

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<sup>3</sup> Available at [http://wdfw.wa.gov/wlm/research/papers/spotted\\_owl/](http://wdfw.wa.gov/wlm/research/papers/spotted_owl/)

## **ANALYSIS**

### **Determining costs associated with a moratorium on decertification.**

Step 1 – Identify owl circles potentially affected by the rule change.

Because the moratorium on decertification of spotted owl circles would expire on June 30, 2007, spotted owl circles that are potentially affected by the rule will have already been surveyed at least once. The Washington State Department of Fish and Wildlife (DFW) provided us with a list of such circles. Additional circles may have been in the process of being surveyed, though this has seldom been the case in the past, since surveyors want to ensure they are following proper surveying protocol.

Five spotted owl site circles have been identified as potentially affected; three in the I-90 East SOSEA located east of the Cascade Range Crest, and two in the Mineral Block SOSEA located on the west side. (An additional spotted owl circle in the process of decertification is not in a SOSEA, so is not affected by this rulemaking.)

Step 2 – Analyze spotted owl circles identified in Step 1.

GIS analysis identified ownership status (federal, state, industry, non-industrial private), whether the parcel was covered by a habitat conservation plan or similar arrangement that exempted the parcel from forest practices rules pertaining to the spotted owl, and its seral layer status. SOSEA boundaries and transecting status 1, 2 and 3 northern spotted owl circles were also delineated, because the proposed rulemaking does not affect the portion of spotted owl circles outside of SOSEAs nor portions of decertified circles within SOSEAs that are also part of other status 1, 2 or 3 circles.

Step 3 – Determine forest acreage affected by the rule change.

Forest acreage affected by the moratorium on decertification is limited to habitat within owl site circles within SOSEA boundaries, excluding forestland that is either in an HCP, owned by the federal government, or covered by a landowner option plan. Portions of a given circle that are also within one or more other status 1, 2 or 3 circles are not considered decertified. In addition, the effects on small forest landowners are limited to habitat within the inner 0.7-mile circle. If the spotted owl circle includes more than 40 percent habitat, excess habitat has been identified and is available for harvest.

Table 1 summarizes the amount of privately-owned forest acreage that is affected by the rulemaking for the three owl circles on the east side and the two on the west side, as well as an estimate of the affected habitat acreage (discussed in Step 4 below). There are 14,407 acres potentially affected within the five owl circles included in the analysis; all but 152 acres are

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<sup>4</sup> Available at <http://www.fs.fed.us/psw/publications/documents/rp-229/>

industrial forestland. These 152 acres are owned by landowners subject to the small parcel northern spotted owl exception provision, and are most likely small forest landowners.

**Table 1**  
**Forest and Habitat Acreage Affected by the Rule Proposal**

	<b>Industrial Acreage</b>		
	<b>Forest</b>	<b>Habitat</b>	<b>% Habitat</b>
East	8123	2624	32.3
West	6132	369	6.0
Total	14255	2993	21.0

	<b>Small Landowner Acreage</b>		
	<b>Forest</b>	<b>Habitat</b>	<b>% Habitat</b>
East	152	26	17.1
West	0	0	0.0
Total	152	26	17.1

	<b>Total Acreage</b>		
	<b>Forest</b>	<b>Habitat</b>	<b>% Habitat</b>
East	8275	2650	32.0
West	6132	369	6.0
Total	14407	3019	21.0

Step 4 – Estimate habitat acreage.

For each of the five owl circles included in the analysis, we estimated the amount of habitat by multiplying the affected forest acreage in the circles by the habitat proportion by seral status estimates provided by Pierce et al. (2005). These proportions are summarized in Table 2. The three owl circles located in the I-90 East SOSEA are within the East Cascades zone, and the two circles within the Mineral Block SOSEA are in the South Cascades zone.

**Table 2**  
**Estimated Percentage of Northern Spotted Owl Habitat with Geographic and Forest Seral Stand Conditions**

<b>ZONE</b>	<b>OTHER SERAL</b>	<b>EARLY SERAL</b>	<b>MID SERAL</b>	<b>LATE SERAL</b>
East Cascades	2.1	12.5	58.8	65.7
North Cascades	2.1	0.4	28.9	60.9
Olympics	2.1	0.4	31.2	60.9
South Cascades	2.1	0.4	45.0	60.9
Southwest	2.1	0.4	21.7	60.9

Source: Pierce et al. (2005) Table 15, p. 51.

Habitat is defined differently on the west and east sides of the Cascade Range Crest, reflecting differences in Northern Spotted Owl behavior. This is apparent in the habitat acreage estimates in Table 1. The proportion of habitat is much higher in the east (32.0%) than in the west (6.0%). We estimate there is a total of 3,019 acres of habitat affected by the rulemaking; that is, 3,019 acres of habitat that could have been harvested if the five owl circles were decertified. Only 26 acres of this acreage is in the small landowner category, leading us to conclude that the rulemaking does not have a disproportionate effect on small businesses.

Step 5 – Estimate habitat that would have been harvested without the rule change.

DNR field staff estimated that without the decertification moratorium, approximately 75 percent of the affected habitat would have been harvested, leaving 2,264 acres of timberland that would not be harvested because of the rule change.

Step 6 – Determine costs associated with a moratorium on decertification.

We estimated the stumpage revenue potential, assuming harvest of 75 percent of the habitat subject to the rulemaking in the five spotted owl circles. This calculation required that we make assumptions regarding the volume per acre and price. Stand quality and species composition are implicitly factored into these assumptions. The high-end estimate assumes volume of 50,000 board feet (50 MBF) per acre at a price of \$400 per MBF, and the low-end estimate assumes volume of 40 MBF per acre at a price of \$350 per MBF. Per-acre stumpage value is \$20,000 and \$14,000, respectively. Therefore, the opportunity loss for 2,264 acres of timberland ranges from \$31.7 million to \$45.3 million. These calculations are illustrated in Table 3.

#### **Determining benefits associated with a moratorium on decertification.**

The benefits of this rulemaking are difficult to estimate. The intended purpose of the rulemaking is to help arrest the decline in Northern Spotted Owl populations in Washington by providing additional habitat protection. Few studies have estimated values of protecting northern spotted owls or their habitat (Hagen et al 1992; Rubin et al 1991; Loomis et al 1996). These studies use the contingent valuation method (CV) to measure the willingness to pay (WTP) for protecting the northern spotted owl and old growth forests. This approach is widely accepted among federal agencies for benefit-cost analysis that measure the benefits of non-market goods such as an endangered species. While all three studies use a CV approach to measure benefits and costs of protecting the northern spotted owl, the study by Loomis and Gonzales (LG) provides the preferred approach for our purpose, as it estimates benefits of an incremental change in protected habitat of a specified number of acres. The report on the findings is available at the U.S. Forest Service Pacific Southwest Research Service website at <http://www.fs.fed.us/psw/publications/documents/rp-229/>.

The LG study surveyed residents of the State of Oregon in 1993 on their WTP for protecting old growth northern spotted owl habitat from fire in the Pacific Northwest. Following is a discussion of the methodology used in the LG study, the WTP results, and the limitations that may apply in terms of the transferability of these results to Washington. We use these results to evaluate the

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probable benefits of protecting Northern Spotted Owl habitat in Washington State, adjusting the results as necessary.

Survey participants were asked to evaluate a scenario whereby approximately 3,500 acres of old-growth Northern Spotted Owl habitat was saved from fire. The average (median) WTP of survey respondents was \$77 per household per year, corresponding to \$24,170 per acre. Assuming that non-respondents (about half of those sent surveys) had a WTP of \$0 provides a minimum value of \$45 per household per year.

We adjusted these findings to account for inflation and the number of households in Washington. WTP in Washington is estimated to be \$104 per household per year, with a minimum value of \$61. The benefits to the state's 2.5 million households amounts to \$259 million per year, an average of \$74,129 per acre. The corresponding minimum values are \$152 million and \$43,322, respectively. (Although these estimates are on a per-year basis, we have assumed they are a one-time payment to mitigate for the uncertainties with using this benefit valuation approach.)

Although this study was the most applicable to our analysis, there are a number of factors that might have an effect on its transferability, with the potential for over- or underestimation. These include:

- The base study was limited to Oregon residents. Attitudes towards protecting the Northern Spotted Owl may differ between the states. Higher average incomes in Washington suggest that WTP may be higher in Washington.
- We extrapolated the LG study results to Washington residents only; WTP for nonresidents was ignored, though it may be considerable.
- The base study valued protecting old growth forests from fire. The rule changes under consideration protect all levels of habitat from general loss. Washington residents likely value less mature forests lower than old growth. Other benefits accruing from avoidance of fire would not be applicable to this analysis, possibly overstating benefits.
- Attitudes towards protecting Northern Spotted Owls and their habitat may have changed since 1993.
- Placing a value on non-market goods such as habitat protection is difficult for some people.

### **Economic analysis of virtual habitat provision.**

The virtual habitat provision of the proposal negates a provision that permitted a landowner to disregard timber harvesting that took place on lands included in an HCP within a given owl circle when determining whether a circle was above or below the 40 percent habitat threshold. Under these circumstances, a non-HCP landowner could harvest habitat that brought the circle below the 40 percent habitat threshold, so long as the part of the circle outside the HCP had more than 40 percent habitat. Such a situation could occur within an owl circle that is partially within an HCP and had excess habitat at the time of certification.

It is not possible to determine the amount of habitat acreage that would be affected by this rule change provision without a detailed analysis of each spotted owl circle that is partially covered by an HCP and included non-federal land. Such an analysis would need to include an up-to-date

identification of the amount and location of harvests that have taken place. Instead, for illustrative purposes, we have provided a case study of an owl circle in the I90-East SOSEA that fulfills the requirements. This owl circle includes a patchwork of ownership, including 658 acres of DNR-managed land covered by DNR's HCP. There are about 300 acres of habitat above the 40% threshold. Prior to the emergency rulemaking, any harvest of spotted owl habitat taking place on land covered by DNR's HCP would not be included in the calculation of the 40 percent threshold for the circle. We estimate that there are 281 acres of habitat on DNR-managed land within the circle (all of which is covered by an HCP). Private landowners could theoretically harvest 281 acres of habitat beyond the 40 percent habitat threshold. The actual amount will likely be lower, depending on the amount of harvest taking place on DNR-managed land, which will be a function of how the DNR habitat acreage fits into DNR's landscape-based HCP.

## **CONCLUSION**

This economic analysis estimates ranges of costs and benefits of the proposed rulemaking. Costs are defined as the estimated timber harvest revenue that could have been accrued if the provisions of the rule change were not in place, assuming that the potential harvest will be delayed indefinitely. Estimated benefits are based on willingness to pay for protecting spotted owl habitat. The estimated costs of protecting 2,264 acres of Northern Spotted Owl habitat range from \$31.7 million to \$45.3 million, and the benefits range from \$152 million to \$259 million. On a per-acre basis, costs range from \$14,000 to \$20,000 per acre, and benefits range from \$43,322 to \$74,129 per acre. Table 3 summarizes estimated costs and benefits.

**Table 3**  
**Estimated Costs and Benefits of the Proposal**

	<b>Total Cost</b>	<b>Cost Per Acre</b>	<b>Total Benefit</b>	<b>Benefit Per Acre</b>
High Estimate	\$45.3 million	\$20,000	\$259 million	\$74,129
Low Estimate	\$31.7 million	\$14,000	\$152 million	\$43,322

We analyzed seral layer information to estimate habitat acreage affected by the proposed rule, assuming that the rule sunsets on June 30, 2007. Additional spotted owl circles could be affected by the rule if the sunset provision were to be subsequently removed. The relationship between costs and benefits, measured on a per-acre basis, would be unaffected, though the total costs and benefits would be greater. Similarly, although we were not able to estimate the effects of the virtual habitat provision, the cost/benefit per-acre relationship will be the same as for the decertification provision.

Per-acre cost estimates are dependent on price, stand quality and species composition assumptions. In addition, this analysis assumes that affected habitat is not harvested, implying that the proposed rules are continued. If the rules are not continued, affected habitat could theoretically be harvested sometime in the future. Costs may also be lower if a landowner chooses to develop a landowner option plan, which exempts the landowner from these rules.

Benefit estimates are more uncertain due to the lack of market price signals for environmental amenities. Although survey respondents may have implicitly valued other amenities that accrue

from protecting Northern Spotted Owl habitat (such as habitat for other species, open space, and water quality), some of the ancillary benefits of protecting habitat may not have been captured by this analysis.

In spite of these uncertainties, estimated benefits are sufficiently greater than costs to provide a reasonable degree of certainty that the benefits of this rulemaking exceed the costs. It is worth noting, however, that this economic analysis estimates overall benefits and costs of proposed rulemaking. It does not analyze the distribution of costs and benefits, other than the impacts on small businesses, which in this case are minimal. The benefits of Northern Spotted Owl habitat protection identified in this analysis will accrue to state residents in general, whereas the costs will primarily be borne by industrial forest landowners.

**Small business impacts.**

The effects of the proposal on small forest landowners are limited to habitat within the inner 0.7-mile circle of spotted owl site centers within SOSEAs. We estimate that 26 acres of small forest landowner habitat are affected by the decertification provision of the proposed rules; this is less than one percent of the potentially affected habitat acreage. There may be specific instances where individual small forest landowners are disproportionately affected.

**REFERENCES**

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