

ECONOMIC ANALYSIS
Forest Practices Rule Making
Affecting Identification of Perennial Initiation Points
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OBJECTIVES

The Forest Practices Board will be considering permanent rule making that will result in the elimination of the default method for identifying perennial initiation points (PIPs) on non-fish bearing streams. 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 (chapter RCW 34.05)¹ 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 (chapter RCW 19.85)² 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 Forests and Fish rules established a water typing system that subdivides non-fish bearing streams (Type N) into two categories:

- Type Np waters are perennial non-fish streams.
 - Type Ns waters are seasonal non-fish streams.)
- (See WACs 222-16-030 and -031 for complete definitions.)

Perennial stream segments are given special protection during forest practices activities as provided in WAC 222-30-021 (Western Washington) and WAC 222-30-022 (Eastern Washington), including buffering of at least half of the Type Np stream length. On parcels of 20 acres or less, landowners with total parcel ownership of less than 80 forested acres are exempt from buffering requirements. Seasonal segments are subject to more limited protection. The identification of the point at which a Type Ns stream becomes a Type Np stream, known as the perennial initiation point (PIP), is therefore an important component of forest practices applications.

Under certain circumstances, it is difficult if not impossible to determine PIPs in the field. These include cases where the applicant does not have access to relevant stream segments or during the wet season or in unusually wet or dry periods. To accommodate such situations, WAC 222-16-030(3) and WAC 222-16-031(4) include a default method for identifying a PIP "if the uppermost point of perennial flow cannot be identified with simple, nontechnical observations." The default method locates the PIP at the point along the channel where the contributing basin area is:

- (a) At least 13 acres in the Western Washington Sitka spruce coastal zone (Coastal Zone);
- (b) At least 52 acres in other locations in Western Washington; or

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

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

(c) At least 300 acres in Eastern Washington.

It was agreed during the Forests and Fish negotiations that determining PIPs “will require a better understanding of the natural variability of the spatially intermittent component of perennial streams.” (Forests and Fish Report, Appendix B (B.1)(e)(iii), April 1999) A study was subsequently initiated through the Forest Practices Board’s Cooperative Monitoring, Evaluation and Research Committee (CMER) to gather data to “refine the demarcation of perennial and seasonal Type N streams.”³ Ten “cooperators” (seven tribal, one state agency, and two timber industry) collected field data at 224 Type N streams in nine study areas in Western Washington and six in Eastern Washington. The study found that observed basin areas were smaller than the Forests and Fish rules default basin areas (described in WACs 222-16-030 and -031). The CMER study found that median observed basin areas for the Coastal, Western and Eastern default regions were 2, 7 and 36 acres, and average observed basin areas were 8, 24 and 118 acres, respectively. These findings suggest that some PIPs determined by the default method will be downstream of the true PIP, possibly resulting in inadequate buffering.

In light of the study findings, Forests and Fish Policy recommended elimination of the default method, to be replaced by language that refers landowners to Forest Practices Board Manual Section 23, which is under development.

PROPOSED RULES SUMMARY

The proposed rulemaking replaces language in WACs 222-16-030(3) and 222-16-031(4) that provides default basin sizes with language that refers landowners to Board Manual Section 23, “Guidelines to Identify Perennial Streams and Locate Divisions Between Stream Types,” currently under development. The Board Manual provides methodology to locate the uppermost point of perennial flow in Type Np water during the seasonal low-flow period and the wet period, as well as an alternative in cases where the landowner does not have access to the full reach of a Type Np stream. No changes are proposed to stream classification or to the protections that are provided to riparian areas.

ECONOMIC ANALYSIS

To comply with the Administrative Procedure Act and Regulatory Fairness Act 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 Regulatory Fairness Act 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.

Potentially Affected Industries

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

Small Businesses Versus Large Businesses

The Regulatory Fairness Act defines a “small business” as one with 50 or fewer employees. Forest 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 meeting the state’s eligibility criteria for small forest landowner status in the Forestry Riparian Easement Program; generally those who harvest less than two million board feet per year. All other private landowners are categorized as “large businesses” for purposes of this analysis.

³ [Type N Stream Demarcation Study Phase I: Pilot Results](#). CMER, 2005.

Benefits and Costs Included in the Analysis

The costs of the rule change are measured as the potential loss of timber revenue, based on an estimate of the timber acreage affected by the rulemaking. Benefits are defined as the value of protecting the habitat, but are not quantified, as there is no known research that quantifies the benefits of protecting non-fish bearing riparian habitat that is applicable to Washington. Methodology is further discussed below.

Involvement of Concerned Stakeholders

This rule making is the result of the Forests and Fish adaptive management process described in WAC 222-12-045. This is a formal process including scientists and policy makers who represent stakeholders of Washington forest practices: landowners of large and small forest land acreage, environmental and conservation organizations, tribal organizations, federal and state natural resource agencies, and Washington counties.

Upon completion of the *Type N Stream Demarcation Study*, and Forests and Fish Policy's petition of the Forest Practices Board to conduct rule making, DNR's Forest Practices Division held stakeholder meetings to encourage participation in rule development. Those meetings took place on April 11, May 12, and May 18, 2006. Representatives from all Forests and Fish stakeholder groups were invited to attend these meetings; in general, representatives from all groups participated in one or more of them.

METHODS OF ANALYSIS

The goal of the rulemaking is to accurately identify Perennial Initiation Points (PIPs). As such, it is meant to correct an inaccuracy in current practice and does not increase regulatory burden. In practice, however, it will decrease the amount of harvestable timber in riparian areas, thus affecting those timber harvesters who would have utilized the alternative default method.

This analysis estimates the acreage and value of timber that will not be harvested annually because of the rule change. The estimate is based on a random survey of forest practices applications (FPAs) and an in-house GIS analysis of the expected change in the location of PIPs. Findings have been extrapolated statewide. The effects on small businesses (small forest landowners) are highlighted where appropriate.

Fifty FPAs submitted during the period June 1, 2005 through May 31, 2006 were randomly selected from each of DNR's six regions. Foresters were asked to report on the following:

- Landowner designation (small forest landowner or industry)
- Presence of Type Np water
- Zone (coastal, western, or eastern)
- Method used to calculate PIP (field or default)
- Total length of Type Np waters.

Summary statistics generated from the surveys include the proportion of large versus small forest landowners, the percentage of FPAs where Type Np water was present, the percentage of FPAs that utilized the default method for identifying PIPs, and whether small forest landowners were more or less likely to utilize the default method. (See Table 1)

For the GIS analysis, we randomly selected three basins and applied the default basin methodology to determine the PIP. We then applied the findings of the CMER study and identified a revised PIP. Based on this analysis, we calculated the percentage change in a typical Type Np stream length for each of the three zones. We then applied the change in Type Np stream length reported in the survey to those applications utilizing the default method. We scaled this to an annual statewide estimate based on the number of FPAs in each region to produce an annual estimate of the additional stream length that would be affected by the proposed rule change. We then estimated the additional buffering acreage required and the resulting financial loss of timber harvest.

ANALYSIS OF COSTS

Survey Results

The results of the survey of FPAs are summarized in Table 1. A large majority of FPAs from the Northeast Region were from small forest landowners (SFLs), while for the other regions, most FPAs were from large forest landowners. Less than one-quarter of the FPAs had Type Np water on site; the proportion was highest (36%) in the Pacific Cascade Region and lowest (14%) in the Northeast Region.

Table 1: Survey results

	Number of FPAs	Applicant size				Type Np water on-site			
		Large		Small		Yes		No	
		FPA	Percent	FPA	Percent	FPA	Percent	FPA	Percent
Olympic Northwest	50	39	78%	11	22%	9	18%	41	82%
South Puget Sound	50	42	84%	8	16%	9	18%	41	82%
Pacific Cascade	50	39	78%	11	22%	18	36%	32	64%
Northeast	50	11	22%	39	78%	7	14%	43	86%
Southeast	50	36	72%	14	28%	12	24%	38	76%
Total	300	196	65%	104	35%	67	22%	233	78%

We further analyzed the 67 FPAs with Type Np water on site (see the first columns of Tables 2 and 3). We dropped 12 FPAs that did not include harvest activity from further consideration. Highlights from the analysis are as follows:

- The majority of FPAs with Type Np water on site (29 out of 55) were in the Western Washington zone; of the remainder, 9 were in the Coastal Zone and 17 in the Eastern Washington zone.
- SFLs accounted for 13, or 24%, of these FPAs.
- The default method was utilized by 10 (18%) of these FPAs; SFLs were more likely to use the default method (38%) than were large applicants (12%).
- Of the 134,715 feet of Type Np stream length measured in these FPAs, 15,900 feet were in FPAs that utilized the default method, accounting for 12% of the total. More than half (53%) of this stream length was in FPAs from SFLs.

Table 2: Timber harvest (in one year) associated with FPAs with Type Np water on-site

		Number of FPAs with Np water (survey results)	Number of FPAs with Np water (statewide extrapolation)
Total FPAs		55	1042
By zone			
Coastal		9	179
Western WA		29	684
Eastern WA		17	179
By applicant size			
Large		42	862
Small		13	180
By applicant size and PIP determination method			
Large	Field	37	800
	Default	5	62
Small	Field	8	87
	Default	5	93
Total	Field	45	887
	Default	10	155

The survey results suggest that small forest landowners were significantly more likely to use the default method in the surveyed FPAs than were larger landowners.

Table 3: FPA stream length (in feet) with Type Np water on-site

		Total Np stream length (survey results)	Total Np stream length (statewide extrapolation)
By Applicant size and PIP determination method			
Large	Field	100,255	1,804,971
	Default	7,500	82,266
Small	Field	18,560	160,064
	Default	8,400	158,150
Total		134,715	2,205,451

Statewide Estimation of Type Np Stream Length

We extrapolated the survey results statewide by weighting the findings based on the frequency of FPAs from DNR regions during the period covered by the survey (June 1, 2005 through May 31, 2006). The number of FPAs filed varied considerably among DNR regions, from 1,773 in the Pacific Cascade Region to 300 in the Southeast Region. The second column in Tables 2 and 3 provides this extrapolation. We estimate the following based on this extrapolation:

- Annually, 1,042 FPAs are approved that include Type Np water on site; of these, 66% are in the Western Washington zone, and 17% are in each of the Coastal and Eastern Washington zones.

- SFLs account for 17% of statewide FPAs and 14% of the total Type Np stream length.
- Default methodology is utilized by 15% of the FPAs, but of the estimated 180 small forest landowners' FPAs with Type Np water, 52% utilize the default method.
- Over 2.2 million feet of Type Np stream length are included in FPAs annually.
- 240,416 feet of Type Np stream length is included in FPAs that utilize the default method, accounting for 11% of the total.

Statewide Estimation of the Change in Type Np Stream Length Due to Rule Making

GIS modeling was performed on typical basins in the coastal, western and eastern zones to estimate the change in Type Np stream length, resulting in multipliers for the three zones that measure this change. We adjusted the estimated Type Np stream length in FPAs by these multipliers, providing a statewide estimation of the change in Type Np stream length due to rule making.

GIS Analysis of Changes in Type Np Stream Length

We estimated the change in Type Np stream length by locating default PIPs based on applying average observed basin areas from the CMER report. We selected three basins for analysis, one each from the Coastal, Westside and Eastside zones⁴. We calculated PIPs for each of the streams in the basin based on the existing default criteria, as well as the criteria presented in the CMER study. Results are presented in Table 4.

Table 4: Results of the GIS analysis

	Coastal zone	Western zone	Eastern zone
WRIA Basin Number	20	23	59
Number of Np streams in basin	9	22	46
Existing default basin size (acres)	13	52	300
Type Np stream length (feet)	11,324	11,935	37,736
CMER study default basin size (acres)	8	22	118
Type Np stream length (feet)	14,612	33,630	127,131
Additional Type Np stream length (feet)	3,288	21,695	89,395
Percent change (multiplier)	29%	182%	237%

Decreasing the default basin size from 13 to 8 acres has a relatively minimal affect in the Coastal Zone, increasing Type Np stream length by 29%. The results in the other zones are substantial. Decreasing the default basin size from 52 to 22 acres in the Western Washington zone almost triples the average Type Np stream length, and decreasing it from 300 to 118 acres in Eastern Washington more than triples the average Type Np stream length. These results are significantly affected by the large number of stream segments that were typed as Ns in their entirety above Type F stream junctions using the default method in the Western and Eastern zones – almost two-thirds (63%) of the streams in the Eastern zone, and almost half (46%) in the Western zone.

⁴ Although these basins were carefully chosen to be representative of each zone, the results of our analysis are not statistically significant.

It is important to note that although this analysis was based on applying existing default basin methodology, and utilizing the findings of the CMER study for comparative basin sizes, there are no plans to utilize this criteria in rule making. We are assuming in this analysis that this criteria accurately identifies PIPs for estimation purposes only.

Estimating Additional Type Np Stream Length Statewide

We estimated the additional Type Np stream length that would be subject to buffering annually by multiplying the extrapolated statewide stream length presented in Table 3 by the additional Type Np stream length multipliers presented in Table 4. This analysis is based on only the ten FPAs in the survey that utilized the default method to find PIPs; therefore, based on GIS analysis, it is not statistically robust. For this reason, we are not presenting summary information categorized by DNR region or zone. In order to fulfill the requirements of the Regulatory Fairness Act, we have presented small forest landowner findings separately.

Of the ten subject FPAs, one applicant was eligible for the 20-acre exemption, and is not subject to Forests and Fish riparian rules, leaving us with nine FPAs for further analysis.

The steps involved in estimating the affected acreage (presented in Table 5) are as follows:

- We estimated the additional stream length by multiplying the stream length for each of the subject FPAs by the multipliers in Table 4, and scaled this to statewide.
- Assuming that 100% of the additional Type Np stream length would be buffered in Eastern Washington (which is standard procedure), and 50% would be buffered in Western Washington, we multiplied the additional stream length calculated above by 100% in Eastern Washington and 50% in Western Washington.
- We converted these figures into square feet by multiplying by 100, producing the Type Np buffer requirement.
- We converted square footage into acreage by dividing by 43,560.

Table 5: Acreage and timber value affected annually by the rule making

	Total	Small forest landowner	Large forest landowner
Statewide Np stream length utilizing current default method (in feet)	208,466	126,200	82,266
Additional Np stream length due to rule making (in feet)	433,495	274,201	159,294
Additional buffered stream length due to rule making (in feet)	333,280	233,014	100,266
Additional buffer (in square feet)	33,328,046	23,301,440	10,026,606
Additional buffer(in acres)	765	535	230
Timber value	\$1,243,960	\$786,849	\$457,111

Although this is a rough estimation, it provides insight into the scale of the effects of the proposed rule change. We estimate that 765 acres of additional buffering statewide will be required annually by the proposed rule change, the majority of which (535 acres) will be small forest landowner acreage. The accuracy of this estimate depends on a number of factors, primarily whether the ten FPAs in our analysis are representative of statewide FPAs. We also made assumptions regarding buffering. We assumed that Eastern Washington applicants will buffer all Type Np stream length (this is common practice in Eastern Washington). In Western Washington, upstream buffering may not be required if stream sections are already buffered in the vicinity of sensitive sites (e.g., unstable slopes and alluvial fans). Countering this, many applicants buffer the entire Type Np stream length. We compromised at 50% buffering.

Estimating the value of timber that will not be harvested due to the proposed rule change

We assumed that all of the newly buffered acreage would have been harvested by the applicant, and utilized average values for merchantable timber of \$2,500 per acre in Western Washington and \$1,250 in Eastern Washington⁵. The first of these assumptions is an overstatement, as some harvests are partial or thinnings, particularly in Eastern Washington. The second assumption is probably an understatement, since applicants are more likely to be harvesting mature tree stands that would have a higher per-acre value.

The total estimated timber value that will not be harvested annually due to the proposed rule change is \$1.2 million; small forest landowners account for 63% of this amount.

⁵ These values were provided to us by DNR Product Sales and Leasing staff.

Small Business Impacts

Our analysis indicates that small forest landowners are more likely to utilize the default method for calculating PIPs. We estimate that the foregone timber revenue will be approximately \$787,000 per year from SFLs, compared to \$457,000 for large forest landowners, resulting in a disproportionate affect on small businesses.

Compliance costs for small businesses are partially mitigated by participation in the Forestry Riparian Easement Program (FREP), which disbursed \$8 million to small forest landowners during the 2005-07 biennium. The FREP compensates eligible small forest landowners in exchange for a 50-year easement on “qualifying timber.” Landowners cannot cut or remove the qualifying timber during the easement period. The landowner still owns the property and retains full access, but has “leased” the trees and their associated riparian function to the state. Participating landowners are compensated at 50% of the value of the qualifying timber, and they are compensated fully for any portion exceeding the regulatory impact of 19.1 percent.

BENEFITS

The benefits of buffering riparian areas include:

- Stream stability
- Nutrient removal
- Pollution prevention
- Stream temperature regulation
- Erosion control
- Flood control
- Recreation
- Wildlife habitat

Some of these benefits are avoided costs, such as natural filtration as a replacement for more costly pollution control, and others reflect environmental amenity values. A number of studies have been completed that value some of these aspects, including flood mitigation, value of fisheries, recreation expenditures, and willingness to pay to protect habitat for individual species. Unfortunately, we did not find any studies that valued riparian buffers in general. Compounding problems associated with this dearth of information, we cannot apply the findings of studies that valued specific aspects of riparian buffers on fish-bearing streams to non-fish bearing streams. Likewise, we cannot estimate the marginal benefits of protecting additional riparian buffers on non-fish bearing streams. However, we can generally assume that the benefits of buffering riparian areas are considerable.

CONCLUSION

This economic analysis estimates the costs of the proposed rule making on an annual basis. Costs are defined as the estimated timber harvest revenue that could have taken place if the provisions of the proposed rule change were not in place. We estimated costs by surveying one year’s worth of FPAs to determine the frequency of use of the default method to identify PIPs, scaling our findings to the level of annual statewide timber harvesting. We then applied GIS-based modeling to determine the degree of change in Type Np stream length in FPAs that would have used the default method, and the additional buffering this would require. We estimate that an additional 765 acres would be buffered annually, including 535 small forest landowner acres. The total estimated timber value that will not be harvested annually due to the proposed rule change is \$1.2 million, with small forest landowners accounting for

\$787,000, or 63%, of this. Participation in the Forestry Riparian Easement Program (FREP) can mitigate a significant portion of these costs for small forest landowners.

An estimated 155 out of 1042 FPAs used the default instead of field verification. As discussed in the report, this analysis necessitated a number of assumptions that were not field tested; in addition, the number of FPAs that utilized the default method (n=10) was too small to be statistically robust. These findings should therefore be considered at best as providing an indication of the scale of the effects of the proposed rule change.

Benefits are identified but not quantified due to the lack of relevant information. Under these circumstances, we can generally conclude that the benefits of buffering riparian areas are considerable; whether they are greater than the costs to affected timber harvesters in this case is inconclusive. Consideration should also be given to the distribution of costs and benefits. While the benefits accrue generally, the costs are borne by a limited number of forest practices applicants.

REFERENCES

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