FINAL ECONOMIC ANALYSIS
Forest Practices Board
Rule Making Affecting Timber Harvest in Riparian Management Zones in Washington
By Phil Aust, Lead Economist, Department of Natural Resources
January 2009

The Forest Practices Board is considering three rule proposals to amend WAC 222-30-021(1) that would affect timber harvesting in riparian management zones (RMZs) in Washington. The objectives of this economic analysis are to analyze costs of each proposal, to determine whether the costs to comply with each proposal are likely to disproportionately impact the state's small businesses, and to describe benefits associated with the proposals.

The reader may note considerable differences when comparing this analysis to the preliminary economic analysis dated June 2008.[1] This is largely due to the use of a different data set as described in the "Data for Analysis" section in this document, and the changes in stumpage prices requiring different price assumptions.

OBJECTIVES

According to the Administrative Procedure Act, (chapter RCW 34.05)[2] agencies must complete a cost-benefit analysis (CBA) to:

- Determine that the probable benefits of the rule are greater than its probable costs, taking into account both the qualitative and quantitative benefits and costs and the specific directives of the statute being implemented; and
- Determine, after considering alternative versions of the rule, that the rule being adopted is the least burdensome alternative for those required to comply with it that will achieve the general goals and specific objectives of the statute that the rule implements.

A small business economic impact statement (SBEIS) is required by the Regulatory Fairness Act (chapter RCW 19.85)[3] to consider the impacts of administrative rules adopted by state agencies 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 rule making process.

HISTORICAL CONTEXT

The Forests and Fish negotiations in the late 1990s resulted in rules that manage timber harvests in riparian zones. One of the objectives of the riparian rules is to ensure that riparian forests reach a desired future condition (DFC) for functioning fish habitat. The rules identify the DFC of

[1] Preliminary Economic Analysis, June 2008.
http://www.dnr.wa.gov/BusinessPermits/Topics/ForestPracticesRules/Pages/fp_rules_activity.aspx
[2] For CBA requirements, see RCW 34.05.328.
[3] For SBEIS requirements, see RCW 19.85.040.

riparian forests as timber stands that demonstrate the characteristics of mature, unmanaged riparian stands at the age of 140.[4] The metric chosen to measure these characteristics is a target basal area per acre at age 140 (hereinafter referred to as bapa-140). In the current rule, the targets vary by site class.

As part of the Forests and Fish adaptive management process, the Riparian Scientific Advisory Group (RSAG) of the Cooperative Monitoring, Evaluation and Research Committee (CMER) commissioned a study of mature, unmanaged riparian forest stands in Western Washington (Schuett-Hames et al., 2005).[5] One of the objectives of this study was to determine whether the bapa-140 targets in the current forest practices rules are appropriate. The study concluded that the targets are too low, but did not provide alternative values. The study also concluded that there is no statistical difference for basal area targets between site classes.

CURRENT RULE SUMMARY

There are three zones within RMZs on Type S and F Waters. The core zone is nearest to the water and is fifty feet in width, the inner zone is the middle zone, and the outer zone is furthest from the water. The widths of the inner and outer zones vary according to site class, as demonstrated in tables throughout WAC 222-30-021(1). The target basal area also varies by site class as shown in Table 1. The DFC for an RMZ adjacent to a Type S or F Water is calculated by a growthmodeling program using the total inventory of the conifer trees in the core and inner zones.

Table 1: Current Desired Future Conditions Target by Site Class

Site Class	Desired future conditions target basal area per acre (at 140 years)
I	285 sq. ft.
II	275 sq. ft.
III	258 sq. ft.
IV	224 sq. ft.
V	190 sq. ft.

Under current rule if the DFC exceeds the targets as listed in Table 1, the landowner has two options available for harvest within the RMZ inner zone: Option 1 is a thinning treatment with a minimum trees-per-acre (tpa) requirement, and Option 2 is a packing treatment that leaves trees closest to the water within no-cut floors. Under current rule, the basal area targets are applied to the combined core and inner riparian zones, such that the bapa-140 requirement in the inner zone will vary according to site class, core zone inventory and the rule-required sizes of the core and inner zones.[6] In addition, shade requirements must be met under both options.

[4] See Forest Practices rules - WAC 222-30-021(1) for details.
[5] Schuett-Hames et al. 2005. http://www.dnr.wa.gov/Publications/fp_cmer_05_507.pdf
[6] Refer to WAC 222-30-021(1)(b)(ii)(B)(I)(II) for current rule, and Section 7 of the Forest Practices Board Manual for information pertaining to riparian zone harvest.

PROPOSED RULES SUMMARY

The Forest Practices Board (Board) is considering using one DFC bapa-140 target value for all site classes. The Board selected the median value for a total live basal area per acre of the CMER commissioned Schuett-Hames et al. study data, which is 325 square feet of basal area per acre for all site classes. The details for the three DFC rule proposals under consideration by the Board are provided below.

Proposal 1. This alternative would increase the bapa-140 stand requirement for all site classes to 325 square feet.

Proposal 2. This alternative would increase the bapa-140 stand requirement the same as the first alternative and would also:

- Allow the basal area of the required 20 inner zone conifer leave trees per acre ($\geq$12 inches diameter at breast height) to be credited towards meeting the stand requirement; and
- Allow additional inner zone management for site classes III and IV on streams greater than 10 feet in width when the combined basal area of the core and inner zone exceeds the target bapa-140 of 325 square feet.

Proposal 3. This alternative would increase the target bapa-140 stand requirement the same as the first alternative, and would also:

- Allow the basal area of the required 20 inner zone conifer leave trees per acre ($\leq$12 inches diameter at breast height) to be credited towards meeting the stand requirement.

BASIC INFORMATION

Potentially Affected Industries. The rule-complying community affected by these proposals is businesses that own or control the cutting rights on forestlands or those with the right to remove the timber.

Costs Included in the Analysis. The costs of the proposed rule changes are measured as the potential loss of annual timber revenue, based on the estimated difference in the timber volumes that could be removed under each rule proposal as compared with the current rules.

Involvement of Concerned Stakeholders. This rule making has followed the Forests and Fish adaptive management process described in WAC 222-12-045 and Forest Practices Board Manual Section 22, "Adaptive Management Program." The rule proposals are the result of numerous stakeholder meetings, including all of the Forests and Fish stakeholders: Landowners of large and small forest land acreage, environmental and conservation organizations, tribal organizations, federal and state natural resource agencies, and Washington counties.

METHODS OF ANALYSIS

This analysis includes the following:

- The effects of a change in bapa-140 targets to 325 (median value from Schuett-Hames report) for all site classes (Proposal 1); and
- The effects of a proposal to change bapa-140 targets to 325 and modifying other provisions of existing rules (Proposals 2 and 3).

Data for analysis. This analysis estimates the amount of basal area that would be left in the inner and outer zones under the three rule proposals described above, compared to the leave tree requirements under the current rule.[7]

The preliminary analysis estimates were based on a statewide extrapolation of a data set consisting of 150 forest practices applications from 2003 and 2004 used by McConnell in the 2007 FPA desktop analysis prepared for the Forests and Fish CMER committee, *An Overview of the DFC Model and an Analysis of Westside Type F Riparian Prescription and Projected Stand Basal Area per Acre.*[8] This analysis uses a different data set consisting of 100 randomly selected Forest Practices Applications (FPAs) from 2005 and 2006 that proposed timber harvesting within the inner zone of RMZs in Western Washington. This is the same data set from which the environmental impacts of the three proposals were analyzed (see Determination of Nonsigificance dated December 4, 2008, and Environmental Checklist dated November 2008).[9]

Approximately 28 percent, or 598 of the 2,137 FPAs identifying harvests within the RMZ, included DFC data runs for either Option 1 or Option 2 inner zone harvests. The 100 FPAs with DFC data runs for Option 1 or Option 2 harvests were selected starting at the top of the computer randomized list and working down the list. If the FPA contained more than one DFC run, then only the run for the first stream segment was used.

The following information was considered while conducting this analysis:

- Site information and stand characteristics listed in the DFC run supplied by applicant including site class, stream size, core and inner zone stand age, major tree species (Douglas fir or Western hemlock), RMZ length, and the acreage of the core and inner zones.
- Total tree inventory data (softwoods and hardwoods) for the core and inner zones.
- Stand characteristics calculated from these data: Core and inner zone trees per acre (tpa), current basal area per acre (bapa); projected no-cut bapa-140; and the total number of required outer zone leave trees.
- Attributes following the model-generated prescription (reported separately for the core and inner zones as appropriate): The current bapa; the projected bapa-140; for inner zone harvest Option 1, the number of trees by diameter class allowed to be cut; the minimum

[7] Outer zone trees are included in the analyses to ensure the comparability of the scenarios.
[8] McConnell, S. 2007. http://www.dnr.wa.gov/publications/fp_cmer_07_701.pdf
[9] Desired Future Condition Performance Targets, SEPA Determination of Nonsignificance. http://www.dnr.wa.gov/BusinessPermits/Topics/ForestPracticesRules/Pages/fp_rules_activity.aspx

tpa for inner zone harvest Option 1; and the no-cut floor width of the inner zone for harvest Option 2.

Data profile. From the sample of 100 FPAs:

- 1 FPA was site class I, 54 were site class II, 43 were site class III, and there was 1 observation each of site classes IV and V.
- 45 FPAs were on large streams, 55 were on small streams.
- The average stand age of the core and inner zone was 50 years, with a range from 35 to 140 years.
- 45 FPAs indicated the major species as Douglas fir and 55 indicated hemlock as the major species.
- The average RMZ length proposed for harvest was 1,613 feet, with a range from 125 - 7,200 feet.

The DFC model determines the change in post-harvest bapa from the time of harvest to year 140 based on the interaction of a number of stand factors including stand age, species mix and percent conifer, tpa, current bapa, and site class.

The DFC model and this analysis assumes that conifer inventory is evenly spaced throughout the inner zone of the RMZ, and is therefore not sensitive to tree inventory distribution by dbh class in the inner zone.

Option 1, "thinning from below. The objective of thinning from below is to distribute stand requirement trees in such a way as to shorten the time required to meet large wood, fish habitat and water quality needs. This is achieved by increasing the potential for leave trees to grow larger than they otherwise would without thinning. Thinning harvest under Option 1 must comply with the following:

- Residual trees left in the combined core and inner zones must meet stand requirements necessary to be on a trajectory to desired future condition.
- Thinning must be from below, meaning the smallest dbh trees are selected for harvest first, then progressing to successively larger diameters.
- Thinning cannot decrease the proportion of conifer in the stand.
- Shade retention to meet the shade rule must be confirmed by the landowner for any harvest inside of 75 feet from the outer edge of bankfull width or outer edge of CMZ, whichever is greater.
- The number of residual conifer trees per acre in the inner zone will equal or exceed 57.

Analysis of the 100 FPA sample showed that under the Option 1 harvest regime, raising the basal area target produced the following results in comparison to current rule:

- 53 of the FPAs would experience no change in the number of trees allowed for harvest in the inner zone under any of the three rule proposals. This is likely due to the minimum 57 trees that are required to be left in the inner zone.
- 47 would result in 3,005 fewer trees available for harvest in the inner zone (with an average of 64 trees per FPA).

- 58 FPAs would experience no change in the largest dbh class available for harvest; in the largest dbh class available for harvest would be smaller under all three proposals.
- There were no differences among the three rule proposals in tpa, bapa, or largest dbh class available for harvest in the inner zone.
- The 20 tpa credit allowed under Proposal 2 and Proposal 3 did not result in changes to allowable harvest compared to Proposal 1.

Option 2. Leaving Trees Closest to Water The objective of Option 2 inner zone harvest is to maximize riparian forest function by retaining trees in a position as close to the stream as possible. The underlying assumption is that individual trees growing closer to the stream provide proportionally more functional benefit than trees farther away from the stream. Harvest under Option 2 must comply with the following:

- Residual leave trees in the combined core and inner zone must meet stand requirements necessary to be on a trajectory to desired future condition.
- A minimum of 20 conifers per acre, with a minimum 12-inch dbh, must be retained in any portion of the inner zone where harvest occurs.
- Trees are selected for harvest starting from the outermost portion of the inner zone first, then selected progressively closer to the stream.
- If there is a surplus of basal area per the stand requirement, the landowner may take credit for the surplus by harvesting additional trees required to be left in the adjacent outer zone on a basal area-for-basal area basis. The number of leave trees in the outer zone can be reduced only to a minimum of 10 trees per acre.

Analysis of the 100 FPA sample showed that under the Option 2 harvest regime, raising the target basal area target produced the following results:

- The average even-age harvest width decreased under all three rule proposals.
- The average bapa allowed for removal in the outer zone decreased under all three proposals.
- Harvest under Option 2 was not allowed in18 of the 100 FPA samples; under Proposal 2, 11 of these FPAs would be allowed to harvest due to the allowance of harvesting under Option 2 for site class III – large streams.
- Due to the increase in the bapa target to 325 square feet, 7 FPAs would be allowed to harvest under current rule and would not be allowed to harvest under Proposal 2.
- The 20 tpa credit provision in Proposal 2 and Proposal 3 results in:
  - An increase in the even-age harvest width compared to Proposal 1, but a decrease in even-age harvest width compared to current rule.
  - An increase in the amount of bapa available for harvest in the outer zone compared to Proposal 1, but a decrease in bapa available for harvest compared to current rule.

Volume of leave trees. The volume of leave trees was calculated for each management option for each of the 100 FPAs. First the weighted average volume per tree was determined using Tarif Tables by taking a weighted average of dbh = 18", average age = 50.5, weighted average of site

index = 115.6, based on the average site class of the 100 FPAs. Next the total volume being left in the inner and outer zones for each observation was calculated.

For Option 1, a DFC print out for each sample provided the number of trees required to be left in the inner zone by dbh class. Using the average weighted dbh and calculated Tarif number, the volume of conifer (separated by Douglas fir and hemlock) left in the inner zone was calculated for the current rule and for each proposal. Outer zone volume is based on a 12"dbh. All tree data received from the original FPAs was entered into an Excel spreadsheet. A leave tree count column was added, as well as a volume table for reference, and volume columns for Douglas fir and Western hemlock. A column was added to total the volume for each observation.

For Option 2, the DFC model calculates the unharvested acreage of the inner zone and the total number of required leave trees in the outer zone. This acreage is presented as the inner zone floor, or the distance from the outer edge of the core zone to the area allowed to be harvested. Using the inner zone stand tables for each FPA, the trees per acre were estimated for the portion of the inner zone that could not be harvested.

Estimation of volume (board feet) required to be retained under each rule proposal. For each proposal the estimated board feet of leave trees for the inner and outer zones in the sample segments was summed and compared to determine which inner zone harvest option resulted in the minimum number of leave trees. Option 2 would require a lower volume of required leave trees in the majority of FPAs under all of the rule scenarios (current rule and all three proposals).

- Under current rule: Option 2 resulted in a lower volume of required leave trees than Option 1 in 64 percent of the FPAs.
- Under Proposal 1 and Proposal 2: Option 2 resulted in a lower volume of required leave trees than Option 1 in 63 percent of the FPAs.
- Under Proposal 3: Option 2 resulted in a lower volume of required leave trees than Option 1 in 71 percent of the FPAs.

It is assumed that the landowner will choose the option that minimizes the number of leave trees, thus maximizing the harvest volumes for the landowner. Harvest cost and/or quality of the material available for harvest might change these results in some marginal cases. Generally it is expected that harvest costs would be higher for inner zone harvest Option 1, and the quality of the material harvested lower, since this option involves thinning from below rather than an even age harvest within the inner zone under Option 2.

Table 2, Column A shows the leave tree volumes of the sample FPAs by the predominant species on the sample sites (Douglas fir or hemlock).

Since the leave volume calculation in the data set was for the first riparian segment listed in each sample FPA, the estimate was expanded based on the full length of the riparian area reported in each FPA. The resulting estimate of the total volume on the sample FPAs is shown in Column C of Table 2. The weighted average of the proportion of the riparian area in the first segment is shown in Column B. As explained previously, the data set used was randomly selected from all of the FPAs that included riparian inner zone harvest in 2005 and 2006. There were 2,137 FPAs that included riparian zone harvest in the two year period from which the sample was drawn, or

an average of 1,068.5 per year. Of these, an estimated 27.9 percent or 298 FPAs that proposed either Option 1 or Option 2 harvest. The estimate of the impact of the sample is multiplied by an expansion factor of 2.98 (298/100) to estimate the average impact per year for all FPAs statewide, shown in Column E of Table 2.

Table 3 shows the estimated stumpage value of $184 per million board feet for hemlock and $347 per million board feet for Douglas fir applied to the estimated leave volume. The price per thousand board feet is the estimated stumpage price for the two species. These prices were based on the composite DNR log price for the two species for the period 2000 through 2008, less an estimated harvest and delivery cost of $150 per million board feet.[10]

This resulted in an estimate of the total value of leave timber for the current rule and the three proposals as shown in Column C of Table 3.

[10] Unpublished data on file with the author available upon request.

Table 2: Estimated Annual Statewide Total Leave Tree Volume

	Column A		Column B		Column C		Column D		Column E		
	Leave tree volume of sample segments (board feet)		Weighted proportion of riparian area in sample (first segment)		Total leave tree volume for total length of riparian areas in sample FPA (board feet)		Expansion factor to state wide		Estimated statewide total leave volume (board feet)		
	Douglas fir	hemlock	D.F.	hem.	Douglas fir	hemlock	D.F.	hem	Douglas fir	hemlock	Total
Current Rule	1,909,515	3,199,605	61%	49%	3,152,623	6,570,952	2.98	2.98	9,406,594	19,605,985	29,012,579
Proposal 1	2,154,022	3,743,739	61%	48%	3,520,297	7,721,437	2.98	2.98	10,503,637	23,038,728	33,542,365
Proposal 2	2,107,726	3,529,210	61%	48%	3,436,317	7,310,939	2.98	2.98	10,253,062	21,813,910	32,066,972
Proposal 3	2,120,833	3,706,088	61%	48%	3,449,424	7,658,388	2.98	2.98	10,292,171	22,850,608	33,142,780

Table 3: Total Annual Value of Leave Timber

	Column A			Column B		Column C			
	Estimated statewide total leave volume (board feet)			Estimated stumpage value		Total value of leave timber			
	Douglas fir	hemlock	Total	Douglas fir	hemlock	Douglas fir	hemlock	Total	Change from Current Rule
Current Rule	9,406,594	19,605,985	29,012,579	$347	$184	$ 3,264,088	$ 3,607,501	$ 6,871,589	
Proposal 1	10,503,637	23,038,728	33,542,365	$347	$184	$ 3,644,762	$ 4,239,126	$ 7,883,888	$ 1,012,299
Proposal 2	10,253,062	21,813,910	32,066,972	$347	$184	$ 3,557,812	$ 4,013,759	$ 7,571,572	$ 699,983
Proposal 3	10,292,171	22,850,608	33,142,780	$347	$184	$ 3,571,383	$ 4,204,512	$ 7,775,895	$ 904,306

COSTS OF PROPOSED RULE CHANGES

Based on the sample of 100 FPAs where harvesting occurred in the riparian area, the estimated annual cost of leave trees in the inner and outer zones under current rule and each proposal are as follows:

- Current rule: $6.9 million.
- Proposal 1: 7.9 million ($1.0 million, or 15 percent more than under current rule).
- Proposal 2: $7.6 million ($0.7 million, or 10 percent more than under current rule).
- Proposal 3: $7.8 million ($0.9 million, or 13 percent more than under current rule).

SMALL BUSINESS IMPACTS

The three proposals do not require any change in reporting, recordkeeping, and other compliance requirements, nor is it anticipated that there will be an increase in the professional services that a small business is likely to need in order to comply with the proposed rules. The impact of the rule as a whole and on small businesses is a reduction in the timber harvested from riparian areas.

The Regulatory Fairness Act definition of small business is one with 50 or fewer employees. This does not lend itself to commercial forestry, because a growing proportion of Washington's commercial forest acreage is owned by small family-owned firms, investment partnerships, and other small businesses that have few or no employees. An examination of the Employment Security data (see below) for the entities submitting FPAs in the sample confirmed that most of the controlling entities showing no employee information or less than 50 employees were investment partnerships or other non-business entities. Although these are not what are normally considered "small businesses", this analysis focuses on estimating impacts on small business as defined by the Regulatory Fairness Act.

The Regulatory Fairness Act, in RCW 19.85.040, directs that

> *To determine whether the proposed rule will have a disproportionate cost impact on small businesses, the impact statement must compare the cost of compliance for small business with the cost of compliance for the ten percent of businesses that are the largest businesses required to comply with the proposed rules …*

In RCW 19.85.020 (3) "Small business" is defined as

> *… any business entity, including a sole proprietorship, corporation, partnership, or other legal entity, that is owned and operated independently from all other businesses, and that has fifty or fewer employees.*

To make the comparison required in RCW 19.85.040, the number of employees for the entities that submitted FPAs within the sample set was obtained from Washington State's Department of Employment Security records. In total there were 18 separate entities in the sample set. For entities that showed more than one location in the state of Washington, the total number of employees for that entity in the state was used. The sum of employees for all relevant entities was 7,646.

Small businesses: There were 12 entities that showed 50 or fewer employees and therefore met the legal definition of a small business, including 4 entities for which there was no data available in the

Employment Security records and 2 that showed zero employees. The analysis was run separately for this subgroup and the results are shown in Table 4 below. These 12 entities submitted 24 of the 100 sample FPAs.

Largest 10 percent of businesses required to comply: Since the total number of firms in our sample was 18, the largest ten percent would be the 2 largest firms. These 2 firms submitted 43 of the 100 sample FPAs. The analysis was run separately for this subgroup and the results are shown in Table 5 below.

This comparison indicates there is a disproportionate impact on small businesses when compared to large businesses under Proposal 1 and Proposal 3, but there is a slight disproportionate impact on large businesses under Proposal 2.

- The cost to small businesses would increase by 16 percent for Proposal 1 and Proposal 3, while the cost to large businesses would increase by 14 percent for Proposal 1 and 12 percent for Proposal 3.
- The costs to small businesses would increase by 11 percent for Proposal 2, while the cost to large businesses would increase by 10 percent for Proposal 2.

Estimated Number of Jobs Created or Lost. RCW 19.85.040 (2)(d) requires that the economic analysis include "(a)n estimate of the number of jobs that will be created or lost as the result of compliance with the proposed rule." In 2005 the Department of Employment Security showed 37,178 covered employments in the Forest and Logging, Wood Production, and Paper Manufacturing industries. This employment was supported by a harvest in Washington of 3.730 billion board feet, which results in approximately one primary job for every hundred thousand board feet harvested per year. Assuming a proportional relationship between timber volume and the timber related jobs, and given the impact on volume harvested shown in Column E of Table 2 for the three proposals, Proposal 1 would result in a loss of an estimated 11.0 jobs per year, Proposal 2 would result in a loss of an estimated 8.5 jobs per year, and Proposal 3 would result in a loss of an estimated 8.9 jobs per year in the Forest and Logging, Wood Production, and Paper and Manufacturing industries.

Reducing costs for small businesses. The Regulatory Fairness Act's RCWs 19.85.030 and -.040 address an agency's responsibility in rule making to consider how costs may be reduced for small businesses. As explained above, the definition of small business in the Regulatory Fairness Act is one that has 50 or fewer employees. In general, the forest practices riparian rules include special provisions for small forest landowners (defined generally as landowners who harvest two million board feet or less annually). They include the ability to be compensated for trees required to be left in RMZ (the Forest Riparian Easement Program[11]), and for landowners with parcels 20 acres or less to use less stringent riparian rules.[12]

Specific to this DFC rule making, the Board proposed three rules to respond to the validation study, and Proposals 2 and 3 are considered less costly ways to do that. The Board will consider the environmental impacts of all three proposals and which proposal best meets its goals.

[11] See chapter 222-21 WAC.
[12] WAC 222-30-023

Table 4: Entities with Fewer than 50 Employees (Small Businesses)

	Estimated State Wide total leave volume (board feet)			Estimated Stumpage Value		Estimated Statewide Total Leave Tree Volume (board feet)				
	Douglas fir	hemlock	Total	Douglas fir	hemlock	Douglas fir	hemlock	Total	Change from Current Rules	Percent Change
Current Rule	827,462	5,118,816	5,946,278	$347	$184	$ 287,129	$ 941,862	$ 1,228,991		
Proposal 1	875,484	6,080,026	6,955,509	$347	$184	$ 303,793	$ 1,118,725	$ 1,422,518	$ 193,526	16%
Proposal 2	832,804	5,802,083	6,634,887	$347	$184	$ 288,983	$ 1,067,583	$ 1,356,566	$ 127,575	10%
Proposal 3	871,913	6,073,874	6,945,787	$347	$184	$ 302,554	$ 1,117,593	$ 1,420,147	$ 191,155	16%

Table 4: Largest 10 percent of Entities Required to Comply with the Rules (Large Businesses)

	Estimated Statewide total leave volume (board feet)			Estimated Stumpage Value		Estimated Statewide Total Leave Tree Volume (board feet)				
	Douglas fir	hemlock	Total	Douglas fir	hemlock	Douglas fir	hemlock	Total	Change from Current Rules	Percent Change
Current Rule	7,402,969	4,569,522	11,972,491	$347	$184	$ 2,568,830	$ 840,792	$ 3,409,622		
Proposal 1	8,221,009	5,595,972	13,816,981	$347	$184	$ 2,852,690	$ 1,029,659	$ 3,882,349	$ 472,727	14%
Proposal 2	8,044,698	5,401,590	13,446,288	$347	$184	$ 2,791,510	$ 993,893	$ 3,785,403	$ 375,780	11%
Proposal 3	8,044,698	5,505,901	13,550,599	$347	$184	$ 2,791,510	$ 1,013,086	$ 3,804,596	$ 394,974	12%

BENEFITS

The goal of the proposed rule making is to facilitate reaching desired future conditions conducive to healthy riparian ecology and function, and ultimately to improve water quality and habitat for fish and wildlife species that utilize riparian areas for all or part of their life cycle. The 1999 Forests and Fish Report, which initiated the current riparian strategies for forest practices rules, is based on recommendations for improving and maintaining " . . . bank stability, recruitment of large woody debris, leaf litter fall, nutrients, sediment filtering, shade, and other riparian features that are important to both riparian forest and aquatic system conditions."[13] The report also initiated an adaptive management program through which adjustments in the rules would be made to achieve resource objectives. The rule proposals are a manifestation of that program and are intended to provide enhanced benefits to water quality and fish and wildlife habitat. The Board's decision to adopt one of the proposals would be the fulfillment of the Forests and Fish adaptive management process in which original science informs the Board's rules.

The economic benefits of the proposed rule change cannot be reasonably estimated. Any environmental benefit would occur at the margin. The quantification of economic benefits would need to be based on measured known environmental benefits, and this information is not available.

Consideration should also be given to the distribution of costs and benefits. While the benefits accrue generally, the costs are borne by the Forest Practices applicants who are affected by the rules.

LEAST BURDENSOME ALTERNATIVE

In addition to the goals related to adaptive management and riparian function, the Forest Practices Board's goal in considering three alternative rules was to consider the environmental and economic impacts of a range of proposals to respond to the Forests and Fish adaptive management program validation study. The Board's environmental analysis concluded that none of the three proposals are likely to result in significant environmental adverse impacts[14]. The estimated annual change from existing rules in stumpage value of trees not harvested under Proposal 1 is $1.0 million (15 percent), for Proposal 2 is $0.7 million (10 percent), and for Proposal 3 is $0.9 million (13 percent). Based on the estimated costs to the timber industry being the least under Proposal 2, it appears that the least burdensome alternative for those required to comply with the forest practices riparian rules, and that will achieve the Board's goals, is Proposal 2.

CONCLUSIONS

This economic analysis estimates the annual costs of three rule proposals. Costs are defined as the annual statewide decrease in timber harvest revenue resulting from the proposed rule changes. These estimates are based on a statewide extrapolation of a data set of 100 sample FPAs from 2005 and 2006.

The estimated annual change from existing rules in stumpage value of trees not harvested under Proposal 1 is $1.0 million (15 percent), under Proposal 2 is $0.7 million (10 percent), and under Proposal 3 is $0.9 million (13 percent).

[13] Forests and Fish Report, 1999. Appendix B(I)(b). This report may be accessed at http://www.dnr.wa.gov/forestpractices/adaptivemanagement/, under "Adaptive Management Links."

It appears there is a disproportionate impact on small businesses when compared to large businesses under Proposal 1 and Proposal 3, but there is a slightly disproportionate impact on large businesses under Proposal 2.

Proposal 2 appears to be the least burdensome alternative for those required to comply with the forest practices riparian rules that will achieve the Board's goal.

The benefits of the rule proposals cannot be quantified due to the marginality of the proposed rule changes. However, adopting one of the proposals would fulfill the Forests and Fish adaptive management process in which original science informs the Board's rules.

Consideration should also be given to the distribution of costs and benefits. While the benefits accrue generally, the costs are borne by the Forest Practices applicants who are affected by the rule change.

RESOURCES CITED

McConnell, S. 2007. An Overview of the DFC Model and an Analysis of Westside Type F Riparian Prescriptions and Projected Stand Basal Area per Acre. Project Title: The FPA Desktop Analysis. Contract No. PSC 07-22.

Schuett-Hames, D., R. Conrad, A. Roorbach. 2005. Validation of the Western Washington Riparian Desired Future Condition Performance Targets in the Washington State Forest Practice Rules with Data from Mature, Unmanaged, Conifer-Dominated Riparian Stands. Northwest Indian Fisheries Commission, CMER No. 05-507.