REPORT TO THE LEGISLATURE

Pursuant to Section 402, Chapter 4,
Laws of 1999, 1st Special Session,
Engrossed Substitute House Bill 2091

Comparing the Value of "Forest and Fish" Leave-Trees with the Forest Excise Tax Credit.

WASHINGTON STATE DEPARTMENT OF REVENUE
WILLIAM N. RICE, ACTING DIRECTOR
NOVEMBER 1, 2002

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October 28, 2002

TO: The Honorable Ken Jacobsen, Chair
Senate Natural Resources, Parks and Shorelines Committee

The Honorable Mark Doumit, Chair
House Natural Resources Committee

The Honorable Lisa Brown, Chair
Senate Ways and Means Committee

The Honorable Jeff Gombosky, Chair
House Finance Committee

FROM: William N. Rice, Acting Director

SUBJECT: Report on the Forest Excise Tax Credit resulting from the "Forest and Fish Bill"

I am pleased to present to you the Department of Revenue's report examining the value of timber in leave-tree buffers compared to the forest excise tax credit established in the 1999 Forest and Fish Bill. This report is submitted pursuant to Section 402 of Chapter 4, Laws of 1999, 1st Special Session, Engrossed Substitute House Bill 2091, which directs the Department to conduct a study and report the results to the Legislature.

The purpose of this study was to quantify the value of timber left standing due to the enhanced forest practice rules stipulated in ESHB 2091, and compare the timber value with the forest excise tax credits granted under this same bill. In conducting this study, 1,325 DNR cutting permits were examined over a two-year period, and 115 of these cutting permits had their leave-tree buffers measured (cruised) to determine timber value. The study finds that the value of timber left standing due to enhanced forest practice rules exceeds the forest excise tax credit amount taken over the same period.

If you have any questions or want additional copies of this report, the study lead, Dr. Laurence Reeves, can be reached at (360) 753-7224 or by e-mail at LaurenceR@dor.wa.gov.

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Executive Summary

In 1999 the Washington State Legislature passed the "Forest and Fish Bill" (Chapter 4, Laws of 1999, 1st Special Session, Engrossed Substitute House Bill 2091,) which implemented new, more restrictive forest practice rules that emphasized "enhanced aquatic resource requirements." The bill also authorized a 16 percent forest excise tax credit for harvests impacted by the new requirements. Section 402 of this bill directed the Department of Revenue (DOR) to compare the tax credit with the value of timber left standing in harvest units due to the new rules. The DOR Forest Tax Section conducted a two-year study that identified 1,325 cutting permits that received the tax credit and had completed harvests. Of those permits, 115 had their leave-trees counted and measured (cruised) to determine the difference between the leave-tree buffer value and the tax credit amount. The following significant observations resulted from this study:

- 80 percent of the 1,325 cutting permits were not required to have leave-tree buffers under the "enhanced aquatic resource requirements." These units were eligible for the tax credit based solely on "road maintenance and abandonment plans" that do not require leave-trees. These road plans do have associated costs, but they are outside scope of this study.

- The 115 harvest units that were cruised all had "enhanced aquatic resource requirement" leave-tree buffers. When summed over all 115 units, the leave-tree value was 11 times greater than the tax credit amount. The leave-tree value was eight times greater than the tax credit amount when examining only the incremental difference between the old forest practice rules (pre-"Forest and Fish") and the new "Forest and Fish" rules.

- 27 percent of the 115 harvest units belonged to "small harvesters" (annual harvests do not exceed two million board feet per year). As a group, small harvesters tended to have the greatest disparity between leave-tree value and tax credit amount, with a combined leave-tree value 23 times greater than the tax credit amount.

- 23 percent of the 115 harvest units were in eastern Washington. These harvest units had the greatest portion of leave-tree value attributed to the old forest practice rules. Nearly two-thirds of the total leave-tree value would have been required under the old forest practice rules, leaving one-third of the timber value loss resulting from the incremental impact of the new rules.

- 6 percent of the 115 harvest units received the tax credit but lost no value due to the new forest practice rules. Either there was no merchantable timber in the leave-tree buffer or the aquatic resource was outside of the harvest unit and the buffer width minimally intersected the harvest unit. In one case the leave-tree buffer was harvested. In all, harvest units with leave-tree buffers that had either no leave-tree value or a leave-tree value less than the tax credit occurred in less than 10 percent of the 115 units.

- Combining tax credits from cutting permits that received the credit based solely on road maintenance and abandonment plans (no leave-tree value) with permits that had leave-tree value reduced the statewide leave-tree value to seven times the size of the tax credit amount. When examining only the incremental difference between the old and new forest practice rules, the statewide leave-tree value was reduced to five times the tax credit amount.

Introduction

With wild salmon stocks declining throughout the Pacific Northwest, Washington State began developing a salmon recovery strategy in the late 1990s aimed at mitigating this trend (Washington State Joint Natural Resources Cabinet 1999). One area of focus was habitat protection, which led to the passage of the "Forest and Fish Bill" in 1999 (Chapter 4, Laws of 1999, 1st Special Session). Among other things, this bill directed the Washington Department of Natural Resources (DNR) to develop more restrictive forest practice rules (Chapter 222 Washington Administrative Code) that emphasized protection of aquatic resources and species. The key elements of these new rules were increasing the reach and width of stream buffers (riparian management zones or RMZs), standardizing harvesting restrictions on steep and unstable slopes and requiring road maintenance and abandonment plans.

Timber industry and forest landowner concerns over the increased costs of complying with the new forest practice rules prompted the legislature to include in the bill a 16 percent forest excise tax credit, thereby reducing the tax rate from 5 percent of stumpage (standing timber) value to 4.2 percent. However, only DNR forest practice applications (cutting permits) on prospective harvest units with harvest limitations due to "enhanced aquatic resource requirements" (EARRs) were eligible for the tax credit. RMZs, steep or unstable slopes, wetlands, federally approved habitat conservation plans, DNR approved road maintenance and abandonment plans, and DNR approved watershed analysis units are all defined as EARRs under the new forest practice rules. Therefore, effective January 1, 2000, if any part of the land covered by a DNR cutting permit is subject to an EARR, all timber harvested under that cutting permit is eligible for the tax credit.

Because there was some disagreement among lawmakers over granting the forest excise tax credit, the bill also included Section 402 that directed the Department of Revenue (DOR) and the DNR to conduct a joint study comparing the tax credit received by taxpayers and the extent to which timber harvests have been limited by an EARR. To fulfill this requirement, the DOR Forest Tax Section embarked on a two-year study that examined 1,325 cutting permits and cruised 115 harvest units to determine the value of leave-trees compared to the tax credit received on the harvest units. This paper details the design and results of this study.

Study Design

The design of this study was developed with input from a nine-person advisory committee made up of individuals from the timber industry, forestry and environmental consulting firms, the DNR and the DOR. The committee's expertise included forest practice specialists, forest economists and timber cruisers (those who count and measure trees). Because the DOR has access to forest excise tax (FET) data and a team of field foresters, it was decided the study would be empirically based, focusing on measuring leave-tree volume in harvested units and examining tax returns to get FET credit amounts.

Identifying Units: The first step was to identify harvest units that had an enhanced aquatic resource requirement (EARR), received the FET credit, and were completed. The DNR provided a quarterly list of new cutting permits with EARRs between January 1, 2000 and December 31, 2001, that was cross-referenced with a DOR list of completed harvests that received the FET credit. A completed harvest is one where taxes were paid and the taxpayer checked the “no future harvest” box on the tax return indicating there would be no more harvesting on land

covered by the cutting permit. Although not all taxpayers check the "no future harvest" box on their tax return and therefore some permits may have been dropped from the sampling pool unnecessarily, the importance of completion can not be understated: if a landowner continues to harvest a unit after it was cruised for this study, the harvest volume and FET credit will certainly change, and the leave-tree buffer may change, thereby invalidating the cruise.

Using the initial criteria, 1,325 cutting permits were identified. The next step was to determine which harvest units would be cruised. Of the five individual restrictions comprising EARRs, this study only sampled harvest units impacted by RMZ, wetland and/or steep or unstable slope restrictions. These were selected because they have standardized rules regarding leave-tree areas that could be readily identified in a harvest unit. Harvest units with EARRs consisting of a watershed analysis unit or habitat conservation plan were not sampled since the rules governing these programs are individually determined on a landowner-by-landowner basis. The high degree of variability in regulations governing these harvest units would make cruising and aggregating results difficult. Harvest units with an EARR consisting of only a road maintenance and abandonment plan were also not cruised since these plans do not have EARR leave-tree requirements. Finally, regardless of whether they were candidates for cruising, statistics on all 1,325 cutting permits were collected for further analysis.

The cutting permits that were potential cruising candidates (EARRs consisting of RMZs, wetlands and/or steep or unstable slopes) were first screened in the office to identify any obvious problems that would disqualify them, and then screened in the field to identify any further problems. Over half of the permits examined were rejected during the screening process for reasons ranging from access refusal to tax credit qualification errors on the cutting permit. During the last quarter of sampling it became necessary to randomly sample the cruising candidate permits due to workload constraints. Even with random sampling, over 95 percent of the cutting permits that passed all the screening steps were cruised.

Measuring Trees: Because of the highly variable nature of timber in leave-tree buffers it was decided all timber would be 100 percent cruised. Blow-down timber in the buffers was also cruised if it appeared to have fallen since the harvest. Cruising teams generally consisted of three foresters using loggers' tapes, relaskops, laser rangefinders, and a hand-held data recorder. Data recorders allowed cruise data to be downloaded directly into a desktop computer where it was analyzed using "SuperACE 98" cruising software (Atterbury Consultants 1998).

Determining Impact: As stated earlier, the purpose of this study was to compare the tax credit with the value of timber left standing in a harvest unit. However, there was no consensus among legislators, advisory committee members and related stakeholders as to whether the study should measure the entire leave-tree buffer (RMZ, wetland, etc.) or only to the incremental portion of the buffer that resulted from the new forest practice rules. Since leave-tree buffers existed under the old forest practice rules, the two approaches would clearly yield different results.

The advisory committee agreed the best approach was to cruise the entire leave-tree buffer width and report both the entire and incremental (just the new forest practice rules) impacts. This approach also proved to be operationally efficient since determining the break between old and new forest practice rules in the field proved to be time-consuming. Instead, the leave-tree

volume associated with the old forest practice rules was extracted in the office using the cruising software based on old forest practice rule leave-tree requirements and field observations regarding stream characteristics. Since the old forest practice rules were more formulaic with regard to RMZ buffer dimensions, calculating the leave-tree requirement per hundred feet of stream reach was fairly straightforward. Once the required number of leave-trees was identified under the old rules, the leave-trees were pulled out based on the proportion of each species and diameter class in the entire cruise. This method implicitly assumed the timber throughout the width of the RMZ was homogeneous.

Wildlife and Green Recruitment Tree requirements also had to be accounted for since most landowners clump these trees into a RMZ buffer if one is present, thereby allowing the trees to count as both a recruitment tree and a RMZ leave-tree. Since the recruitment tree requirement is not an EARR and was part of the old forest practice rules, these trees must also be extracted from the total leave-tree volume as discussed above and included with the old forest practice rule leave-trees. After extracting the leave-tree volume associated with the old rules and recruitment trees, the remaining volume was assigned to the new forest practice rules.

Once the leave-tree volume was identified for the three impact categories (total impact volume, new forest practice rules volume and old forest practice rules volume), dollar values were assigned using the Department of Revenue Stumpage Value Tables (Washington Administrative Code 458-40-660). These values are developed semi-annually and apply to different species, timber quality, location and distance to mill. There are also adjustments for logging condition, stand volume per acre and thinning. Stand quality distinctions in the Stumpage Value Tables are based on the percentage of log grades as defined by the Official Northwest Log Scaling and Grading Rules.

Finally, since tax reporting on a harvest unit often spans several quarters and thus different Stumpage Value Tables, the same Table is applied to the entire harvest based on the last quarter that taxes were reported.

Results

While this study generated a large amount of detailed data on harvest units throughout the state, every attempt was made to focus on answering the question raised by the legislature, namely the comparison between the FET credit and the value of timber left standing in harvest units due to EARRs. Therefore, the primary data presented in this section are the EARR leave-tree volumes, the EARR leave-tree values, and the FET credit amounts derived from the 115 harvest units, all of which had either a RMZ, wetland and/or steep or unstable slope EARR. These data are stratified into four categories: All 115 harvest units sampled statewide, harvest units reported under the “small harvester” reporting option (landowner’s annual harvest is less than 2 million board feet), and harvest units on the eastern and western side of the Cascade Crest. Finally, the EARR leave-tree volume and value in each of the four categories is apportioned between total, new (incremental) and old forest practice rules.

An important characteristic of these data is the high degree of variability they exhibit. For example, several harvest units received the FET credit but had no EARR leave-trees, while several others had EARR leave-trees valued at over $100,000. This makes providing a

meaningful description of the data's central tendency difficult. To avoid this pitfall, the data are presented below as total amounts for each category and the ratios are based on total EARR leave-tree value divided by total FET credit amounts. More detailed statistical and geographical information can be found in Appendix A.

Table 1 displays combined cruise results from the 115 harvest units by category, total EARR leave-tree volume in thousand board feet (mbf) and value, and the results of apportioning the volume and value between the old and new forest practice rules. With the exception of harvest units in eastern Washington, the majority of the total EARR leave-tree volume and value resulted from the increased restrictions imposed by the new forest practice rules. In eastern Washington, where the old forest practice rules already had numerous restrictions in place to safeguard water temperature and other water quality factors, only 35 percent of the total EARR leave-tree volume resulted from the increased restrictions imposed by the new forest practice rules.

Table 1. EARR Leave-tree Volume (mbf) and Value Amounts of Harvest Units Cruised.

# of Harvest Units	Total EARR Volume	Total EARR Value	New FP Rule Volume	New FP Rule Value	Old FP Rule Volume	Old FP Rule Value
All Harvest Units (Statewide)			(72%)		(28%)	
115	11,208	$3,945,452	8,066	$2,839,402	3,142	$1,106,050
Westside Harvest Units			(75%)		(25%)	
88	10,479	$3,756,736	7,810	$2,799,896	2,669	$956,840
Eastside Harvest Units			(35%)		(65%)	
27	729	$188,716	256	$66,271	473	$122,445
Small Harvester Units			(51%)		(49%)	
31	714	$244,388	367	$125,617	347	$118,771

Table 2 displays the FET credit amount received by the 115 harvest units and the relationship, as a ratio, between the EARR leave-tree value and the FET credit. The ratios indicate that overall the FET credit does not cover the value lost to EARR leave-tree buffers for harvest units with RMZs, wetlands and/or steep or unstable slopes. For the statewide and western Washington harvest units that were cruised, the total value lost to EARR leave-tree buffers is 11 times greater than the FET credit amount. For small harvesters the discrepancy is even greater, at 23 to one. This is due to several factors: Small harvesters are more likely to own bottomland with more water resources and their harvest units are smaller in size relative to industrial timberland owners. Thus, a 100-foot wide leave-tree buffer will put a higher percentage of timber off-limits in a smaller unit compared to a large unit. And since the FET credit is a percentage of stumpage value, less timber available to harvest means a smaller FET credit. Those who can harvest the most volume relative to the leave-tree volume realize the greatest benefit from the tax credit.

When looking at the incremental impact of the new forest practice rules only, the value lost to EARR leave-tree buffers is still between five and 12 times greater than the FET credit, with the statewide ratio at eight to one.

Table 2. FET Tax Credit Amount and Relationship to EARR Leave-tree Value of Harvest Units Cruised (those with a RMZ, wetland and/or steep or unstable slope EARR).

	FET Credit Amount	Ratio of EARR Value to Credit	Ratio of New FP Rule Value to Credit	Ratio of Old FP Rule Value to Credit
All Units (Statewide)	$350,107.09	11 to 1	8 to 1	3 to 1
Westside Units	$337,057.06	11 to 1	8 to1	3 to 1
Eastside Units	$13,050.03	14 to 1	5 to 1	9 to 1
Small Harv. Units	$10,745.07	23 to 1	12 to 1	11 to 1

Based on DNR data, roughly 70 percent of all cutting permits approved over the past year were eligible for the FET credit. To put the FET credit into some context monetarily, Table 3 displays the total quarterly credit amount relative to the total quarterly FET deposited into the state general fund. The FET is distributed quarterly to both the counties where the timber was harvested and to the state general fund. Since the FET credit only comes out of the general fund portion, the FET distribution to the counties remains unaffected by the tax credit.

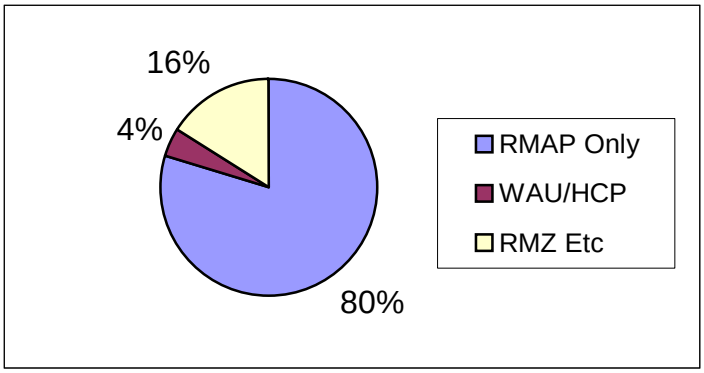
Table 3. Quarterly FET Credit Amount and FET Deposits into the General Fund.

Quarter and Year	FET Credit Amount	FET Deposited into General Fund	Credit as % of General Fund Deposit
Q1-2000	$0	$4,454,108	0%
Q2-2000	$42,684	$4,745,779	1%
Q3-2000	$182,887	$3,951,037	5%
Q4-2000	$468,644	$4,207,989	11%
Q1-2001	$524,137	$3,720,193	14%
Q2-2001	$622,951	$3,281,958	19%
Q3-2001	$810,881	$2,433,057	33%
Q4-2001	$992,566	$3,134,485	32%
Q1-2002	$1,160,678	$2,173,326	53%
Q2-2002	$1,125,490	$2,286,603	49%
Q3-2002	$1,406,545	$1,977,143	71%
Source: DOR Information Services Report Series B240FE, Reports #2 and #6.			

As discussed earlier, statistics were kept on all 1,325 cutting permits that met the initial screening. Of these permits, 80 percent were eligible for the FET credit based solely on a road maintenance and abandonment plan (RMAP). This should come as no surprise since all small landowners must submit a RMAP when they apply for a cutting permit, and large landowners must put 20 percent of their land into a RMAP each year until all timberlands are covered by a RMAP. However, this indicates that 80 percent of the permits receiving the FET credit are not leaving any trees standing in the harvest unit due to EARRs (they still must leave Wildlife and/or Green Recruitment Trees, but these are not EARRs). This is not to say there is no cost to developing and implementing a RMAP or to leaving recruitment trees, just that there is no loss of value due to the new EARR leave-tree requirements.

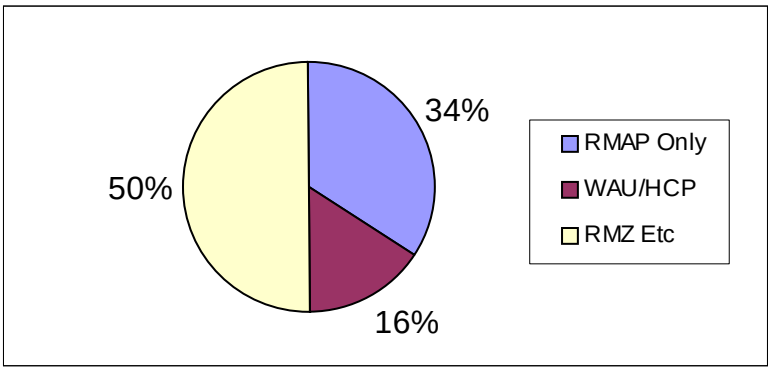
Of the remaining cutting permits that were eligible for the FET credit, 16 percent were eligible due to RMZs, wetlands and/or steep or unstable slopes (possibly in conjunction with a RMAP), and 4 percent were eligible due to habitat conservation plans or watershed analysis units (HCP/WAU) (again, possibly in conjunction with a RMAP). Figure 1 displays these data graphically.

Figure 1. Percentage of Permits Receiving FET Credit by Qualifier



Although 80 percent of the cutting permits were eligible for the FET credit due to a RMAP only, these cutting permits received only 34 percent of the total FET credit amount. As illustrated in Figure 2, the remaining 66 percent of the total credit amount was allocated to cutting permits that received the FET credit due to WAU/HCP or RMZs, wetlands, and/or steep or unstable slopes.

Figure 2. Percentage of FET Credit Dollars by Qualifier



Once again, these findings are not surprising since "RMAP only" permits tend to be more prevalent with small harvesters and are therefore on a smaller scale. On average, "RMAP only" permits were three to four times smaller in acreage and received a FET credit that was one-tenth that of the other cutting permits that were also eligible for the FET credit. Thus, although there were many more "RMAP only" cutting permits receiving the FET credit, they each received a smaller credit amount compared to the other eligible permits.

The difference between the WAU/HCP and RMZ, wetlands, and/or steep or unstable slope cutting permits was not so great. On average, the WAU/HCP permits tended to be smaller in acreage while receiving more in FET credit. Since credit amounts are directly related to the stumpage value of harvested timber, this indicates that there was more timber harvested on WAU/HCP permits compared to RMZ, wetlands, and/or steep or unstable slope permits. This observation suggests that these permits would have a smaller ratio (discrepancy) between EARR leave-tree value and FET credit.

Finally, observations from the 115 cruised harvest units were applied to all 1,325 cutting permits to give an overall description of the difference between EARR leave-tree value and FET credit amount. Since HCP/WAU cutting permits had EARR leave-tree requirements but were not cruised, an assumption had to be made about the ratio of EARR leave-tree value to FET credit amount for these cutting permits. As discussed previously, HCP/WAU cutting permits probably have a smaller ratio than RMZ, wetlands, and/or steep or unstable slope permits. However, the EARR leave-tree to FET credit ratio for all permits was not very sensitive to changes in the assumed HCP/WAU cutting permit ratio since these permits comprised only 16 percent of total FET credit amount. For the sake of simplicity and to be conservative, the same ratio (11 to 1) was used for HCP/WAU permits as that for permits with a RMZ, wetlands, and/or steep or unstable slope.

Table 4 displays the total FET credit amount of the cutting permits used in this study, the overall ratio of EARR leave-tree value to FET credit amount, and the value apportioned to the old and incremental new forest practice rules based on the percentages in Table 1.

Table 4. FET Tax Credit Amount and Relationship to EARR Leave-tree Value for All Cutting Permits in Study.

	FET Credit Amount	Ratio of EARR Value to Credit	Ratio of New FP Rule Value to Credit	Ratio of Old FP Rule Value to Credit
1,325 Permits Statewide	$793,851	7 to 1	5 to 1	2 to 1

Conclusion

This study identified 1,325 cutting permits that received the FET credit and had completed harvests. Of those permits, 115 harvest units having a RMZ, wetland and/or steep or unstable slope were cruised to determine the difference between the EARR leave-tree value and the FET credit amount. The resulting ratios of EARR leave-tree value and FET credit amount was applied to the original 1,325 harvest units to provide a general description of the difference between EARR leave-tree value and FET credit amount for all 1,325 cutting permits, even those that did not have EARR leave-tree requirements.

On average, the FET credit does not fully compensate timberland owners for trees left standing in leave-tree buffers required by the “enhanced aquatic resource requirements” of the new forest practice rules. For all 1,325 cutting permits combined, the EARR leave-tree buffer value was seven times greater than the FET credit amount, even when factoring in the 80 percent “RMAP

only" permits that had no EARR leave-tree requirements. This is because these RMAP permits only account for 30 percent of the FET credit amount. When considering only the incremental impact of the new forest practice rules, the EARR leave-tree value was still five times greater than the FET credit amount.

Of the 115 harvest units with a RMZ, wetland and/or steep or unstable slope that were sampled in this study, the statewide value of timber in EARR leave-tree buffers is eleven times greater than the FET credit amount. When one looks at the statewide incremental impact of the new forest practice rules, the value of timber in the EARR leave-tree buffers is eight times greater than the FET credit amount. Although there are individual instances where one of the cruised harvest units suffered no loss due to EARRs or the FET credit exceeded the EARR leave-tree value, these occurred in less than 10 percent of the units sampled.

For individual categories, small harvester units have the largest discrepancy between EARR leave-tree value and FET credit, as their total EARR leave-tree value loss was 23 times greater than the FET credit amount. Even the incremental impact of the new forest practice rules was large, with an EARR leave-tree value to FET credit ratio at 12 to 1, although their leave-tree losses were almost as great under the old forest practice rules. Harvest units east of the Cascade Crest also had an EARR value to FET credit ratio that was higher than the statewide ratio, indicating they are receiving less FET credit relative to their EARR leave-tree buffer losses. In addition, 65 percent of the total EARR leave-tree buffer losses were already required under the old forest practice rules.

The incremental impact of the new forest practice rules was greatest for Western Washington harvest units, where three-quarters of the total EARR leave-tree volume resulted from the new forest practice rules. Western Washington harvest units also had the smallest discrepancy between the EARR leave-tree value and the FET credit, although the ratio was still 8 to 1.

It is clear that each group is impacted differently in terms of how the new forest practice rules affect their ability to harvest timber and to what extent the FET credit covers EARR leave-tree value loss. However, given the huge variability between harvest units, there will always be some "winners and losers," that is, units that are minimally impacted by the forest practice rules and others that are heavily impacted, even among the most homogenous groups. Since the FET credit is related to value of timber harvested, not the value of timber left standing, a harvest unit that is severely impacted by the new forest practice rules is no more likely to receive a large FET credit as one that is a minimally impacted.

Readers should also remember that this study only examined the value of leave-trees left standing due to EARRs and did not consider the costs associated with developing and implementing RMAPs, or the timber value associated with Wildlife and/or Green Recruitment Trees.

Appendix A. Additional Descriptions of the 115 Cruised Harvest Units

Table 5. Count of Harvest Units Sampled by County

County Name	*Units Sampled*	*County Name*	*Units Sampled*
Adams	1	Okanogan	1
Clallam	3	Pacific	1
Clark	1	Pend Oreille	2
Cowlitz	7	Pierce	6
Ferry	3	Skagit	9
Grays Harbor	19	Skamania	4
Jefferson	3	Snohomish	4
King	1	Spokane	3
Kittitas	8	Stevens	4
Klickitat	3	Thurston	1
Lewis	14	Whatcom	6
Lincoln	3	Whitman	2
Mason	6	*Statewide Total*	*115*

Table 6. Grouping of Individual EARR Leave-Tree Value to FET Credit Ratios

EARR Leave-Tree Value to FET Credit Ratios	*Total Harvest Unit Count*
0 (No value lost due to EARR leave-trees)	7
Less than 1:1 (credit exceeded leave-tree value)	3
1:1 to less than 2:1	6
2:1 to less than 6:1	17
6:1 to less than 10:1	20
10:1 to less than 20:1	25
20:1 to less than 50:1	24
50:1 and higher	13

Table 7. Statewide Detailed Harvest Unit Statistics

(Volume is measured in thousand board feet (MBF), value is measured in dollars)

		Total EARR Volume	Total EARR Value	New EARR Volume	New EARR Value	Old EARR Volume	Old EARR Value	FET Credit	Volume Reported	Stumpage Value Reported	Trees Cruised	RMZ Length	FPA Acres
Quantiles													
Maximum	100.0%	665	229,776	559	211,536	296	117,660	22,767	6,445	2,845,879	2,248	9,200	2,060
	99.5%	665	229,776	559	211,536	296	117,660	22,767	6,445	2,845,879	2,248	9,200	2,060
	97.5%	455	201,568	396	172,663	109	36,183	11,319	4,029	1,414,880	1,898	8,008	277
	90.0%	231	85,467	190	67,862	64	21,267	7,191	2,820	898,896	1,553	4,825	123
Quartile	75.0%	134	44,647	101	31,875	34	12,333	4,629	1,769	578,626	744	2,993	83
Median	50.0%	69	22,609	30	8,281	17	5,895	1,996	821	249,529	379	1,577	54
Quartile	25.0%	15	4,844	1	224	7	1,857	406	219	50,804	137	758	20
	10.0%	7	1,516	0	0	1	304	130	62	16,251	47	374	10
	2.5%	0	0	0	0	0	0	36	17	4,483	0	0	4
	0.5%	0	0	0	0	0	0	9	10	1,138	0	0	3
Minimum	0.0%	0	0	0	0	0	0	9	10	1,138	0	0	3
Moments													
Mean		97.5	34,308.3	70.1	24,921.2	27.3	9,376.4	3,044.4	1,133.9	380,571.4	541.9	2,113.7	78.4
Std Dev		114.2	43,327.7	102.4	38,657.4	35.8	13,392.6	3,466.9	1,164.0	433,361.3	533.2	1,858.4	194.6
Std Error Mean		10.7	4,040.3	9.5	3,604.8	3.3	1,248.9	323.3	108.5	40,411.1	49.7	173.3	18.1
Upper 95% Mean		118.6	42,312.2	89.1	32,062.4	33.9	11,850.4	3,684.8	1,348.9	460,626.1	640.4	2,457.0	114.3
Lower 95% Mean		75.2	27,178.2	58.8	21,404.2	21.9	7,786.7	2,404.0	836.2	290,546.0	394.3	1,486.8	84.2
N		115	115	115	115	115	115	115	115	115	115	115	115
Sum Weights		115	115	115	115	115	115	115	115	115	115	115	115
Sum		11,208	3,945,452	8,066	2,865,935	3,142	1,078,287		130,397	43,765,707	62,318	243,076	9,016
Variance		13044.46	1.88E+09	10479.74	1.49E+09	1279.203	179361996	12049160	1354834	1.88E+11	284318.6	3453527	37857.7
Skewness		2.3393	2.39	2.5827	2.68	4.2498	5.04	2.254	1.586	2.3	1.2797	1.513	9.4675
Kurtosis		7.3181	6.98	8.4241	8.46	27.6022	37.23	8.505	3.361	8.5	0.8115	2.426	96.4692
CV		117.1879	126.29	145.9536	155.12	130.9065	142.83	113.876	102.653	113.9	98.3982	87.92	248.177

Table 8. Western Washington Detailed Harvest Unit Statistics

(Volume is measured in thousand board feet (MBF), value is measured in dollars)

		Total EARR Volume	Total EARR Value	New EARR Volume	New EARR Value	Old EARR Volume	Old EARR Value	FET Credit	Volume Reported	Stumpage Value Reported	Trees Cruised	RMZ Length	FPA Acres
Quantiles													
Maximum	100.0%	665	229,776	559	211,536	296	117,660	22,767	6,445	2,845,879	2,248	9,200	265
	99.5%	665	229,776	559	211,536	296	117,660	22,767	6,445	2,845,879	2,248	9,200	265
	97.5%	542	214,811	514	188,293	111	36,251	12,462	4,485	1,557,714	1,911	6,534	134
	90.0%	244	97,904	200	84,064	66	24,773	8,190	2,962	1,023,774	1,571	4,900	114
Quartile	75.0%	168	57,143	126	44,208	37	14,522	5,531	1,964	691,337	902	3,034	75
Median	50.0%	88	30,966	55	19,824	21	7,289	3,013	1,219	376,655	462	1,635	48
Quartile	25.0%	33	9,499	10	3,438	8	2,312	1,146	420	143,310	208	776	19
	10.0%	12	3,703	0	0	3	554	235	120	29,404	83	400	9
	2.5%	0	0	0	0	0	0	124	45	15,520	0	0	4
	0.5%	0	0	0	0	0	0	111	36	13,877	0	0	3
Minimum	0.0%	0	0	0	0	0	0	111	36	13,877	0	0	3
Moments													
Mean		119.1	42,690.2	88.8	31,758.6	30.3	10,917.7	3,830.2	1,404.8	478,800.6	638.4	2,159.2	54.5
Std Dev		121.0	46,108.2	109.8	41,748.1	38.7	14,729.4	3,603.6	1,196.1	450,443.1	544.4	1,810.9	43.5
Std Error Mean		12.9	4,915.2	11.7	4,450.4	4.1	1,570.2	384.1	127.5	48,017.4	58.0	193.0	4.6
Upper 95% Mean		144.7	52,459.6	112.0	40,604.2	38.5	14,038.5	4,593.7	1,658.3	574,240.8	753.8	2,542.9	63.8
Lower 95% Mean		93.4	32,920.8	65.5	22,912.9	22.1	7,796.8	3,066.7	1,151.4	383,360.4	523.1	1,775.6	45.3
N		88	88	88	88	88	88	88	88	88	88	88	88
Sum Weights		88	88	88	88	88	88	88	88	88	88	88	88
Sum		10479	3756736	7810	2794753	2669	960753	337057.1	123624	42134454	56182	190013	4799
Variance		14645.223	2125960000	12048.603	1742900000	1494.1085	216954804	12985650	1430773	2.029E+11	296337.31	3279236.3	1893.2172
Skewness		2.1292	2.14	2.3013	2.35	4.18336	4.69	2.093	1.378	2.1	1.0319	1.341	1.55493
Kurtosis		6.0089	5.44	6.6215	6.38	25.34153	31.43	7.79	2.806	7.8	0.2185	1.931	4.87478
CV		101.6274	108.01	123.6801	131.45	127.4457	134.91	94.083	85.146	94.1	85.2665	83.866	79.787

Table 9. Eastern Washington Detailed Harvest Unit Statistics

(Volume is measured in thousand board feet (MBF), value is measured in dollars)

		Total EARR Volume	Total EARR Value	New EARR Volume	New EARR Value	Old EARR Volume	Old EARR Value	FET Credit	Volume Reported	Stumpage Value Reported	Trees Cruised	RMZ Length	FPA Acres
Quantiles													
Maximum	100.0%	170	43,120	125	32,232	86	20,982	2,783	1,467	347,907	1,797	8,080	2,060
	99.5%	170	43,120	125	32,232	86	20,982	2,783	1,467	347,907	1,797	8,080	2,060
	97.5%	170	43,120	125	32,232	86	20,982	2,783	1,467	347,907	1,797	8,080	2,060
	90.0%	90	20,246	32	8,370	57	11,930	1,291	625	161,407	516	4,593	265
Quartile	75.0%	24	7,087	4	1,185	20	5,973	679	299	84,912	285	2,640	110
Median	50.0%	14	3,864	0	0	10	2,754	318	179	39,746	137	1,305	70
Quartile	25.0%	7	1,857	0	0	2	568	97	52	12,145	50	727	26
	10.0%	0	0	0	0	0	0	36	17	4,446	0	0	10
	2.5%	0	0	0	0	0	0	9	10	1,138	0	0	5
	0.5%	0	0	0	0	0	0	9	10	1,138	0	0	5
Minimum	0.0%	0	0	0	0	0	0	9	10	1,138	0	0	5
Moments													
Mean		27.0	6,989.5	9.5	2,636.4	17.5	4,353.1	483.3	250.9	60,416.8	227.3	1,965.3	156.2
Std Dev		38.1	10,225.3	25.3	6,809.8	21.9	5,121.1	588.4	307.7	73,546.0	347.4	2,034.6	389.2
Std Error Mean		7.3	4.9	1,310.6	4.2	985.5	113.2	59.2	14,153.9	66.9	391.6	74.9	18.1
Upper 95% Mean		42.1	19.5	5,330.2	26.2	6,378.9	716.1	372.6	89,510.4	364.7	2,770.2	310.1	114.3
Lower 95% Mean		11.9	-0.5	-57.5	8.9	2,327.3	250.6	129.1	31,323.2	89.8	1,160.4	2.2	84.2
N		27	27	27	27	27	27	27	27	27	27	27	27
Sum Weights		27	27	27	27	27	27	27	27	27	27	27	27
Sum		729	188716	256	71182	473	117534	13050.03	6773	1631253	6136	53063	4217
Variance		1452.2308	104556989	639.95157	46373775	478.87464	26225299	346177.75	94656.054	5409010000	120691.97	4139670	151445.46
Skewness		2.60591	2.8	4.03255	3.687	1.80385	1.896	2.6222	2.7492	2.62	3.801	2.07	4.8507
Kurtosis		7.41041	7.78	17.86367	14.623	2.89486	3.785	8.5819	9.2296	8.58	16.9335	4.574	24.392
CV		141.14128	146.3	266.80708	258.303	124.9147	117.641	121.7312	122.647	121.73	152.8684	103.527	249.1657

Table 10. Small Harvester Detailed Harvest Unit Statistics

(Volume is measured in thousand board feet (MBF), value is measured in dollars)

		Total EARR Volume	Total EARR Value	New EARR Volume	New EARR Value	Old EARR Volume	Old EARR Value	FET Credit	Volume Reported	Stumpage Value Reported	Trees Cruised	RMZ Length	FPA Acres
Quantiles													
Maximum	100.0%	141	71,365	108	54,575	86	20,982	2,505	1,072	313,113	1,797	2,765	2,060
	99.5%	141	71,365	108	54,575	86	20,982	2,505	1,072	313,113	1,797	2,765	2,060
	97.5%	141	71,365	108	54,575	86	20,982	2,505	1,072	313,113	1,797	2,765	2,060
	90.0%	81	21,702	40	14,865	30	7,165	815	396	101,880	499	2,353	131
Quartile	75.0%	24	6,091	12	4,345	14	4,425	406	227	50,804	254	1,490	75
Median	50.0%	13	4,104	5	1,204	4	1,438	217	103	27,078	123	727	18
Quartile	25.0%	6	1,576	0	0	1	309	111	45	13,877	43	358	7
	10.0%	0	0	0	0	0	0	38	18	4,718	0	0	4
	2.5%	0	0	0	0	0	0	9	10	1,138	0	0	3
	0.5%	0	0	0	0	0	0	9	10	1,138	0	0	3
Minimum	0.0%	0	0	0	0	0	0	9	10	1,138	0	0	3
Moments													
Mean		23.0	7,883.5	11.8	4,609.7	11.2	3,265.1	346.6	169.9	43,326.9	217.7	942.9	106.9
Std Dev		32.4	13,970.5	21.5	10,212.2	18.6	4,745.4	472.7	210.0	59,088.3	337.4	799.2	366.2
Std Error Mean		5.8	2,509.2	3.9	1,834.2	3.3	852.3	84.9	37.7	10,612.6	60.6	143.5	65.8
Upper 95% Mean		34.9	13,007.9	19.7	8,355.6	18.0	5,005.7	520.0	247.0	65,000.5	341.5	1,236.0	241.2
Lower 95% Mean		11.1	2,759.1	3.9	863.9	4.4	1,524.5	173.2	92.9	21,653.3	93.9	649.8	-27.4
N		31	31	31	31	31	31	31	31	31	31	31	31
Sum Weights		31	31	31	31	31	31	31	31	31	31	31	31
Sum		714	244388	367	142902	347.00	101217	10745.07	5268	1343133	6748	29230	3314
Variance		1049.6323	195175452	463.53978	104288978	345.56	22518684	223450.8	44098.729	3491430000	113869.63	638715.96	134121.36
Skewness		2.49226	3.66	3.36483	4.23	3.03	2.608	3.5211	3.0358	3.52	3.7069	0.808	5.3932
Kurtosis		6.15405	14.88	13.36528	20.16	9.76	7.405	14.7946	11.2921	14.79	16.4611	-0.178	29.6201
CV		140.66371	177.21	181.86082	221.54	166.07	145.338	136.3777	123.5745	136.38	155.021	84.759	342.577

Appendix B. Administrative Impact

As discussed earlier, the Legislature called for joint participation between the Department of Revenue (DOR) and the Department of Natural Resources (DNR) on this study. The DNR was not able to provide staff to assist with timber cruising on harvest units. Since cruising comprised the vast majority of the study's effort and expense, these costs were borne by the DOR Forest Tax Section (see Table 11 below). The Forest Tax Section balanced the additional workload by deferring a portion of the field audits to future years and redirected resources to this study. The delayed audit fieldwork will be accomplished within the next two years.

The DNR provided assistance in other areas: They furnished computer reports of approved cutting permits that helped identify eligible harvest units, the Small Forest Landowner Office provided cruise data on several small harvester units that were cruised for the Riparian Easement Program, and two of the nine-person advisory committee were DNR employees.

Table 11. Administrative Impact of Study (DOR)

Expense	*Amount*	*Explanation*
Salaries	$119,870	Based on 4,710 staff hours
Travel	$12,124	Remote units required overnight travel
Equipment Purchases	$12,043	Rangefinders, safety gear, computer repairs, etc.
Vehicle Use	$10,499	Based on 66,780 miles traveled and lease costs
TOTAL ESTIMATE	$154,536	

References

Atterbury Consultants. 1998. SuperACE 98 Timber Cruising Program. Beaverton, OR.

Washington State Joint Natural Resources Cabinet. 1999. Statewide Strategy to Recover Salmon: Extinction is Not an Option. Governor's Office, Olympia, WA. 114p.