

1993 RIPARIAN MANAGEMENT ZONE SURVEY

by the

TFW Field Implementation Committee



June 20, 1994

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List of Acronyms

- dbh - Diameter at Breast Height, a standard measure of tree size.
- DNR - Washington Department of Natural Resources
- DOE - Washington Department of Ecology
- FIC - Field Implementation Committee, a Timber/Fish/Wildlife Committee reviewing the implementation of new forest practice regulations and procedures.
- FPA - Forest Practice Application, a regulatory requirement for specific forest practice activities on state and private forest lands which is administered by DNR.
- HPA - Hydraulic Project Approval, a regulatory requirement for all mechanical and construction activity within the ordinary high water marks in Washington State.
- ID Team - Inter-Disciplinary Team, a team of specialists called from state agencies, tribes and landowner interests to review a specific and craft solutions to difficult Forest Practice situations.
- NTC - Notice to comply, an enforcement action taken by DNR foresters to correct inappropriate forest practices.
- OHWM - Ordinary High Water Mark, the inside edge of a RMZ.
- RLA - Riparian Leave Area, a buffer strip of trees along type 4 and 5 streams sometimes required as part of an FPA permit.
- RMZ - Riparian Management Zone, a required buffer strip along type 1, 2 and 3 subject to regulatory restrictions operations and harvest.
- SSS - Shoreline of Statewide Significance - A designation for extra wide riparian buffers required by the State Shorelines Act administered by the Department of Ecology.
- SWO - Stop Work Order, an enforcement action used by DNR foresters to stop ongoing forest practice violations.
- UMA - Upland Management Area, a unharvested cluster of trees reserved for wildlife. UMAs sometimes overlap RMZs.
- WDF - Washington Department of Fisheries
- WDW - Washington Department of Wildlife

Acknowledgements

Completion of this survey is a reflection of the strength of the TFW Field Implementation Committee and the dedication of its active members and chairs. Mark Hunter's (WDF) contributions to this team effort are most noteworthy.

We are much obliged to Scott Hall and Dave Whipple (WDW) for development of a survey form capturing all of the necessary compliance data for riparian zone regulations. Thanks are also due Mark Hunter, Roger Ramsdell (DNR) and Bob Conrad (NWIFC) for the population sampling protocols and determining the statistical requirements for the population of forest practice applications sampled.

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Introduction

The TFW Field Implementation Committee (FIC) was asked by the Administration Committee (Admin) to do a Riparian Management Zone (RMZ) Survey to answer three questions:

1. What is the level of compliance with the 1988 forest practice requirements for RMZs?
2. What is the nature and extent of violations?
3. To what extent are RMZs affected by blowdown?

The first two questions arose from the 1991 FIC Compliance Survey which left some unanswered questions regarding the level of compliance with forest practice regulations governing harvest activities in RMZs. The broad scope and size of the 1991 survey did not allow time to walk every RMZ and determine all possible rule violations. Thus, the 1991 survey was not able to determine the level of compliance to RMZ regulations.

The third question was added to the survey objectives by the TFW Administration Committee prior to the beginning of survey field activities. The Administration Committee requested this addition because of concerns raised about the extent of blowdown by the Forest Practices Board and the TFW Policy Group.

The survey was planned and directed by FIC and field work was conducted by the participants of the TFW parties during August, September, and October 1993. Total hours invested in the survey by the participants was approximately 1200 hours.

Methodology

Statistical Methodology. The RMZ survey population was the subset of statewide FPAs that met the following three criteria:

1. Submitted or renewed between January 1, 1990 and December 31, 1991.
2. Had Type 1, 2, or 3 Water present.
3. Were Class III, III-P, or IV-S applications. Class IV-G (conversions) were not included.

The total number of FPAs that met these three criteria was 1708. FIC sampled this FPA population to determine the percentage of compliance with RMZ regulations with an accuracy of plus or minus 10% and a 95% precision level. (This means if 100 samples of a specific sample size were randomly made from the same population, the estimates from 95% of the samples would fall within plus or minus 10% of the true population value). Sample size was determined using a normal approximation to the binomial distribution, and a finite population correction factor. From this, the required sample size was determined to be 91 applications.

Initially, FIC assumed that a few sample sites would not yet be harvested, or for other reasons would have to be dropped from the sample. Thus, the initial sample size was 100 applications. In late August, it became apparent that the rate of unharvested FPAs was higher than anticipated. In order to assure meeting the sample goal of 91 sites, FIC decided to randomly sample an additional twenty FPAs.

The first sample was selected using computer software which generated random numbers, and the second sample was selected using a random numbers table. Both procedures generated random numbers between 1 and 1708. A computer listing of all 1708 FPAs in the population was sequentially numbered. By matching the randomly generated numbers to the corresponding sequential numbers, the sample FPAs were determined.

Survey Methodology. FIC developed a survey questionnaire (see Appendix A) and field compliance monitoring protocols. Field tests of the survey procedures on Eastern and Western Washington RMZs were held near Cle Elum, Washington. The questionnaire captured information from the forest practice application records as well as from actual field visits conducted by TFW volunteers according to the established protocols.

The first part of the questionnaire was to capture information provided by the applicant from the original forest practice application, such as water type, lineal feet, and method of operation.

The second part was to record DNR conditioning beyond standard regulations, HPA requirements, and any compliance or enforcement documents related to the RMZ. The remainder of the survey questionnaire required field inspections of the streams and RMZs. There was a compliance question for every forest practice regulation (1988 rules) related to RMZs. The last page was for recording visual blowdown estimates and any additional narrative comments.

TFW Admin Committee requested the blowdown survey late in this survey development process. FIC decided to keep this survey simple because of limited surveyor time. Surveyors were asked to at least make a visual estimate of blowdown following harvest, and record their estimates in broad percentage categories. Some surveyors chose to provide actual tree counts and more precise percentages.

FIC assigned one committee member to each DNR region to coordinate and supervise the survey efforts. Each regional coordinator contacted the regional DNR office to acquire a copy of each sampled application file. The regional coordinators also recruited volunteers to perform the surveys. State agencies, tribes, and forest industry representatives all donated staff time to perform these surveys. Surveyors attempted to contact landowners for access permission, directions, keys when necessary, and information as to whether the units were actually harvested.

All RMZ sites were walked to verify stream width and substrate type, determine the presence and extent of operational violations, and determine the approximate width of the RMZ. Equipment entry or damage within RMZs, harvest activity and blowdown were assessed. One survey form was completed for every Type 1,2 or 3 waters within the application harvest area. For two-sided RMZs, the examiner completed one survey form per side.

When harvest occurred within the minimum required RMZ, more extensive measurements were taken and recorded. This data included stream width, RMZ width, tree species ratio (conifer/deciduous), tree count, and dbh (diameter breast height). Snags, wildlife trees, and stumps were also counted and their diameters were recorded.

Results - Compliance Survey

Tally of Survey Activity. The following table accounts for all 120 applications that were selected for sampling. Only 94 applications were actually sampled for use in this survey. Twenty-one (21) applications could not be sampled because no harvest occurred in the vicinity of type 1, 2 or 3 waters as originally intended in the application. In most of these cases, no harvest had occurred anywhere on the application unit(s). The application files could not be retrieved for three other applications.

REGION	Sampled FPA'S	No Harvest	Lost In Archives	Otherwise Removed	TOTAL	Statewide Population
Southeast	3	0	0	0	3	45
Olympic	21	2	0	0	23	407
Central	25	3	3	2*	33	563
S.P.S.	15	8	0	0	23	209
Southwest	13	4	0	0	17	242
Northwest	12	3	0	0	15	146
Northeast	5	1	0	0	6	96
SUMMARY	94	21	3	2	120	1,708

* One site was dropped from the sample because additional harvest occurred at the site under a subsequent FPA and more recent Forest Practice regulations. The other site was dropped because it had no Type 1, 2 or 3 waters on or near the harvest site. It was miscoded in the database, causing it to be included in the sample.

Application Data Summary. The following tables summarize the data recorded in sections A, B and C of the Survey Questionnaire Form (See Appendix A). These sections contain information from the application form, and all associated documents in the application file including maps, HPAs, meeting notes and enforcement actions. It should be noted that surveyors did not always attempt to field verify the information summarized in these tables. Some notes regarding the correct length of RMZs are recorded in the notes for individual applications in Appendix B.

RMZ RELATED INFORMATION

# OF APPLS.	# OF RMZs	# of 2 Sided RMZs	Total # of RMZs in Survey	Type 1 RMZs	Type 2 RMZs	Type 3 RMZs	SURVEY DATES
94	113	36	149*	57,885 ft.*	28,230 ft.*	174,951 ft.*	7/93 - 10/93

* Two-sided RMZs were counted twice for the total number and lengths of the RMZs.

HARVEST ACRES AND METHOD of HARVEST INFORMATION

PROPOSED HARVEST ACRES	# of Appls. Harvested by TRACTOR	# of Appls. Harvested by SHOVEL	# of Appls. Harvested by CABLE	# of Appls. Harvested by SHOVEL/ CABLE	# of Appls. Harvested by SHOVEL/ TRACTOR	# of Appls. Harvested by TRACTOR/ CABLE	# of Appls. Harvested by HAND	# of Appls. Harvested by OTHER
8,595	37	11	36	3	3	2	1	1

OTHER SURVEY INFORMATION TAKEN FROM THE FOREST PRACTICES APPLICATIONS

TYPE OF REQUIREMENT	#OF OCCURRENCES	REMARKS
Hydraulics Permit Approval Requests (HPA)	10	HPA's requested by Applicants
Total # of HPA's Required	25	HPA's required by WDF or WDW
Shoreline Mgmt Act (SMA) Rules Apply	7	
Other RMZ Conditions	1	See Comment Section
HPA and SMA Rules Apply	2	
HPA, SMA and Other Conditions Required	2	
Activity within 100 feet of Typed Water	86	
Reduced Leave Tree Requirements:	8	See (a) through (d) for breakdown
a) Small Harvest Unit Exemption - (West Side)	(1)	
b) East Side Partial Cut	(3)	
c) Other Reductions in Leave Tree Requirements	(2)	
d) E. Side Small Harvest Unit Exemptions	(2)	
Temperature Sensitive Streams	2	
Known Water Rights Within 1 Mi	6	
Written Proposed Activity In RMZ	28	Includes cable over water
Proposed RMZ Activity Shown on Map but not in Application Data	4	
Were Associated Wetlands Indicated on the Written Portion of the Application	18	Of these, only 6 were shown on the Map
MAP & APPL Information Inconsistent	2	
Number of Applications With special RMZ Conditions	24	

NOTE: The information shown in the above table reflects data shown on the Approved Forest Practices Application.

RMZ RELATED ENFORCEMENT ACTIONS TAKEN ON APPLICATIONS SURVEYED

INFORMAL CONFERENCES	NOTICE TO COMPLY	STOP WORK ORDER	CITATION ISSUED
1	1	1	1

NOTE: Only one entry, representing the highest level of action taken, is shown per application found in the survey. For example the Notice to Comply listed above also included an Informal Conference, however only the Notice to Comply was recorded since the associated Informal Conference would have been mandatory.

Results - Operational Violations.

With an exception of the last question, a 'YES' response in this table indicates that a violation of Forest Practices Rules has occurred. The data below reflects the total number of applications in which the regulation was violated. It does not count multiple violations of the same regulation at each application site. The numbers in brackets [...] identified the specific survey questionnaire number. The "-0-" response means the surveyor did not respond to the question.

Section D: Operation Violations

Question From Survey Form:	YES	NO	N/A	Unknown	- 0 -
Removal or disturbance of (in bank) deadfalls, stumps or logs from within the OHWM (Ordinary High Water Mark)? [D1]	0	94	0	0	0
Harvest of trees with large roots embedded in bank from within minimum RMZ? [D2]	3	90	0	1	0
Harvest of trees with large roots embedded in bank from within the OHWM? [D2]	0	94	0	0	0
Timber felling in type 1, 2 or 3 stream, lake or pond? [D3]	5	89	0	0	0
Bucking within Type 1, 2 or 3 stream, lake or pond? [D4]	4	88	0	1	1
Damage from cable yarding in/across Type 1 - 3 Water to: [D5]					
Streambed within the minimum RMZ?	0	74	19	0	1
Stream banks within the minimum RMZ?	0	74	19	0	1
Exposed soil within the RMZ?	0	74	20	0	0
Streambed within the OHWM?	0	74	20	0	0
Stream banks within the OHWM?	0	74	19	0	1
Exposed soil within the OHWM?	0	74	20	0	0
Evidence of heavy equipment within the RMZ? [D6]	8	84	1	0	1
Evidence of Heavy Equipment within the OHWM? [D6]	3	90	1	0	0
Evidence of tractors or skidders within the OHWM? [D7]	1	89	4	0	0
Yarding Damage to more than 50% of trees left in RMZ? [D8]	0	92	1	0	1
Yarding Damage to more than 50% of trees left within the OHWM? [D8]	0	92	2	0	0
Sidecast below the 50 year flood level within the RMZ? [D9]	1	87	6	0	0
Sidecast below the 50 year flood level within the OHWM? [D9]	0	88	6	0	0
Erosion on non-water-barred RMZ skid trails? [D10]	2	76	14	2	0
Erosion on non-water-barred skid trails within the OHWM? [D10]	2	75	16	1	0
Slash disposal by means other than by hand within RMZ? [D11]	8	80	5	1	0
Slash disposal by means other than by hand within OHWM? [D11]	3	83	6	1	1
Slash disposal within the 50 year floodplain (within the RMZ)? [D12]	5	86	3	0	0
Were harvest laid out to accommodate felling and bucking without damage to RMZ? [D13] [This question does not address a specific rule. Neither 'Yes' or 'No' indicates a violation.]	82	8	3	0	1

RMZ width and tree count violations. Since tree count and RMZ width regulations are different for eastern and western Washington, survey results are shown separately. Only 8 completed surveys were from Eastern Washington. This low number of applications does not allow drawing statistically significant conclusions about compliance in Eastern Washington. This information is significant only in aggregate with statewide information. Unless otherwise indicated in the tables, an 'N' response indicates a regulatory violation. The numbers in brackets [...] identified the specific survey questionnaire number. The "-0-" response indicates that the surveyor did not respond to the question, or a response was not necessary.

Section E. Western Washington RMZ Width and Tree Count Questions

Question from Survey Form:	Yes	No	N/A	Unknown	-0-
Is there an adjacent wetlands associated with the RMZ? [E1] ('No' does not imply a violation.)	26	57	0	3	0
Is the associated wetlands included in the RMZ? [E2]	23	1	60	2	0
Does the RMZ meet minimum width requirements? [E3]	81	4	0	1	0
Does the average RMZ width exceed the maximum width requirements? [E4] ('No' does not imply a violation.)	35	40	0	11	0
Is this a no entry RMZ? [F4] ('No' does not imply a violation.) If yes, was it... Required by FPA conditions? Or... Voluntarily left by the landowner?	58 (7) (51)	28	0	0	0
If this is a no-entry RMZ was there a violation? [E6] (A 'Yes' answer implies a violation.)	0	7	0	0	79
Does the deciduous/conifer tree count ratio meet requirements? [E7]	21	5	2	0	58
Do the leave trees meet minimum size requirements? [E8]	23	3	2	0	58
If tree minimum sizes were not available were the next largest trees left? [E9]	5	0	23	0	58
Do the number of leave trees meet minimum requirements? [E10]	24	1	1	2	58
If under the small harvest unit exemption, has the 50% tree count rules been met? [E11]	2	0	26	0	58
Have the wildlife tree count requirements been met? [E12]	25	3	0	0	58
Have the wildlife tree conifer/deciduous ratio requirements been met? [E13]	22	3	3	0	58
Are at least 40% of the wildlife trees alive and undamaged? [E14]	27	1	0	0	58

Section F. Eastern Washington RMZ width and tree count violations.

Question from Survey Form:	Yes	No	N/A	-0-
Is there an adjacent wetlands associated with the RMZ? [F1] ('No' does not imply a violation.)	1	7	0	0
Is the associated wetlands included in the RMZ? [F2]	0	1	6	1
Does the minimum width RMZ meet requirements? [F3]	7	1	0	0
Is this a no entry RMZ? [F4] ('No' does not imply a violation.) If yes, was it... Required by FPA conditions? Or... Voluntarily left by the landowner?	3 (2) (1)	5	0	0
If this is a conditioned no-entry RMZ, was this condition violated? [F5] (A 'Yes' answer implies a violation.)	2	0	0	6
Were all trees 12" or less in dbh left? [F6]	3	2	0	3
Were all non-hazardous snags left? [F7]	5	0	0	3
Were 16 conifers/acre 12-20" dbh distributed by size and representative of stand left after harvest? [F8]	5	0	0	3
Have 3 live conifers/acre $\geq$ 20" and 2 live deciduous trees/acre $\geq$ 16" been left as leave trees? [F9]	5	0	0	3
If deciduous trees and 2 snags/acre $\geq$ 20" do not exist: were 2 live conifers/acre $\geq$ 20" substituted? [F10]	1	0	4	3
If 2 live conifers/acre $\geq$ 20" do not exist; were the 5 largest live conifers/acre substituted? [F11]	0	0	5	3
Were 3 live deciduous trees/acre 12-16" dbh left where they exist? [F12]	1	0	4	3
For Boulder/Bedrock Streams - were 75 trees/acre $\geq$ 4" dbh left? [F13]	0	0	2	6
For Gravel/Cobble Streams - were 135 trees/acre $\geq$ 4" dbh left? [F14]	5	0	0	3
For Ponds/Lakes - were 75 trees/acre $\geq$ 4" dbh left? [F15]	0	0	2	6
Were 50% of the leave trees live and undamaged? [F16]	5	0	0	3
If $\geq$ 10% of harvest unit lies within the RMZ of a Type 1, 2 or 3 Water and either the harvest unit is a clearcut of $\leq$ 30 acres or is a partial cut $\leq$ 80 acres, are $\geq$ 50% of the trees remaining after harvest? [F17]	0	0	5	3

Narrative Summary of Violations. Total number of applications with 1988 Forest Practices RMZ rule violations was 20. Five of eight Eastern Washington sites had violations and 15 of 86 Western Washington sites had violations. Violations were characterized as minor, significant and major. Minor violations involved one or two improper actions that, in the opinion of the surveyors, had little or no potential for damage to public resources. Compliance actions would normally be handled with an informal conference by a forester. **Seven survey sites had minor violations.**

Significant violations involved multiple improper actions or a significant deviation from procedures, and usually had moderate potential for damage to public resources. Significant violations would normally warrant a formal enforcement action by foresters such as a notice to comply or stop work order and sometimes minor corrective actions. **Nine violations were considered significant.**

Major violations had a high potential for damage to public resources. They normally involve multiple improper actions over an extensive area, and warranted higher level enforcement actions by foresters, such as stop work orders, corrective actions or civil penalties. **Four violations were determined to be major.** Only one of these four applications had enforcement actions. Another site with major violations had an informal conference.

Identification of violations does not automatically imply that the operator and/or landowner is the responsible party. At some sites, surveyors noted that the improper activity appeared to have occurred before or after the activity described in the FPA. One of the major violations may have been a case of timber theft. This survey makes no systematic attempt to determine who committed violations or when they were committed, although some surveyors recorded observations to that effect.

A site by site narrative of each Forest Practices violation is presented in Appendix B.

Compliance with HPA Regulations.

An Hydraulic Project Approval (HPA) is required whenever construction activity occurs within the Ordinary High Water Mark (OHWM) of a stream. An HPA is not required for every FPA. The FPA form used by landowners during the time of this survey granted the applicant the opportunity to request an HPA. Likewise, foresters had the opportunity to recommend an HPA. Copies of the FPA are routed to WDF or WDW for review and conditioning by a habitat biologist. In these situations, the FPA served as a formal HPA application.

Training for this survey did not include field assessment for Hydraulic Code violations. Most surveyors had at least some prior experience in assessing HPA compliance. However, it is possible that within the sample of 94 sites, some HPA violations were not recognized.

It was easier to identify violations where HPAs were required but not issued. If the FPA permit required an HPA and the site was harvested, then an HPA should have been issued. If the HPA was not sent with the original application file to the surveyor, a call was made to the appropriate DNR office to determine whether the HPA was in the FPA file, and, if not, the WDF/WDW HPA database was searched for any reference to the FPA number.

Of the 94 FPA sites sampled, 10 applicants requested HPAs, and 25 applications were either conditioned by the forester to require an HPA or an HPA was apparently issued as a result of activity subsequent to the initial conditions established by the forester. Of these 25 FPAs conditioned to require HPAs, 5 did not have HPAs. One of these 5 probably did not need an HPA, because only one of five units listed on this application was harvested, and the surveyor could not clearly determine a reason for requiring an HPA on this unit. The remaining four sites apparently violated the condition requiring an HPA. Two of these four violations involved temporary crossings of type 4 streams, thus did not occur in the RMZ, and were not listed in the narrative of RMZ violations in Appendix B.

Of the 20 HPAs issued, the survey did not document any violations of HPA conditions. As noted above, some violations may not have been recognized as a result of survey objectives.

In addition to the 25 applications conditioned for HPAs and/or were issued HPAs, two sites should have had an HPA, but didn't. Both sites had temporary heavy equipment crossings over type 3 streams. Neither application mentioned these activities in the original FPA.

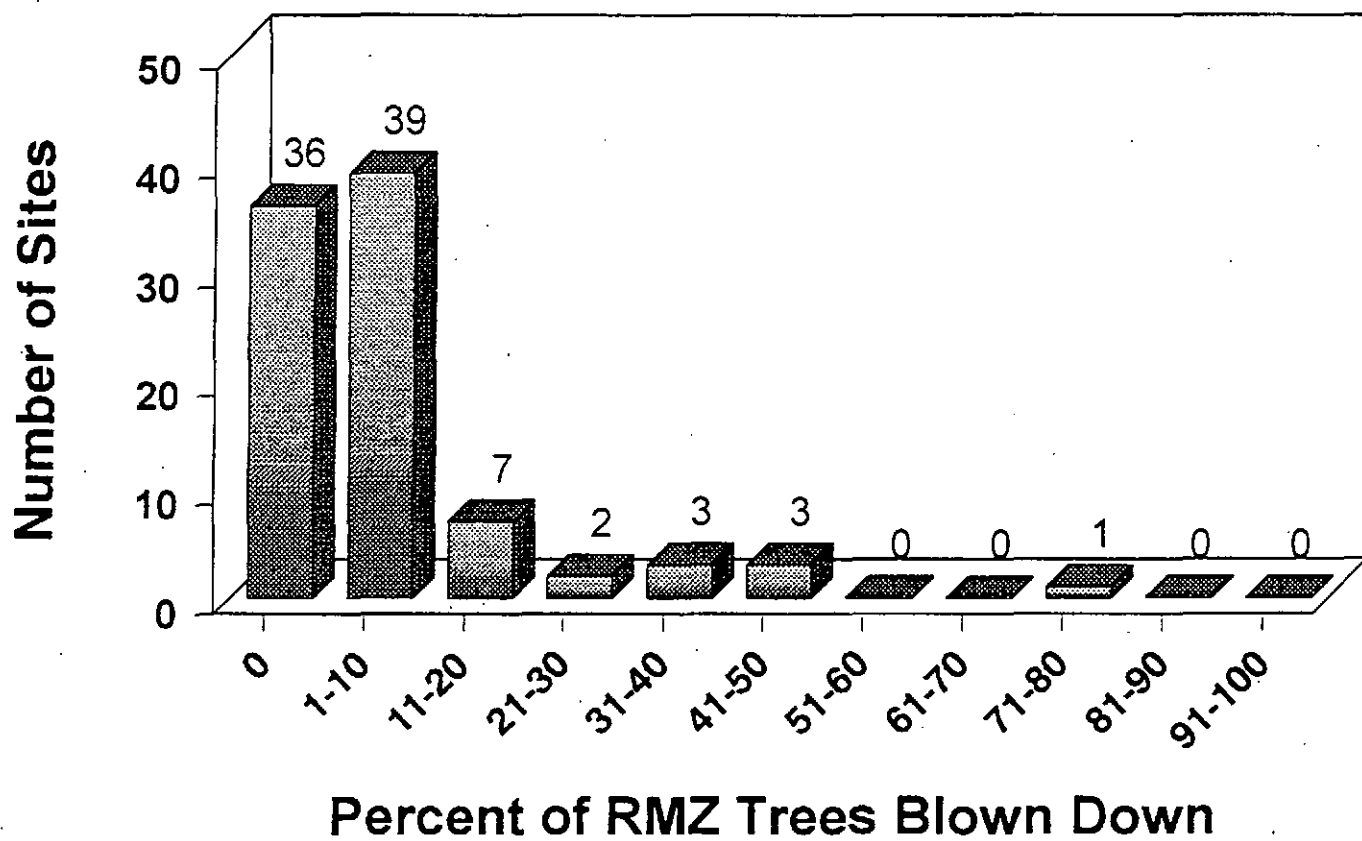
Results - Blowdown Survey.

This summary consists of an estimated amount of post harvest blowdown that has occurred within the RMZs. The blowdown at each site was recorded in 10% increments.

This blowdown survey is not a scientific study or evaluation. It is intended to help decision makers determine whether further evaluation and/or research on this subject is appropriate. Factors such as RMZ width, wind exposure, time since harvest, tree size, tree species, soil type, soil depth and recent history of significant storms could influence the rate of blowdown. No attempt was made to examine these factors.

The results of the blowdown survey are shown in Figure 1. In summary, 82% of the RMZs surveyed had 10% or less of the leave trees blown down. Only one site had more than 50% blowdown. Three of the 94 samples were not used in this blowdown summary. Two samples were recently harvested and did not meet time requirements necessary to qualify for inclusion. One sample had no information.

RMZ Blowdown Survey Results



Average RMZ Width in Excess of Minimum Requirements.

This section evaluates the average RMZ width, with special emphasis on identifying RMZ widths greater than what was required. It should be noted that actual measure of the average RMZ width was beyond the formal scope of the survey. Never the less, surveyors measured or visually estimated RMZ width at many sites. In addition, two of the questionnaire responses give an indirect perspective on the issue.

Questionnaire Responses. The survey provided two sources of information on RMZ widths. Question E4 (Does average RMZ exceed maximum width?) on the questionnaire form (Appendix A) provided some insight on the RMZ width for western Washington sites, but no numerical estimate of width. Depending on the water type and width of the stream, the 'maximum width' can be either 25', 50', 75' or 100' (See WAC 222-30-010[5c]). Under the regulations in effect for the samples in this survey, maximum widths are required only when wetlands are present, a condition present on a small portion of the RMZs. Responses to question E4 determined that of 86 western Washington samples, 35 sites exceeded the maximum width, 40 did not, and there was no response to this question for 11 sites. Thirty-five (35) of 75 sites (41%) were wider than the maximum RMZ.

Question E5 (Is this a No-Entry RMZ? If so, was it voluntary?) may provide more insight on this issue. The question asks if there was any tree harvest within the minimum RMZ of 25'. Responses to question E5 determined that 58 of 86 western Washington samples (67%) had no-entry minimum RMZs. Fifty-one (51) of the 86 samples (41%) were voluntary no-entry RMZs, which means the forester did not require a no-entry RMZ as part of the conditions.

Estimates of RMZ width. The following chart summarizes average RMZ width for 37 western Washington applications where surveyors elected to record specific width information (See Appendix C). The stream sites were separated by water type. Those sites with wetlands in the RMZ are separated because they fall under different RMZ width requirements.

RMZ width averages and estimates for western Washington.

	Type 1 waters	Type 2 waters	Type 3 waters
No Wetlands and No Entry into RMZ	200+' (site 6) 100' (site 10) 150' (site 33) 75+' (site 34) 100' (site 60)# 166' (site 66)#*	50+' (site 52) 100' (site 72)	UMA (site 12) UMA (site 15) 150' (site 18) 45' (site 24) 55' (site 29) 50+' (site 31) 88' (site 40) 40+' (site 61) 100+' (site 63) UMA (site 64) 90+' (site 74) 52' (site 81)
Average	132'	75'	81'
No Wetlands with Entry into RMZ			35' (site 37) 35' (site 43) 60' (site 48) 35' (site 50) 25+' (site 70)
Average			38'
Average **	132'	75'	68'
With Wetlands and No Entry into RMZ	100' (site 28) 300+' (site 69) UMA (site 74)	300+' (site 84)	75' (site 9) 175' (site 16)* 50+' (site 39) 100' (site 54) 160' (site 56) 50+' (site 62)
With Wetlands and with entry into the RMZ			75' (site 16)* 50' (site 66)*

* Two different RMZ zones with the same application number are listed in this table.

** Combined average of the above two categories.

+ Greater than the number given. Typically, the average width was not formally measured, but the surveyor recorded a value that represented a conservative estimate of RMZ width.

UMA Upland Management Area; These buffers are typically considerably wider than the required RMZ, and are intended meet specific wildlife habitat needs.

Identified as Shorelines of Statewide Significance (SSS), which are conditioned under DOE regulations which limits harvest to 30% of the trees within 200 ft of the OHWM. It is not clear whether all applications harvesting within SSS are identified.

Interpretation of the western Washington RMZ width data is complicated by non-random samples, mixed average and 'greater than' estimates of width, Shoreline of Statewide Significance regulations, wetlands within RMZs, and UMAs. Despite this confusion, some interpretations can be made.

Of 37 estimates of RMZ width, 25 RMZs had required minimum RMZ widths of 25' because no wetlands were present. Only five of these 25 sites had harvest within the 25' minimum RMZ. These RMZs were all Type 3 streams, and had an average width of 38 feet. There were 20 no entry RMZs with an average width of 96 feet. The average RMZ width for all 25 sites was 84 feet¹.

Average width estimates for Western Washington RMZs with wetlands cannot be interpreted in any reasonable manner. Only two of eight Eastern Washington sites had specific RMZ width information. Because of significant regulatory differences, these sites cannot be interpreted in the same manner as western Washington sites. These were both Type 3 RMZs with no wetlands and no internal harvest. Site 32 RMZ width was greater than 50 feet and over 300 feet in places. Site 44 RMZ was an average of 100 feet wide.

Summary. The available data cannot provide an estimate of the average RMZ width, nor the average RMZ width in excess of the minimum requirements. However, substantial number of RMZs are wider, often significantly wider, than required by the regulations of the Forest Practices Board.

¹ The eight 'greater than' estimates are assumed to be average estimates, and 3 UMA buffers are assumed to be 100 feet wide. Both of these are conservative assumptions. Two and possibly more of the Type 1 sites were regulated by the more stringent State Shorelines Act requirements, which permits harvest of only 30% of the trees within 200 ft of the OHWM.

Conclusions

A. Of the 94 RMZ survey sites, 74 sites (79%) had no violations, whereas 20 sites (21%) had violations. Four sites had major violations, 9 sites had significant violations and 7 sites had minor violations. Enforcement actions would have been appropriate at the thirteen sites (14%) that had significant or major violations.

B. Enforcement actions occurred at 4 of 13 (31%) sites with significant or major violations.

C. Seventeen of 94 sites (18%) had operational violations. The most common operational violations involved heavy equipment activity (D6; 8 sites) and slash disposal with means other than hand (D11; 8 sites) within the minimum RMZ. Other frequent violations were felling and bucking in type 1, 2 or 3 waters (D3 & D4), harvest of trees rooted in the stream bank (D2) and erosion of non-water-barred skid trails (D10).

D. Only 8 eastern Washington sites were sampled. Five (5) of these sites had violations. The sample size is not sufficient to draw conclusions. However, the high incidence of violations may merit further investigation.

E. 75 of 91 sites (82%) had 10% or less of the trees blown down. Only one site exceeded 50%. This blowdown survey made no attempt to examine the relationships between blowdown and RMZ width, wind exposure, time since harvest, tree size, tree species, soil type, soil depth, or recent history of significant storms.

The remaining conclusions apply only to western Washington sample sites. RMZ regulations are quite different for eastern and western Washington, thus it is impossible to address regulations such as tree counts and RMZ width in the same context:

F. Operators rarely violated any of the RMZ regulations when the minimum RMZ (25 ft) was not entered. The minimum RMZ was not entered in 58 of the 86 western Washington RMZ survey sites (67%). Violations occurred at only one of these 58 sites (2%), whereas violations occurred at 14 of 28 sites (50%) where the minimum RMZ was entered.

G. Four (4) of 86 sites (5%) violated minimum RMZ width requirements (E3).

H. Violations of RMZ leave tree requirements, which include numbers, size and conifer/deciduous ratios, occurred at 6 of 86 (7%) sites. The most frequent violations were the conifer/deciduous ratio (E7; 5 sites), followed by the minimum wildlife tree count (E12; 3 sites), and the wildlife tree conifer/deciduous ratio (E13; 3 sites).

I. Surveyors noted a wide variation in the quality of RMZs left by landowners. Although 15 of 86 sites (17%) had violations, 35 of 86 sites (41%) had average RMZ widths wider than the maximum RMZ. Maximum or greater-than maximum width RMZs are required when wetlands are present and are occasionally required to address site-specific concerns. However, maximum and greater-than maximum width RMZs are required only on a small portion of the total length of RMZs surveyed. Field notes for many sites indicated very wide no-entry RMZs. The Field Implementation Committee determined that many of the RMZs were much wider than the minimum required by Forest Practice regulations.

Future Survey Recommendations.

This survey proved to be very time consuming. The Field Implementation Committee had difficulty getting volunteers to do the field work, and maintaining a consistent interpretation of the regulations. Given cutbacks in both state agency and tribal staffs and the absence of volunteers from the environmental constituencies, future surveys should not attempt to rely on volunteers. It would be helpful to have a dedicated survey team to provide for consistent methodology and interpretation of the regulations.

Particular attention must be paid to the content and format of the survey form so it meets survey objectives, and elicits consistent responses from surveyors. Complex regulations make this difficult.

It is recommended that landowners be consulted prior to field visits to verify harvest activity and access routes.

Appendix A. Survey Questionnaire Form.

RMZ HARVEST/ACTIVITY SURVEY

draft 7/26/93 FINAL

FPA # _____ SURVEY DATE: _____ SURVEYOR: _____

SECTION A. Information from the application file

SECTION A.1. Record information from the application only. If no information is available, leave blank.

REQUESTS: ALTERNATE RMZ PLAN _____ HPA _____DATA: WATER TYPE _____ NO. UNITS _____ LINEAL FEET _____
STREAM _____ SIDES (1) or (2) _____ POND/LAKE/BAY _____WATER TYPE _____ NO. UNITS _____ LINEAL FEET _____
STREAM _____ SIDES (1) or (2) _____ POND/LAKE/BAY _____WATER TYPE _____ NO. UNITS _____ LINEAL FEET _____
STREAM _____ SIDES (1) or (2) _____ POND/LAKE/BAY _____\$9: LEGAL DESCRIPTION

(first line only, if >1 entry on FPA): SEC _____ T _____ N R _____

\$12: TYPE OF OP _____\$13: METHOD/EQUIP _____\$14A: ACRES _____\$16: RD/HVST W/IN 200' OF SH. OF STATE() SH. OF STWD. SIGN.(); INTAKES()H2O TYPE _____ ACTIVITY _____; H2O TYPE _____ ACTIVITY _____;
H2O TYPE _____ ACTIVITY _____; H2O TYPE _____ ACTIVITY _____;
H2O TYPE _____ ACTIVITY _____; H2O TYPE _____ ACTIVITY _____;
START DATE: _____ END DATE: _____PAGE 2: FPA CLASSOPERATION SUBJECT TO HPA() SHORELINE MGT. ACT() OTHER(RMZ -RELATED)()
REDUCED LV. TREES: SM. CC() E. SIDE PART.() OTHER() _____
SHADE RET. FOR TEMP. SENS.()
KNOWN/REC. WATER RIGHT W/IN 1 MI.()ENTIRE FPA OR ATTACHMENTS:

1) ANY OTHER WRITTEN MENTION OF RMZ ACTIVITY? Y N

EXPLAIN "Y" RESPONSE ON COMMENTS PAGE

Section A.2. Record information from application file maps.MAP:2) TYPED WATERS W/IN OR ADJ. TO OPS? Y N
(IF YES, AND WATERS ARE NOT SPECIFIED IN "DATA" SECTION ABOVE, ESTIMATE
DATA FROM MAP AND INCLUDE AS ADDENDUM)

3) TYPED WATER W/IN 100' OF OPS.? Y N

A) RMZ INDICATED PER "DATA" SECTION ABOVE? Y N

B) ACTIVITY "WITHIN OR ABOVE OHWM" INDICATED PER \$16 ABOVE? Y N

C) ANY ACTIVITY IN RMZ INDICATED WHICH IS NOT SPECIFIED ELSEWHERE? Y N

IF ANSWER TO 3)A OR B IS NO, EXPLAIN ON COMMENTS PAGE

IF ANSWER TO C IS YES, EXPLAIN ON COMMENTS PAGE

SECTION B. Other application file information.

1) This RMZ is EASTSIDE WESTSIDE (circle one)

2) Were there RMZ requirements different from standard regulations specified on the FPA as conditions? Y N

If yes, specify below. Pay special attention to No Entry RMZ conditions or non-standard RMZ width conditions.

3) Was a Type 4 RLA specified by applicant? Y N
Was a Type 4 RLA required as a condition? Y N

4) Is any part of the stream within the FPA listed as a temperature sensitive stream on regional database or map Y N

5) Was an HPA included with the FPA Y N
If yes, list activities completely on Comments page and/or attach portions of HPA which specify activities

6) Were wetlands associated with an RMZ indicated on written portion of FPA? Y N
On the map? Y N If yes, describe on Comments page

7) Compliance/enforcement documents related to the RMZ? Y N U X If yes, indicate the number of each ICL___ NTC___ SWO___ Cit___ Other___
Describe on Comments page

SECTION C. Determine the appropriate RMZ width.

1) Was there timber harvest activity (including yarding, other equipment activity, bucking, etc.) within the legally required RMZ . . . Y N U X

Westside Worksheet:

2) Stream Type/Average Width (circle one):

Type 1/2 $\geq$ 75' Type 1/2 $<$ 75' Type 3 $\geq$ 5' Type 3 $<$ 5'

3) Streambed (circle one): Boulder/Bedrock Gravel/Cobble $\leq$ 10"

Consult DNR greenbook (p. 34) to determine Standard RMZ Width. Go to question 6.

Eastside Worksheet:

4) Adjacent harvest unit type (circle one) PARTIAL CUT OTHER CUT

5) Width of RMZ required by FP rules: _____

Partial Cut: minimum 30', maximum 50'

Other Cut: minimum 30', maximum 300', average 50'

6) Enter standard RMZ width in feet. _____

7) Final RMZ width: enter special conditions for RMZ width as noted in Section B2. If none, enter standard width. _____.

SECTION D. Identify Operational Violations.

Response key: Y = YES, NOT COVERED BY HPA OR FPA CONDITIONS (VIOLATION)
 C = COVERED BY CONDITIONS IN THE FPA OR HPA
 N = NO, U = UNKNOWN, X = NOT APPLICABLE

With each "Y" response below, estimate or count number of occurrences and approximate extent of violation and record as a comment in Section H (e.g., Length of RMZ disturbed, distance of zone sidecast into, etc.). Avoid subject descriptions such as "poor", "slight", "severe", "negligible" etc. Multiple responses to the questions below are possible (e.g., 5 "covered" entries into the RMZ and 1 "yes [i.e., violation]" entry). PROPER DOCUMENTATION AND TALLIES FOR EACH TYPE OF RESPONSE ARE IMPORTANT.

	<u>W/IN MIN. RMZ</u>	<u>W/IN OHWM</u>
1) Deadfall, stump, log, root (in bank) disturbance or removal		Y C N U X
2) Harvest of trees w/large roots embedded in bank	Y C N U X	Y C N U X
3) Falling in stream/lake/pond		Y C N U X
4) Bucking/limbing between banks		Y C N U X
5) Damage from cable yarding in/across Type 1-3 on:		
Streambed	Y C N U X	Y C N U X
Banks	Y C N U X	Y C N U X
RMZ (exposed soil)	Y C N U X	Y C N U X
6) Evidence of heavy equipment in RMZ	Y C N U X	Y C N U X
7) Tractor/wheeled skidders in stream		Y C N U X
8) Yarding damage to > 50% of the trees (all ages)	Y C N U X	Y C N U X
9) Sidecast below the 50-year flood level	Y C N U X	Y C N U X
10) Erosion on non-water-barred RMZ skid trails	Y C N U X	Y C N U X
11) Slash disposal by means other than by hand (burning, heavy equipment, etc.)	Y C N U X	Y C N U X
12) Slash disposal into the 50-year flood level	Y C N U X	Y C N U X
13) Were harvest units laid out to accommodate felling and bucking without damage to RMZ?	Y C N U X	

SECTION E. RMZ Width and tree count violations: Westside only.

Response key: Y = YES, NOT COVERED BY HPA OR FPA CONDITIONS (VIOLATION)
 N = NO, U = UNKNOWN, X = NOT APPLICABLE

If there is a YES response, please describe the violation in Section G.
 Be specific: use tree counts, ratios, width measurements and other numbers. Please attach your tree count work sheet to this form when you are done.

***** RMZ Width *****

- | | | |
|----|---|---------|
| 1) | Adjacent wetland (swamp, bog, marsh, pond) | Y N U X |
| 2) | Is the wetland included in RMZ? | Y N U X |
| 3) | Does minimum width of RMZ meet requirements? | Y N U X |
| 4) | Does average RMZ exceed maximum width? | Y N U X |
| 5) | Is this a 'No Entry' RMZ? Circle One: | |
| | NO | |
| | YES, Conditional (should be listed in section C2) | |
| | YES, Voluntary (no apparent harvest or operations in RMZ) | |

IF the answer is NO, go to question 7. If 'YES, conditional', answer question 6 only, then go to next page. If 'YES, voluntary', go to Section G.

- | | | |
|----|------------------------------------|---------|
| 6) | Were No Entry conditions violated? | Y N U X |
|----|------------------------------------|---------|

***** Leave Trees *****

- | | | |
|-----|--|---------|
| 7) | Does conifer:deciduous ratio meet requirements? | Y N U X |
| 8) | Do leave trees meet minimum size requirements? | Y N U X |
| 9) | If tree size minimums were not available, were the next largest trees left? | Y N U X |
| 10) | Do number of leave trees meet minimum requirements? | Y N U X |
| 11) | If $\geq 10\%$ of the unit lies w/in RMZ and the unit is a clearcut of ≤ 30 acres, are $\geq 50\%$ of the above leave trees left? | Y N U X |

***** Wildlife Trees *****

- | | | |
|-----|--|---------|
| 12) | Are 5 undisturbed/uncut wildlife trees/acre left? | Y N U X |
| 13) | Are the wildlife trees in conifer:deciduous ratio of 1:1 | Y N U X |
| 14) | At least 40% of wildlife trees live and undamaged | Y N U X |

SECTION F RMZ Width and tree count violations: Eastside only.

Response key: Y = YES, NOT COVERED BY HPA OR FPA CONDITIONS (VIOLATION)
 N = NO, U = UNKNOWN, X = NOT APPLICABLE

If there is a YES response, please describe the violation in Comments Section. Be specific: use tree counts, ratios, width measurements and other numbers. Please attach your tree count worksheet to the application when you are done.

***** RMZ Width *****

- 1) Adjacent wetland (swamp, bog, marsh, pond) Y N U X
- 2) Is the wetland included in RMZ? Y N U X
- 3) Does width of RMZ meet requirements? Y N U X
- 4) Is this a 'No Entry' RMZ? Circle One:
 NO
 YES, Conditional (should be listed in section C2)
 YES, Voluntary (no apparent harvest or operations in RMZ)

IF the answer is NO, go to question 6. If 'YES, conditional', answer question 5 only, then go to next section. If 'YES, voluntary', go to next section.

- 5) Were 'No Entry' conditions violated? Y N U X

***** Leave and Wildlife Tree Requirements*****

- 6) All trees ≤ 12 " dbh Y N U X
- 7) All snags remaining (those not posing a hazard) Y N U X
- 8) 16 conifers/acre 12-20" dbh distributed by size and
 representative of the stand Y N U X
- 9) 3 live conifers/acre ≥ 20 " dbh and 2 live deciduous
 trees/acre ≥ 16 " Y N U X
- 10) If deciduous trees and 2 snags/acre ≥ 20 " do not exist;
 2 live conifers/acre ≥ 20 " substituted Y N U X
- 11) If 2 live conifers/acre ≥ 20 " do not exist;
 the 5 largest live conifers/acre substituted Y N U X
- 12) 3 live deciduous trees/acre 12-16" dbh where they exist Y N U X

Eastside minimum leave tree requirements per acre (those listed above are included in the below requirements:

STREAM SUBSTRATE

- 13) BOULDER/BEDROCK 75 trees/acre ≥ 4 " dbh Y N U X
- 14) GRAVEL/COBBLE 135 trees/acre ≥ 4 " dbh Y N U X
 (< 10" diam)
- 15) LAKES/PONDS 75 trees/acre ≥ 4 " dbh Y N U X

SECTION F. Continued.

- 16) At least 50% of leave trees live and undamaged Y N U X
- 17) If $\geq 10\%$ of harvest unit lies w/in RMZ of Type 1,2,3, & either the
harvest unit is a clearcut of ≤ 30 acres or is a partial cut of ≤ 80
acres, are $\geq 50\%$ of the trees remaining Y N U X

SECTION G. Blowdown Survey.

Estimate the percentage of trees in the RMZ blown down using the tree counts from section E or F. This requires you to make the distinction between standing and downed trees while you are tallying them. If you have a 'No Entry' RMZ, please make a visual estimate of the percentage of the RMZ that blew down after harvest. Please assess the entire length of the RMZ when you do this.

- 1) Mark the appropriate Percentile range below.

0% blowdown _____

1% to 10% blowdown _____

11% to 20% blowdown _____

21% to 30% blowdown _____

31% to 40% blowdown _____

41% to 50% blowdown _____

51% to 60% blowdown _____

61% to 70% blowdown _____

71% to 80% blowdown _____

81% to 90% blowdown _____

91% to 100% blowdown _____

- 2) What type of survey did you do? Circle one.

Visual Estimate

Actual Count

SECTION H: COMMENTS PAGE

Please reference the question you are commenting on and try to use quantitative descriptions rather than subjective descriptions.

For an example;

Section E.9. Only 3 wildlife trees per acre.

Appendix B. Site-Specific Narrative of Violations.

Appendix B. Site-Specific Narrative of Violations.

The notes below give a site-by-site detail of all the violations. The notes list the multiple-choice questionnaire responses that indicate a violation, and elaborate on the nature and extent of the violation. The surveyors were requested to make quantitative notes of the violations they saw, thus there should be notes associated with every violation. In every case where notes were absent and a questionnaire response indicated a violation, the surveyors were contacted to determine if the questionnaire response was appropriate and, if so, document the extent of the violation in the best manner possible from recollection.

The total lengths of RMZs are given to provide a sense of perspective. The lengths are either estimated (i.e., from the application form) or actual (hip chain measure). Two-sided RMZs are doubled for the total length. Lengths are useful to give a sense of perspective on frequency of violations. In other words, a single violation on a 100' RMZ is a greater concern than the same violation on a much longer RMZ.

The narratives of violations were extracted from unabridged narratives in appendix C. Since the full narrative for individual sites may contain additional information of interest, you may want to read them.

WESTSIDE

Survey Site 9. Violations characterized as minor.

Estimated length - 5000'

Questionnaire responses indicating violations: D6

Notes: Cat tracks at one point only (about 22' from ordinary high water) out of 1800' RMZ (very minor damage).

Survey Site 14. Violation characterized as minor.

Questionnaire response indicating violations. D2.

Estimated length - 2000'

Question D.2. Harvest of two blowdown trees that fell on a pile of bucked logs. These trees were rooted in the bank. This is a marginal violation call. If the operator had called the DNR forester prior to taking action, he would have been given immediate permission to remove the blowdown.

Survey Site 15. Violations characterized as significant

Questionnaire Responses indicating violations. D3, E8.

Estimated length - 1900'

Question D.3. [Zone B] Three trees felled into creek at one site. May have occurred after harvest.

Question E.8. [Zone B] In the opinion of the surveyors, both foresters experienced with state regulations, the site was obviously in violation of leave tree size requirements. No tree counts were actually taken.

Survey Site 16. Violations characterized as major.

Estimated length - 7000'

Questionnaire responses indicating violations:

D3, D4, D6, D7, D10, D11, D12, E7, E12, E13, E14

Notes: [All violations cited below were in Zone C, an undocumented RMZ.]

Question D.3. Two large conifers felled into stream.

Question D.4. Two large conifers bucked and limbed in stream.

Question D.6. Tracked machine, probably shovel, crossed stream in one location exposing much mineral soil sloping directly into stream with no water bars or restoration work. No vegetative cover to protect soil.

Question D.7. Tracked machine operated inside RMZ for 100' stretch sitting on bucked up chunks and slash probably placed under it tracks. No trees hardwood or conifer were left adjacent to stream along this stretch although several stumps present. Very serious violation.

Question D.10. Some erosion on short naked grade where shovel crossed creek and no vegetation or cover to hold soil in place. Fairly flat ground with very short grade down to stream of about 20', not much erosion.

Question D.11. Slash was machine piled into RMZ in the area where shovel entered and worked along 100' stretch only.

Question D.12. Same area as D.11.

Question E.7. In a 400' stretch 2 sided only one conifer tree was left standing and it was less than 12" dbh. Six conifer stumps were found within 25' of stream, several 3' and larger in diameter (douglas fir). In the total 1000' 2 sided RMZ along the east fork there were over 12 large conifer stumps within 25'.

Question E.12. All of the largest conifer and hardwoods were cut within 25' of stream on both sides. The largest leave trees were hardwoods about 12" - 15" size. Several conifer stumps in RMZ over 40" and hardwood stumps over 24".

Question E.13. No conifer wildlife trees left.

Question E.14. No wildlife trees were left.

Survey Site 19. Violations were characterized as significant.

Questionnaire Responses indicating violations. D2,D3,E3,E7,E12,E13
Estimated length - 2500'

Question D.2. One tree was harvested with roots embedded in the bank.

Question D.3. One tree felled into stream.

Question E.3. See notes below.

Question E.7., E.12. and E.13. Selective removal of large conifers such that conifer/deciduous ratio requirements and wildlife tree requirements were obviously violated. No actual tree count made, both surveyors were foresters experienced with state regulations and were comfortable with the call.

Survey Site 24. Violations characterized as significant.

Questionnaire responses indicating violations: B7,D11,E3

Actual length - 1532'

Question B.7. [Zone C] Stop work order, notice to comply, and deviation from approved application issued 1/10/92. Harvest of more than 30% of trees inside of 200' RMZ. Additional leave trees were required outside of 200' to compensate for overharvest within 200'.

Question D.11. [Zone B] One incident of mechanical slash piling within 25' of stream. 20' by 10' by 5' high.

Question E.3. [Zone C] Stop work order noted above documents violation of 200' RMZ required under Dept of Ecology's Shoreline of Statewide Significance.

Survey Site 28. Violations characterized as significant.

Questionnaire responses indicating violations: B2(condition violation),C1. Estimated length - 1300'

Notes. Cables were hung across this type 1 stream without an HPA. This is a violation of one of the conditions, but did not appear to result in much damage to RMZ trees in the 3 spots where lines were hung out of 1300'.

Survey Site 37. Violations characterized as major.

Questionnaire responses indicating violations: D6, D10, E3, E7, E8, E12, E13
Actual length - 2900'

Question D.6. Skid trail cut into 55% slope enters RMZ for about 50' and then loops back out within about 10' of high water mark = deeply cut into hill, much raw soil exposed and gullies evident in skid trail where much erosion has occurred with no water bars. Erosion gullies enter directly into stream. Very bad blatant violation.

Question D.10. See comment for Question D.6.

Question E.3. RMZ = 10' wide where skid trail enters.

Question E.7. Of 53 leave trees only 3 were conifer.

Question E.8. See comments for Question E.3.

Question E.12. One of the 2 large conifer stumps needed to be left for wildlife. There might have been more conifer stumps in the RMZ, but too many himalayan blackberries to know for sure.

Question E.13. Two of largest conifers removed, 26" and 28" dbh stumps within 12' and 16' of high water mark. Only 3 other conifers left in RMZ about 4", 6" and 12" in size.

Note: HPA required to install T4 culvert. None issued.

Survey Site 43. Violations characterized as minor.

Questionnaire responses indicating violations: D3, D4

Estimated length - 3600'

Question D.3. & 4. Bucking and limbing at one point in RMZ, presumably to remove portions of one large maple tree which accidentally fell into RMZ and in the creek. Bucked portions small enough to move by hand had been left on either side above the OHWM. About 5 trees with bucked ends presumably slid down the steep hillside into the RMZ, but did not enter stream and were not removed from RMZ.

Survey Site 48. Violations characterized as significant.

Questionnaire responses indicating violations: D6, D11, E7, E8

Actual length - 3600'

Question D.6. [Zone A] Skidder, either tractor or cat, was used in RMZ parallel to stream for about 50' to remove two large cedar trees about 5' in diameter, about 15 and 20' from the stream. The area was cleared with a blade and the slash and some soil was pushed into the RMZ within 15' of stream. No water bars were left where skid trail climbed back up adjacent 40% slope.

Question D.11. [Zone A] See above.

Question E.7. [Zone A] The total count for 1,100' was 16 conifer >12" and 13 hardwoods >12" which is at least 2 conifer short of meeting a 2:1 ratio of trees >12" totaling at least 25 trees/1000' for this boulder/bedrock type 3 stream. Six large conifer stumps in 1100' of RMZ 25 trees >12" in 1st 1000'. [i.e., Conifers were available to meet tree count. [Zone B] Ratio of conifer/hardwoods = 6/13 for the trees >12" diameter. many older <12" were also left in the RMZ. 2 large cedar trees 5' diameter size class were removed. [i.e., conifer/deciduous ratio violated.]

Question E.8. [Zone B] The total of 19 trees for 1,100' of RMZ >12" diameter does not meet the 25 required for a boulder bedrock type 3 stream.

Survey Site 49. Violations characterized as significant.

Actual length - 3100'

Questionnaire responses indicating violations: D4,D9,D11

Question D.4. 20' section where limbs from a blowdown cedar were cut and discarded into stream. Appears to have happened after the harvest operation.

Question D.9. & D.11. Slash and gravel dumped into the 25' RMZ zone. Appears to be associated gravel mining/disposal area on cut site, not necessarily associated with harvest operation. Violations appear to be recent. Disposal site was parallel to RMZ, and within 25' RMZ for 90', average height 15'. (8+00 flag)

Survey Site 66. Violations characterized as significant.

Questionnaire responses indicating violations: B2(HPA required but not submitted),D6,D11,D12

Actual length - 13,500'

Question D.6. [Zone A] Apparent crossing used by heavy equipment 900' from the upstream boundary of Bright's Creek. It is not clear whether a bridge was installed or not. Erosion damage did not appear extensive. No HPA applied for.

Question D.11.&12. [Zone A] Mechanical slash piling right at the water's edge. Same place as stream crossing noted above. 12' of stream bank covered, and extending to the 25' RMZ boundary.

Survey Site 70. Violations characterized as significant.

Questionnaire responses indicating violations: B2(condition violation--no HPA)

Estimated length - 2600'

Notes: There were two openings to cross the stream to log on the other side. There was no mention of this or of an HPA.

Survey Site 81. Violations characterized as major.

Questionnaire responses indicating violations:

D6,D11,D12,E2,E3,E7,E10

Estimated length - 3530'

[all violations occurred in Zone A]

Question D.6. Severe and extensive soil disturbance throughout RMZ. approx. 300' of major soil disturbance within 25' of OHWM, about 800' of severe soil disturbance between 25' to 50'. Deep rutting in wetlands at one location (10' x 15' area). Most of this damage appears to be related slash piling and fire trail construction.

Question D.11. Three slash disposal piles within RMZ.

1) located right on the stream bank (0' from OHWM) 15' long x 20' wide x 6' high.

2) 10' from OHWM, 20' x 10'.

3) Slash disposal into RMZ-associated wetlands. 10' x 20'.

Question D.12. See remarks for D.11. All these slash piles were within 50 year flood level.

Question E.2. Several RMZ associated wetlands were left without any buffers. at 280', a wetlands area was cut off, including approx. 15 trees around edge of wetlands and one tree within wetlands. Also deep rutting from heavy equipment within wetlands. Wetlands started at 25' from OHWM and extended to 65' from OHWM. 15' wide, and 40' long. At 2050', a RMZ associated forested wetlands was completely cut, included 15 trees within wetlands, and 20 trees within the buffer zone. 15' to 30' wide, extending from bank to 90' from OHWM. At 1250', a minor slash pile disposed into a marsh grass-type wetlands. Tree buffer appeared to be adequate.

Question E.3. As noted above, there are several incidences of slash disposal within 25' and nearly 300' of soil disturbance activity within 25' from heavy equipment. many trees were harvested within 25'.
 Question E.7. Leave trees were at least 75% deciduous. There were substantial stretches of RMZ with nothing but alder. Some evidence of selective cutting for conifer within RMZ.
 Question E.10. Leave tree requirement is 100 trees per 1000' of RMZ. Only 194 trees were left in 3000' of RMZ, or 64.7 trees per 1000'.

Survey Site 86. Violation is characterized as minor.
 Questionnaire Responses indicating violations. D6.
 Estimated length - 100'

Question D.6. There was about 50' of skid trail within the RMZ, coming as close as 15 to 20' from the OHWM. There was soil disturbance, however it is unlikely that it will run-off into the river.

EASTSIDE

Survey Site 2. Violations characterized as major.
 Questionnaire responses indicating violations: B2 (no-entry condition violation), F5.
 Estimated length - 11,280'
 Question F.5. Informal conference dated 8/30/90 established the following conditions: Will not remove the trees from the RMZ, and will contact DNR prior to entry. Because of cutting under FPA #4741, all trees should have been left to meet leave tree requirements. 20 to 25 large trees were removed from Knowles Creek RMZ without notifying DNR. Thus, both conditions were violated.

Survey Site 3. Violations characterized as minor.
 Questionnaire responses indicating violations: D6, D11, D12
 Estimated length - 7800'
 Question D.6. Dozer use as tail hold for high lead yarder, minimal disturbance
 Question D.11&12. Part of one landing was within the 30' required RMZ. Part of one large slash pile also within 30' RMZ / damage was minimal, if any.

Survey Site 4. Violations characterized as minor.
 Questionnaire Responses indicating violations: D11, F6.
 Estimated length - 2600'
 Question D.11. Upper RMZ on north side of creek seems to have been burned from slash control operations.
 Question F.6. Some 6" dbh trees were cut in RMZ. We cannot determine when these were cut. Possibly a thinning action.

Survey Site 26. Violations characterized as minor.
 Questionnaire responses indicating violations: D2, F6
 Actual length - 2812'
 Question D.2. One large hemlock felled that had roots embedded in stream bank.
 Question F.6. Some trees less than 12" were cut.

Survey Site 32. Violations characterized as significant.
 Questionnaire responses indicating violations: B2 (no-entry condition violation), D3, D4, D12, F5.
 Actual length - 1300'

Question D3 & D4. Three trees felled and bucked within the high water mark.

Question D12. One mechanical slash pile within 50 year flood line.

Question F5. Application was conditioned for a 50' [no-entry] RMZ. Only violation occurred at RMZ entry point. Some trees were cut that may have been safety concerns as they are on the county road right of way.

Appendix C. Full Listing of Field Notes.

Appendix C. Full Listing of Field Notes.

This appendix is a summary of all notes recorded on the RMZ survey forms. These notes include specific details of violations, problems and concerns about the application, tree counts, blowdown counts, limitations to observations, and remarks that reflect the personal or professional interests of the surveyor. Occasionally, the comments were edited to provide clarification of what the surveyor intended to say, in which case the inserted comments were placed in brackets []. Routine editing and sequencing of the comments were made without brackets.

Survey Site Number 1

Section A.1. Specifically written in "no equipment in water or normal high water mark" on page 1. Type 1 water RMZ is noted on application, type 3 water RMZ is not noted.

General Notes: One page of conditions which refer to shoreline management act. This was a low-harvest setting. 10 mbf[?] on 25 acres. There was no harvest in the RMZ, but the RMZ isn't much to look at. In its natural condition, it doesn't meet the minimum leave tree size or distribution requirements, but that's not because they cut too much. There was an abundance of old rusted car bodies, refrigerators, and other discarded objects.

Survey Site Number 2

Question F.5. Informal conference dated 8/30/90 established the following conditions: Will not remove the trees from the RMZ, and will contact DNR prior to entry. Because of cutting under FPA #4741, all trees should have been left to meet leave tree requirements. 20 to 25 large trees were removed from Knowles Creek RMZ without notifying DNR. Thus, both conditions were violated.

General Notes. Kinney Creek RMZ wider than required, averaging 50 to 60'. No entry on either side. Approximately six entries made into both sides of Knowles Creek RMZ, south of access road in SE1/4SW1/4. Trees removed only, no equipment. A functional RMZ remained. Note, prior entries were made into RMZs along both creeks.

Survey Site Number 3

Question B.2. 50' no entry RMZ, 75' no entry RMZ on original FPA.

Question D.6. Dozer use as tail hold for high lead yarder, minimal disturbance

Question D.11&12. One landing (portion of) was within the 30' required RMZ. Part of one large slash pile also within 30' RMZ / damage was minimal, if any.

General Notes. The RMZ had been logged prior to this application with hardwoods and some conifer left.

Survey Site Number 4

Question D.11. Upper RMZ on north side of creek seems to have been burned for slash control operations.

Question F.6. Some 6" dbh trees were cut in RMZ. We cannot determine when these were cut. Possibly a thinning action.

Survey Site Number 5

General Notes: This application was a renewal, thus classed as a class 2. The original FPA was classed as a type IIIP. ID team was called to examine stream typing.

HPA Conditions. The HPA allows the hanging of cables across the stream only. All line-whip debris shall be removed from the stream prior to or concurrent with each yarding road change. cables shall be hung through or over the RMZ leave trees; no trees shall be removed. Bridge install - this project shall be accomplished in a manner that does not cause a detrimental amount of sediment to enter the stream. Any bank excavation shall be isolated from the stream. The sills shall be placed outside the ordinary high water zone of the stream. The bridge shall be surfaced in a manner that does not allow earthen material (mud, dirt, etc.) to fall into the stream. The downed tree on the left bank of the bridge site shall remain in place with its top attached. The rootwad may be removed and the tree can serve as the left-bank sill log.

Survey Site Number 6

Question A.1. Harvest unit adjacent to Pacific Ocean and Queets River, both shorelines of statewide significance.

General Notes: Measured zone in two areas where it looked the narrowest. 300+ feet to Pacific Ocean. 200+ feet to Queets River overflow channel, longer distance to river. Harvest unit contains numerous leave trees, all large conifer. Unit exceeds state regulations. No visible harvest occurred within 200' of the river. Quinault Indian Nation reserved right to condition RMZ width and other details.

Survey Site Number 7

Question A. Type 3 waters not harvested; Question A.1.4.A. Logged area estimated at 20 acres although FPA claimed 5 acres. Timber near type 3 streams was not harvest.

General Notes. Site had not been reforested at the time of the survey. Minimal wild seeding with lots of competition from brush and grass.

Survey Site Number 8

Question B.3. Type 4 and 5 protection stipulated in minutes of ID team. Not replanted as conditions required. Type 4 Ryas left on unit.

Question E.5. No cut provision for RMZ outlined during ID team.

General Notes. This harvest unit required extensive oversight by forest practice forester and cooperators to insure compliance during harvest. site not reforested at time of visit. No [replanted?] trees observed. Type 4 and 5 water protected from equipment. All merchantable timber removed.

Survey Site Number 9

Question A.2.3.B. No activity indicated on map and no felling or yarding found in RMZ on type 3.

Question D. Cat tracks at one point only (about 22' from ordinary high water) out of 1800' RMZ (very minor damage).

Question G. No blowdown. This RMZ is sheltered in deep draw.

General Notes. [Notes Documented RMZ] Actual RMZ width = about 30' no cut for 400' both sides. and 125' - 150' no cut for the remainder of 1800' unit (1 side). (1400' of this unit was one-sided RMZ and the remainder was two-sided). Much beaver activity and non forested wetland area in longer one sided part of unit. Beaver have not left many trees close to stream. Most trees are close to outer portion of RMZ. no trees cut within RMZ. [Notes concerning undocumented RMZ] This no-entry RMZ was at least 1400' long, one sided and averaged about 100' wide. This RMZ not listed on cover sheet. the 1800' RMZ in sec. 17 was logged, but the 2 units in section 7 were never logged. I guess the 400' and 700' RMZ's listed on the cover page refer to section 7.

Survey Site Number 10

General Notes. Zone width ranges from ~ 50' to ~ 150'. Only minimal harvest within this area.

Survey Site Number 11

Question A.1. Riparian protection required on type 4 & 5 water; Harvest not completed near type 4 water.

Survey Site Number 12

General Notes. Large RMZ with adjacent UMA.

Survey Site Number 13

Question A.2.2. Additional 1660' type 5 water.

Question B.5. [List of HPA conditions] Work in the stream shall be restricted to the placement of cable tailholds across the stream and the riparian management zone (RMZ). No transport of logs over the stream shall occur. No yarding logs through or felling in the stream is authorized. the yarding cable shall be strategically placed at such locations and of sufficient height to minimize stream crossing corridors and to avoid crossing over spawning riffles during the period october 1 to June 1. When changing tailholds, the cable shall be moved around the vegetation and trees in the RMZ. All logging debris entering the stream as a result of line whip shall be removed within eight (8) hours of its entry.

General Notes: Zone has > 90 standing trees with only 2 deciduous.

Survey Site Number 14

General Notes. FPA states "addition to FP-02-10152". This application covers 1 side of the stream. The opposite side was logged under a different application.

Question D.2. Harvest of two blowdown trees that fell on a pile of bucked logs. These trees were rooted in the bank. This is a marginal violation call. If the operator had called the DNR forester prior to taking action, he would have been given immediate permission to remove the blowdown.

Survey Site Number 15

Question A.2.1. [Zone A] This application treated as a class 2 forest practice since it was a renewal. Original application was a class IIIP forest practices.

Question B.6. [Zone A] Adjacent UMA protects wetlands.

Question D.3. [Zone B] Three trees felled into creek at one site. May have occurred after harvest.

Question E.4. [Zone A] Width of zone exceeds regulations if adjacent UMA is included.

Question E.8. [Zone B] In the opinion of the surveyors, both foresters experienced with state regulations, the site was obviously in violation of leave tree size requirements. No tree counts were actually taken.

Question E.13. [Zone B] All wildlife trees are conifer. Only 2 deciduous trees observed in zone. [i.e., there was no violation because there were no deciduous trees available.]

General Notes. [Zone C] No 2 sided type 3 RMZ observed.

Survey Site Number 16

[All violations cited below were in Zone C, an undocumented RMZ.]

Question D.3. Two large conifers felled into stream.

Question D.4. Two large conifers bucked and limbed in stream.

Question D.6. Tracked machine, probably shovel, crossed stream in one location exposing much mineral soil sloping directly into stream with no water bars or restoration work. No vegetative cover to protect soil.

Question D.7. Tracked machine operated inside RMZ for 100' stretch sitting on bucked up chunks and slash probably placed under it tracks. No trees hardwood or conifer were left adjacent to stream along this stretch although several stumps present. Very serious violation.

Question D.10. Some erosion on short naked grade where shovel crossed creek and no vegetation or cover to hold soil in place. Fairly flat ground with very short grade down to stream of about 20', not much erosion.

Question D.11. Slash was machine piled into RMZ in the area where shovel entered and worked along 100' stretch only.

Question D.12. Same area as Question D.11.

Question E.7. In a 400' stretch 2 sided only one conifer trees was left standing and it was less than 12" dbh. Six conifer stumps were found within 25' of stream, several 3' and larger in diameter (douglas fir). In the total 1000' 2 sided RMZ along the east fork there were over 12 large conifer stumps within 25'. **Question E.12.** All of the largest conifer and hardwoods were cut within 25' of stream on both sides. The largest leave trees were hardwoods about 12" - 15" size. Several conifer stumps in RMZ over 40" and hardwood stumps over 24".

Question E.13. No conifer wildlife trees left.

Question E.14. No wildlife trees were left.

Question G.4. [Zone A] 42 trees broken off or blown down out of an estimated 600 total trees. Most of these (35 out of 42) were broken off by the wind. [Zone C] 4 Conifers and 8 alders blew down. 12 alder broke off from the wind and the 21% counts the wind broken trees as well.

General Notes. [Zone A] RMZ = 40' - 110' wide, average ~75'.

[Zone B] RMZ = 100' - 300' wide, average 175'.

Survey Site Number 17

Question B.7. Notice to comply related to forest road standards included with FPA. Forest practice forester was positive that a second NTC was issued related to operations within type 3 water, and the RMZ, but was unable to get a hold of it.

General Notes. This application was for cedar salvage within a plantation. Timber age on the site was 15 - 20 years old. This site may not be a proper site since timber was not harvested adjacent to the stream on this application. Thought should be given to eliminating this selection.

Survey Site Number 18

General Notes. Average RMZ width about 150'. 100' at narrowest point. Steep 80% slope to creek was not entered at all.

Survey Site Number 19

General Notes. Tree count close to minimum with some trees removed within 25' of stream. All trees not counted. Site not reforested at time of visit. Will have lots of competition from brush and grass.
Question D.2. One tree was harvested with roots embedded in the bank.
Question D.3. One tree felled into stream.

Question E.7. and E.12. Selective removal of large conifers such that conifer/deciduous ratio requirements and wildlife tree requirements were obviously violated. No actual tree count made, both surveyors were foresters experienced with state regulations and were comfortable with the call.

Survey Site Number 20

Question A.1.1. RMZ mentioned in ID team minutes.

General Notes. ID team minutes addressed RMZ. This RMZ required extensive pre-harvest attention by the forest practice forester and TFW cooperators to ensure protection of public resources within the harvest unit. Map included with FPA has been modified to reflect changes in water typing, and harvest plan resulting from this review.
 [Identical comments for zones B and C]

Survey Site Number 21

Question A.1.1. Conditions to prevent disturbed soil from entering flowing water.

Question B.3. Type 5 stream addressed by conditions requiring yarding away or suspension. Type 5 stream buffered by RLA which was not mentioned in FPA.

Survey Site Number 22

General Notes. Only 3 trees (conifer) were removed from the RMZ. Zone width exceeds minimum widths at all other points. Northern portion of RMZ exceeds maximum RMZ widths. Conifer tree count 66, snags 9, new windthrow 5, stumps 3, wildlife 3. Deciduous tree count 108, snags 11, new windthrow 6. 3 marked wildlife trees in north part of unit, 2 at 16" and 1 at 12".

Survey Site Number 23

General Notes. Unit designated for clearcut harvest not harvested at time of survey. Thinning area consisted of harvest along road, and selected shovel roads into the timber to harvest selected trees and access cedar for salvage. No operations closer than 50' - 100' from the water. Consider deleting this FPA from the sample since little or no timber harvest occurred adjacent to the type 3 water.

Survey Site Number 24

Question A.1. [Zone C - undocumented RMZ] Stop work order notes a type 1+ water RMZ that was undocumented in application.

Question A.2.A. [Zone C] This RMZ site was undocumented in application. Map indicates the cut to be well removed from the river.

Question B.6. [Zone A&B] The possibility of type 3 wetlands was mentioned but not positively identified.

Question B.7. [Zone C] Stop work order, notice to comply, and deviation from approved application issued 1/10/92. Harvest within 200' of state scenic river and cutting more than 30% of trees inside of 200' RMZ. Additional trees leave trees were required outside of 200' to compensate for overharvest within 200'

Question C.11. [Zone B] One incident of mechanical slash piling within 25' of stream. 20' by 10' by 5' high. Average RMZ width was approx 40' to 50' wide.

Question E.3. [Zone C] Stop work order noted above clearly documents violation of 200' RMZ required under Dept of Ecology's State Shorelines Act. 100' RMZ may have been violated, however extensive bank cutting may have occurred since harvest, making it difficult to determine the OHWM line at the time of harvest.

Survey Site Number 25

Question B.6. [Zone B&C] Wetlands outlined on map are within RMZ area.

General Notes. [Zone B&C] Stream width difficult to classify. Mixed stream/pond live area. No flow in upper reach during sample. Area wet and contains water during winter. Only harvest within 25' of stream was along road corridor.

HPA Conditions. The culverts shall be placed on the natural streambed at the inlet and outlet. road fill within the ordinary high water zone of the stream shall consist of clean gravel or shot rock only. The culverts shall be of sufficient size to adequately pass flows to the 25 year flood level. The culverts and road fill shall be removed before the expiration of this approval. If the stream is not dry, then all work in the stream channel shall be isolated from the flowing stream by pumping or piping the stream flow around the construction site and returning the flow directly into the natural stream channel. Log culvert: The culvert shall be placed on the natural streambed at the inlet and outlet. Logs shall be placed in the stream channel over the culvert and up to the level of the stream banks. The culverts shall be of sufficient size to adequately pass flows to the 25 year flood level. The culverts, and logs shall be removed by the expiration of this permit.

Survey Site Number 26

Question D.2. One large hemlock felled that had roots embedded in stream bank. 3 segments surveyed.

Question F.6. Some trees less than 12" were cut.

General Notes. [Tree Count] Camp Creek #1, left side, 522', 30 trees cut, 107 remain. Camp Creek #2, right side, 634', 44 trees cut, 159 trees left. 1. Pend Orielle #1, 249', 8 trees cut, 23 remain. Camp Creek average width 6', cedar/white pine/hemlock zone, pretty creek, a lot of seds [sediment?] present in substrate probably due to the county road nearby. Visual sighting of fish.

Survey Site Number 27

Question A.2.3.C. No removals from RMZ specified on map page.
(written right next to RMZ on the map).

Question E.7. There were very few conifer within 25', but no evidence that any were cut. Thus, there was no violation.

General Notes. Cables were hung across this type 1 stream without an HPA. This is a violation of one of the conditions, but did not appear to result in much damage to RMZ trees in the 3 spots where lines were hung out of 1300'. The percentage of blowdown includes mostly wind broken alder. Only 8 of 176 trees in RMZ actually blew over.

Survey Site Number 28

Question B.6. Map indicated an untyped stream immediately outside the cut boundary about 500' long. This was a RMZ associated wetlands and probably a type 3 water that would require a RMZ. about 100' of this occurred within the type 1 waters RMZ, and 400' ran parallel and just outside the border of the cut, and off the property.

General Notes. The 30% harvest with the 200' buffer, as requirement as a 'shoreline of the state' was violated by our count (29 large trees standing, 23 large stumps). The operator appeared to have made a 100' no cut zone along river, and clearcut everything from 100' to 200'. Never-the-less, some very outstanding timber value was left standing.

Survey Site Number 29

General Notes. Average width about 55' on both sides. More blowdown on west side. Blowdown about 5%.

Survey Site Number 30

Question B.6. Wetland along RMZ shown on map. unit is a selective harvest and probably should be deleted from the data set. Only 19% of the standing timber was harvested.

Survey Site Number 31

General Notes. I found one large tree harvested within 50' in the entire 1213' RMZ. No other entry.

Survey Site Number 32

Question D3 & D4. Three trees felled and bucked within the high water mark.

Question D12. One mechanical slash pile within 50 year flood line.

General Notes. Application was conditioned for a 50' RMZ. Only violation occurred at RMZ entry point. Some trees were cut that may have been safety concerns as they are on the county road right of way. Final RMZ width is much wider than required, 300+ feet in some areas. Stream flows in a draw bottom. No harvest beyond edge of draw.

Survey Site Number 33

Question A. Known water right within 1 mile. Proposed hydropower project for Racehorse Creek. Not yet built, not in proposed area, nor is it downstream from proposed area.

Question G. Blowdown was not applicable because harvest did not occur until June 1993. No opportunity for winter storms.

General Notes. Combined RMZ-UMA to address bald eagle roosting concerns. The result was a no-cut RMZ considerably wider than 100'. Made two RMZ width measurements; 145', 170'. These were typical of the buffer. Unit 3 was harvested in June 1993. Unit 2 also shows a combined RMZ-UMA, however timber harvest had not started. Harvest was in progress on unit 1, which didn't have an RMZ.

Survey Site Number 34

Question A.1. Map marks 100' no cut RMZ.

General Notes. Actual RMZ is substantially less than 100' in a number of places, however it averaged greater than 75'. A very healthy buffer for a stream suffering from coarse sediment aggradation from an upstream source.

Survey Site Number 35

Question A.3.A. FPA shows 1300' type 3 stream, 700' type 2 stream and about 600' type 3.

General Notes. We couldn't find the type 5 stream that divided the RMZ into type 2 & 3. For the lack of better definition, I assumed the type 3 started at 1000', where a bedrock cascade started. Even with this stringent assumption, no violations found. Harvest occurred within the maximum RMZ only in the first 200'. The other 1300' was a no entry RMZ.

Survey Site Number 36

Question A.2.3.B. Temporary bridge or stream crossing location not shown on map.

Question B. FPA class is listed as 4 general, but landowner does not intend to convert, or develop, and does intend to reforest according to his application. Therefore I would assume that this is a class 3 application and was not properly classified. Also, HPA was not checked even though it was obvious that landowner intended to use a temporary bridge based on his mention of bridge in section 16 of FPA form.

Survey Site Number 37

Question A.2.1. Type 4 RMZ shown on map and noted in remarks on the map page of the application. Type 3 RMZ was only harvest on one side, average width about 35', varied from 10-50' wide.

Question D.6. Skid trail cut into 55% slope enters RMZ for about 50' and then loops back out within about 10' of high water mark = deeply cut into hill, much raw soil exposed and gullies evident in skid trail where much erosion has occurred with no water bars. Erosion gullies enter directly into stream. Very bad blatant violation.

Question D.10. See comment for Question D.6.

Question E.3. RMZ = 10' wide where skid trail enters.

Question E.7. Of 53 leave trees only 3 were conifer.

Question E.8. See comments for Question E.3.

Question E.12. One of the 2 large conifer stumps needed to be left for wildlife. There might have been more conifer stumps in the RMZ, but too many Himalayan blackberries to know for sure. Question.

Question E.13. Two of largest conifers removed, 26" and 28" dbh stumps within 12' and 16' of high water mark. Only 3 other conifers left in RMZ about 4", 6" and 12" in size.

Question G. blowdown = 9.4% (5/53) (includes wind broken alder trees).

Note: HPA required to install T4 culvert. None issued.

Survey Site Number 38

Question A.2.3. RMZ on left bank was ~5000' long. RMZ on right bank was ~8000' long. they apparently decided not to harvest a narrow wedge of land that required a bridge for access.

Question. E.7. There were very few conifers in the RMZ. There was no evidence conifers were harvested.

Survey Site Number 39

Question A.2.3. Two type 4 waters running through or adjacent to property. **Question A.3.** Actual RMZ length measured at 1637'. Average RMZ width greatly exceeded the 50' maximum RMZ buffer.

Question A.3.3.A. Map shows 1300' type 3, not 1000'.

Survey Site Number 40

Question B.5. An HPA was required for two bridges across type 4 streams. Could not find any evidence that an HPA was submitted.

General Notes. A voluntary no cut RMZ substantially wider than 25' (average 75' to 100') was present.

Survey Site Number 41

General Notes. As near as I could tell, only three large cedars were harvested; all are just outside the 75' maximum RMZ. This was primarily a gravel mine operation.

Survey Site Number 42

Question A.1. Map page states that will be over 200' from RMZ on western most unit of 4 units shown.

Question A.3.B. Felling and skidding in type 4 not shown. No type 4 water shown on water type map.

Question G. Blowdown was broken alder. No trees actually blown over.

General Notes. Actual RMZ was only about 500' long and was one-sided not two-sided. Units were not drawn in the right location on the FPA map.

Survey Site Number 43

Question A.2.3.A. RMZ not shown on map

Question A.2.3.B. Not indicated on map.

Question D.3. & 4. Bucking and limbing at one point in RMZ, presumably to remove portions of one large maple tree which accidentally fell into RMZ and in the creek. bucked portions small enough to move by hand had been left on either side above the ordinary high water mark. About 5 trees with bucked ends presumably slid down the steep hillside into the RMZ, but did not enter stream and were not removed from RMZ.

General Notes. RMZ did not have any stumps. Much older logging had not left any large trees near the stream and the RMZ was mostly second growth hardwoods. RMZ was about 35' wide average ranging from 30' to 50', very similar on both sides. Both sides were quite similar and

there were not intentional violations and no trees were cut within 30' either side of stream, so I do not see any need to treat the 2 sides differently.

Survey Site Number 44

Question G. Approximately 30% blowdown along stream.

General Notes. RMZ marked with blue paint. All leave trees within RMZ marked with blue paint. 1) RMZ = 2 acres ~ 1350' long x 100' wide (both sides of stream) 461 trees counted / 3 acres = 154 trees/acres ave. 1 deciduous tree 2' diameter left. None taken. Many red cedar snags left.

Survey Site Number 45

General Notes. RMZ ribboned with candy stripped ribbon intervisible approx distance from stream 25'. Total of 10 trees taken = 4 left side and 6 east side (right). Closest tree taken 20' left side and 24' right side. This place blessed with brush. Cow parsnips 9' tall. Bracken fern 6' tall. Snowberry 4' tall.

Survey Site Number 46

Question A.1.2. Reduced live trees: (other) Notify wildlife or fisheries before operation in or across type 4.

Question A.2.1. No entry RMZ written on map page only.

Survey Site Number 47

Question A.1 FPA info. deficiencies: 1) RMZ length was 550' long, not 200' 2) there was a flowing untyped stream (probably 4) at the downstream edge of the RMZ.

Question G. Blowdown not applicable because harvest occurred in June or July 1993. There were not opportunities for winter storms to cause blowdown.

General Notes. Harvest occurred in June of July 1993, more than 1 year after expiration date. DNR NW office has no evidence of a reissue of the FPA. There was an untyped stream, probably type 4, at the downstream edge of the RMZ. There was felling and bucking across a 20' section of this untyped stream, with slash discarded into the stream. Apparent wildlife enhancement project at site, a one acre wetland pond was present: The site is not part of the forest steward program.

Survey Site Number 48

Question D.6. [Zone A] Skidder, either tractor or cat, was used in RMZ parallel to stream for about 50' to remove two large cedar trees about 5' in diameter, about 15 and 20' from the stream. The area was cleared with a blade and the slash and some soil was pushed into the RMZ within 15' of stream. No water bars were left where skid trail climbed back up adjacent 40% slope.

Question D.11. [Zone A] See above.

Question E.5. Two large conifer trees removed within 25' of stream.

Question E.7. [Zone A] The total count for 1,100' was 16 conifer >12" and 13 hardwoods >12" which is at least 2 conifer short of meeting a 2:1 ratio of trees >12" totaling at least 25 trees/1000' for this boulder/bedrock type 3 stream. Six large conifer stumps in 1100' of RMZ 25 trees >12" in 1st 1000'. [i.e., Conifers were available to

meet tree count. [Zone B] Ratio of conifer/hardwoods = 6/13 for the trees >12" diameter. many older <12" were also left in the RMZ. [i.e., conifer/deciduous ratio violated.]

Question E.8. [Zone B] The total of 19 trees for 1,100' of RMZ >12" diameter does not meet the 25 required for a boulder bedrock type 3 stream.

Question E.10. [Zone B] 2 large cedar trees 5' diameter size class were removed.

Question G. [Zone B] All broken alder trees - top 1/2 or more broken off. 2) 8 out of about 165 trees).

General Notes. [Zone A] The average RMZ width was about 60' with plenty of alder in the 6" - 12" class, but very few hardwoods or conifer >12". Old logging removed most of the larger trees. This harvest did not remove any hardwoods within 25', but did remove 6 large conifer, mostly cedar, 3 of these over 60" in diameter. A wider, no-harvest area was left at both the upstream and downstream ends of this RMZ. The total length of RMZ was actually about 1800' not 2400'.

Survey Site Number 49

Question A.3. FPA indicated 900' type 1. Map indicated 1100' type 3 (2 sided) and 900' type 1. Actual, 400' type 1, 1500 type 3.

Conditions state that type 5 upgrade to type 3 occurred. (juvenile salmon present throughout stream - upgrade well justified).

Question D.4. 20' section where limbs from a blowdown cedar were cut and discarded into stream. Appears to have happened after the harvest operation.

Question D.9. & 11. slash and gravel dumped into the 25' RMZ zone. Appears to be associated gravel mining/disposal area on cut site, not necessarily associated with cut. Violations appear to be recent. Disposal site was parallel to RMZ, and within 25' RMZ for 90', average height 15'. (8+00 flag)

General Notes. About 1 acre of wetlands included in RMZ.

Survey Site Number 50

Question A.1.1. Written mention of RMZ on attached condition page which says HPA required to cross type 3 or remove material from.

Question A.2.3.A. Activity within OHWM mentioned in 16 was not shown on map.

General Notes. One douglas fir was harvested within 25' of stream (about 18" dbh). This RMZ was mostly conifer, was wider than required (average 35' wide) and had many more trees left than required. Cables did cross the RMZ and no HPA was present in the file for this activity, which is a violation of the HPA requirement unless WDW gave some kind of verbal OK. The RMZ was in excellent condition however and exceeded rule protection requirements.

Survey Site Number 51

Question C.1. Several trees close to the stream were jacked over to prevent falling in stream.

Question G. Many of the larger (~12") conifer leave trees blew down.

Survey Site Number 52

Question A.1.2.1. {Zone A} Cloquallum Creek designated shoreline of the state. County regulations attached.

Question A.2.3. What appears to be a type 4 stream on north side of unit is not on map, but is protected with an RMZ that meets type 3 regulations. RMZ width 25' or larger and meets tree count for 2 sided zone.

General Notes. [Zone B] RMZ was no entry and existing RMZ is from 38' to 150' wide with an average of approximately 50'.

Survey Site Number 53

Question A.2.A. Map suggests a two side RMZ of at least 300'. actual RMZ is one sided, approx 120' long.

General Notes. Only one acre of the cottonwood was harvested, not 10 acres as noted. thus, the RMZ was much more limited than the planned on the FPA.

Survey Site Number 54

Question A.2.1. Temporary culvert installation in RMZ, ...[which would normally require an] HPA from WDW, was not indicated anywhere on FPA, but the HPA was in the file and attached conditions did mention HPA would be required to cross stream. **Question A.2.3.A.** RMZ not shown on water type maps.

Question A.2.3.B. FPA mentioned felling, skidding and yarding within type 3,4, and 5 water, yet no activity was shown on the map to indicate any type 3 RMZ entry, and in fact the RMZ was never entered.

General Notes. RMZ, 40 - 160' wide to edge of associated swamp. average 100' wide - no harvest inside. RMZ about 2,200' long with only about 400' 2 sided. This 400' was much like the other side so it was not inventoried separately.

Survey Site Number 55

Question A.1. FPA states "a 100' RMZ boundary to be clearly marked prior to cutting."

Question A.2.3.A. RMZ indicated on conditions page not shown on map. Unit adjacent to Clover Creek and associated wetland. No mature timber in the RMZ: shrub/canary grass wetland species.

Survey Site Number 56

Conditions: Leave 50' RMZ along type 3 water (both sides).

General Notes. Buffer width averaged approximately 160'. Buffer representative of wetland species including Oregon Ash.

Survey Site Number 57

Question B.6. DNR water type map shows extensive stretches of wetlands, approx 1/2 of the RMZ length.

General Notes. Extensive beaver ponds.

Survey Site Number 58

Question A.1. Comments on RMZ activity "no operating shall take place when siltation to type 1,2 or 3 water would likely occur." above also applies to Question 2.A.3.B & 3.C.

Question B.6. Water type map only shows a type 2 pond and adjacent harvest site.

Survey Site Number 59

Question B.6. The RMZ consists of a chain of wooded beaver ponds.

Question G. In a 600' section 12 of 70 trees were blown over.

Survey Site Number 60

General Notes. Outstanding no-entry RMZ left with significant conifers left unharvested. It appeared to be approx 100' wide.

Survey Site Number 61

Question A.1.1. The original proposal called for both sides of stream to be harvested. The final plan calls for only one side. **Question**

A.2.3.A. Application claims 25' RMZ. Map suggests an RMZ of about 200' to 300'. Application state two sided RMZ. map suggests one sided RMZ.

Question E.4. Direct access to site was impossible, thus I could not directly measure RMZ width. From a nearby hillside, I could see enough to determine that it was a no-entry RMZ, easily 25' wide and it may have been greater than 50' wide.

General Notes. This is a small tract of land that had been harvested and sold and I was unable to contact landowner. The vicinity was heavily posted, fenced and gaged. However, I managed to get a very good view from a Weyco logging road on a high hillside nearby.

Survey Site Number 62

Question A.2. RMZ was only 430' long, not 700'.

General Notes. 50' wide no cut/entry RMZ consisting of 4' to 5' dbh Cedar, of considerable value. One of these cedars had blown over and fallen away from creek. The owner subsequently cut it up and split it for rails. It was in the 25' to 50' zone, and its utilization appear inconsequential.

Survey Site Number 63

Question A.1. Map states "variable width no cut RMZ."

General Notes. high quality no-entry RMZ. Average width probably exceeded 100'. minimum width was close to 25'. The type 2 RMZ was mostly hardwood. The type 3 RMZ had significant large conifers (70 - 120 trees) left in the RMZ.

Survey Site Number 64

Question A.2.3. Stream in center of cut was upgraded from type 4 to 3. No reason given. It is accessible to fish in the Clearwater River.

Question E.4. RMZ width greatly exceeds maximum RMZ on the right bank because of a combined RMZ - UMA area. Left bank is much narrower, but exceeds 25'.

General Notes. Stream below 6000 road showed serious fine sediment impact, probably from the road use, not from this FPA. 6000 is a main line road.

Survey Site Number 65

Question E.4. I was unable to get a hold of the landowner and the lot was heavily fenced and posted. however, I could see a solid no entry RMZ. however, I could not determine its width without trespassing.

General Notes. An apparent illegal conversion: trailer, garden and shop on site.

Survey Site Number 66

Question A.3.A. Large deviation between application and actual cut. FPA states type 1+ 0' and type 3 1320' (1 side). Map #1 type 1+ 7000' and type 3 8000' (4000 each side). Map #2 type 1+ 5500 and type 3 4000' (1 side). Actual hip chain measure type 1+ 6800' and type 3 6700' (3350 each side). The maps in the FPA file show two different cut boundaries. Map #1 shows cut on both sides of Bright's Creek, map #2 shows cutting only on south side of Bright's Creek.

Question D.6. [Zone A] Apparent crossing used by heavy equipment 900' from the upstream boundary of bright's creek. it is not clear whether a bridge was installed or not. Erosion damage did not appear extensive. No HPA applied for.

Question D.11.&12. [Zone A] Mechanical slash piling right at the water's edge. Same place as stream crossing noted above. 12' of stream bank covered, and extending to the 25' RMZ boundary.

General Notes. [Zone A] Apart from the stream crossing, and the associated slash pile, the type 3 RMZ looked good. Average RMZ width was >>50' wide. [Zone B] Outstanding no-entry RMZ for the type 1+ water. Average width, based on 21 measurements, is 166'. Easily complies with 'shoreline of statewide significance' requirements.

Survey Site Number 67

Question A.2.3. Felling timber and yarding timber occurred in type 4,5 water - not claimed on FPA.

Question A.2. 'D200' road on map incorrectly labelled.

Question B.3. No type 4 RLA on ground. Claimed on FPA, but not on map.

Question D.4. Bucked logs observed within channel are from mitigation of a dam break flood caused by a plugged culvert.

Survey Site Number 68

Question A.1. The FPA says partial cut w/60% to be removed. The only volume left was in the RMZ. The rest of the unit was clearcut.

Question B. Entire FPA or attachments #1 conditions section says to maintain RMZ along type 1 water. Also comment about meeting with representative from Pacific County to determine OHWM. HPA required as condition and as requested on FPA. The HPA not attached to FPA.

Survey Site Number 69

General Notes. Average RMZ width exceeded 300'. This RMZ included extensive forested wetlands (skunk cabbage, bigleaf maple).

Survey Site Number 70

General Notes. "maintain RMZ along type 3 water." "no removal or crossing of type 3 water without HPA." Also a comment on landowners map that non-merchantable areas would be left adjacent to RMZ. There were two openings to cross the stream to log on the other side. There was no mention of this or of an HPA. There are plenty of leave trees (the rest of the RMZ has no entry) and the RMZ is greater than minimum.

Survey Site Number 71

Question A.2.3.B. No operation within RMZ around type 3 open water wetland.

Question B.6. wetlands were not on DNR water type map. Landowner drew wetlands onto map where they existed, plus marking RMZ. **General Notes.** Only part of this application was harvested. Unit surrounding type 4 stream was upgraded to type 3 and unit was not logged. Unit where stream is type 5 was logged and mostly alder with few <6 dbh cedar RLA was left.

Survey Site Number 72

General Notes. Outstanding no-entry RMZ. Average width approx. 100'.

Survey Site Number 73

Question B.7. Compliance form attached to FPA states that fp [field review by DNR forester was] done and is okay, etc. No action necessary.

Question C. The stream within the operation is a ditch at 5' wide with steep banks. appears as if entire area was a wet meadow. Ditch may have been dug to drain area. Stagnant water setting in channel. Channel is lined on one side by 1 tree width of alders. In other areas both sides of channel may have alders. Rest of area is pasture.

Survey Site Number 74

Question A.2.A. Map shows only a one sided RMZ. The north or right bank shows no harvest. (actual RMZ length was 2700'). **General Notes.** Generous RMZ, however it was 98% deciduous to start with. What conifers were available were left; A few marketable conifers were left outside 25', and virtually no harvest within 25'. Measured RMZ length - 2700'. Right bank had only 500' of cut between road and OHWM. **Notes on downstream RMZ** - a) No blowdown b) 1500' left bank, 500' right bank. c) Deficient for wildlife conifers. The stand was overwhelming hardwood including many very large cottonwood; at least 50 30' dbh and a few >40" dbh. I couldn't find a single large conifer stump within 25' or 50'. d) RMZ width ranged from 45' to >200'. It averaged probably around 90' or greater. No cut/no entry RMZ. **Notes on upstream RMZ** - a) Minor blowdown (i.e., less than 3%) b) 1200' left bank & right bank. Right Bank RMZ had no harvest/no entry between road and stream. Average width >100'. A number of substantial conifers. Left Bank RMZ was no harvest/no entry; Thinnest area was about 40' average around 60' to 70'. In one 400' stretch, there were quite a few large conifer within 50', possible making up deficit downstream from bridge. I could find no large conifer stumps (i.e., wildlife trees) within 25' to 50'. Stream showed some light to moderate fine sediment impact. Salmonids were present. LOD, structural complexity in good shape.

Survey Site Number 75

Question A.1.2. Shorelines of the state to be protected. type 3 RMZ will be maintained.

Question A.2.3.B No activity indicated.

Question G. Blowdown in the non-indicated UMA is excessive with large hemlock and associated root wads exposing lots of bare mineral soil. It occurred well above OHWM and doesn't appear to be impacting the stream.

Survey Site Number 76

Question E.5. The timber sale map and the FPA both specify RMZ's but the water type map (FPA map) actually draws the harvest unit boundary well within the legally required RMZ. This unit is completely felled but a portion of it is yet to be logged (currently active).

Survey Site Number 77

Question A.1.2. HPA requested to tailhold across type 3 water. No HPA attached.

Survey Site Number 78

General Notes. No felling, bucking, or yarding damage caused by the 2 trees removed from RMZ. No tree count actually made. Removals from within the RMZ = 2 trees. Leave tree count in excess of requirements. The trees that were removed were small conifer.

Survey Site Number 79

Question B.6. UMA located around wetland area. application not complete. full packet may have shown them. The type 3 water was not on the original stream type map, but was identified and protected as type 3 by the landowner.

Survey Site Number 80

Question B.3. No activity mentioned in FPA.

Question G.2. Sample of entire 660' 97 total trees, 14.7 trees per 100' of RMZ.

Survey Site Number 81

Question B.5. HPA was included in file. However, it involved a set of prescriptions for suspended yarding across type 1,2 or 3 streams, an activity that did not occur at this site.

Question D.6. Severe and extensive soil disturbance throughout RMZ. approx. 300' of major soil disturbance within 25' of OHWM, about 800' of severe soil disturbance between 25' to 50'. Deep rutting in wetlands at one location (10' x 15' area). Most of this damage appears to be related slash piling and fire trail construction.

Question D.11. Three slash disposal piles within RMZ. 1) located right on the stream bank (0' from OHWM) 15' long x 20' wide x 6' high. 2) 10' from OHWM, 20' x 10'. 3) Slash disposal into wetlands within RMZ. 10' x 20'.

Question D.12. See remarks for D.11. All these slash piles were within 50 year flood level.

Question E.2. Several RMZ associated wetlands were left without any buffers. at 280', a wetlands area was cut off, including approx. 15 trees around edge of wetlands and one tree within wetlands. Also deep rutting from heavy equipment within wetlands. Wetlands started at 25' from OHWM and extended to 65' from OHWM. 15' wide, and 40' long. At 2050', a RMZ associated forested wetlands was completely cut, included 15 trees within wetlands, and 20 trees within the buffer zone. 15' to 30' wide, extending from bank to 90' from OHWM. At 1250', a minor slash pile disposed into a marsh grass-type wetlands. Tree buffer appeared to be adequate.

Question E.3. As noted above, there are several incidences of slash disposal within 25' and nearly 300' of soil disturbance activity

within 25' from heavy equipment. many trees were harvested within 25', however no evidence of selection for conifer. The RMZ flagging was less than 10' from OHWM in many places.

Question E.7. Leave trees were at least 75% deciduous. There were substantial stretches of RMZ with nothing but alder. Some evidence of selective cutting for conifer within RMZ.

Question E.10. Leave tree requirement is 100 trees per 1000' of RMZ. Only 194 trees were left in 3000' of RMZ, or 64.7 trees per 1000'.

General Notes. By far the worse RMZ in the 30 sites I had visited. The flagged RMZ was often less than 10' from the OHWM, severe soil disturbance throughout, tree count deficiency, wetland disturbance etc, etc. Much of the damage appears to be associated with post-harvest cleanup and fire trail construction. In general, the work crews were indifferent to environmental concerns. For example, there was a 40" dbh spruce tree with no market value because of large lower branches and split trunk that would have been an excellent choice for an RMZ wildlife tree. However, it was cut down, limbed and then left to rot. Several forest practices away from the RMZ also looked questionable. One positive point was a nice cluster of large spruces left at the upstream end of this RMZ. [Zone B] Despite the poor record for the adjacent type 1 RMZ under the same FPA, this [type 3] RMZ looked good. Average RMZ width was 52', no-entry.

Survey Site Number 82

Question G.2. Actual count based on 800' sample 12 trees/100' average.

General Notes. HPA attached - allows for lines across RMZ. Only harvested 1/2 or unit. RMZ actually 3100' instead of 6000'. leave trees were clumped, many natural openings along stream.

Survey Site Number 83

Question B.6. Wetland management zone delineated on FPA map (attached).

Question G. Based on 1000' sample. 158 total trees/1000'. 10 blowdowns/1000' sample.

HPA Conditions. 1. HPA attached - can hang across RMZ. 1. year-round work in this stream shall be restricted to the placement of cable tailholds across the type 3 stream, yarding logs away from the stream, and removal of incidental, limb debris from the stream. no logs may be yarded over the stream. 2. the yarding cable shall be strategically placed at such locations and of sufficient height to minimize stream crossing corridors. when changing tailholds, the cable shall be moved around the vegetation and trees within the RMZ. 3. no trees shall be felled into the stream. 4. If incidental, limb debris enters the stream as a result of this project, its removal shall occur concurrently with each change in yarding road or no later than 72 hours after its entry into the stream. Existing embedded material and live vegetation shall not be removed.

Survey Site Number 84

General Notes. The buffer around the ponds were >300' and harvest was only partial. (l.t. 20%) No reason to expect any blowdown. This site had a very high standard of forest stewardship. It had a few patches of clearcuts under 1 acre in size and selective cutting in other areas. There was no harvest near the ponds.

Survey Site Number 85

HPA Conditions. 1. Year-round work in this stream shall be restricted to the placement of cable tailholds across the type 3 stream, yarding logs away from the stream, and removal of incidental, limb debris from the stream. No logs may be yarded over the stream. 2. The yarding cable shall be strategically placed at such locations and of sufficient height to minimize stream crossing corridors. when changing tailholds, the cable shall be moved around the vegetation and trees within the RMZ. 3. No trees shall be felled into the stream. 4. If incidental, limb debris enters the stream as a result of this project, its removal shall occur concurrently with each change in yarding road or no later than 72 hours after its entry into the stream. Existing embedded material and live vegetation shall not be removed.

Survey Site Number 86

Question A. On the addendum for the renewal it was noted that any activity within the maximum RMZ was completed. This has been a light thinning so far. Mainly blowdown & cedar has been removed. Primarily maple in and near the RMZ.

Question A.3.A. RMZ not designated on map but unit boundaries do not go within the dashed line along the type 1.

Question D.6. There was about 50' of skid trail within the RMZ, coming as close as 15 to 20' from the OHWM. There was soil disturbance, however it is unlikely that it would run-off into the river.

Survey Site Number 87

Question A.3.A. RMZ was around 600', covering one side of the pond.

General Notes. Given that the OHWM are redefined as the 'mean water surface elevation' in the case of ponds, it can be safely argued that there were no trees in the 25' wide RMZ to harvest, since there was a wide marsh grass wetlands around the entire pond. Never-the-less, the forester encouraged the landowner to leave a number of trees outside to 25' margin, but inside 100'. These trees were sufficient to meet the 25 per 1000' tree count.