

**WASHINGTON STATE  
DEPARTMENT OF NATURAL RESOURCES  
FOREST PRACTICES  
COMPLIANCE MONITORING PROGRAM DESCRIPTION**

This is a dynamic document  
Revisions will reflect rule modifications, new interpretations, addition of new Forest Practices activities for assessment, and recommendations from the 2007 Technical Review Committee

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Walt Obermeyer –Revision, January 2010

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## PURPOSE

The purpose of this document is to provide the reader with an understanding of the scope of the compliance monitoring program, its purpose, organization and the knowledge needed to reference and understand current and past sampling designs. This document is revised from earlier forms to accommodate inclusion of future designs without extensive modification.

## INTRODUCTION

The Compliance Monitoring Program is an important element in the Forests and Fish Report (1999) and subsequent changes to the Forest Practices Act (chapter 76.09 RCW). In response to changes in the Act, the Forest Practices Board directed the Department of Natural Resources (DNR) to implement a compliance monitoring program. In 2006 DNR completed the original Forest Practices Compliance Monitoring Program design.

In February 2007, the Board directed the DNR Adaptive Management Program manager, Darin Cramer, to conduct a review of the Program design. Subsequently, a Technical Review Committee convened to review and suggest changes to the design. (See Appendix F for the Adaptive Management Program's report to the Forest Practices Board on this committee's recommendations.) This document contains changes in response to the Technical Review Committee's recommendations.

The Compliance Monitoring Program intends that the design contains an intensive, consistent, and repeatable field-based methodology to determine what proportion of forest practices are conducted in compliance with Washington's Forest Practices rules. It is imperative that all compliance decisions be made in the field; a field-based review offers the most insight into decision-making for forest practices program implementation, and identifying rules that are difficult to interpret training needs, and additional guidance needed in the Forest Practices Board Manual.

This document is an effort to describe all aspects of the Compliance Monitoring Program including the program structure, the sampling design, and data collection and analysis procedures. Appendices are attached for the reader's information including sample designs, Field Review protocols and forms, statistical methods, and the program's technical review as described above

## BACKGROUND

In 2000, the Legislature revised the forest practices law adopting the 1999 Forests and Fish Report. The Forest Practices Board followed in 2001 approving a comprehensive revision of the forest practices rules. (WAC 222). Forest landowners and operators are subject to these rules wherever they grow or harvest trees or conduct activities such as road building and forest-related quarry mining). The goals of these forest practices rules are to:

1. Provide a framework for compliance with the federal Endangered Species Act for aquatic and riparian-dependent species on non-federal forestlands.
2. Restore and maintain riparian habitat such that it can support a harvestable supply of fish.

3. Meet the requirements of the federal Clean Water Act for water quality on non-federal forestlands.
4. Maintain an economically viable timber industry in Washington State.

DNR field staff, forest landowners, timber owners, and operators are responsible for ensuring that ongoing forest practices are in compliance with the Forest Practices Act and forest practices rules. In order to ensure this takes place, DNR has been required to develop and implement a Compliance Monitoring Program:

*The department shall conduct compliance monitoring that addresses the following key question: “Are forest practices being conducted in compliance with the rules?” The department shall provide statistically sound, biennial compliance audits and monitoring reports to the board for consideration and support of rule and guidance analysis. Compliance monitoring shall determine whether forest practices rules are being implemented on the ground. An infrastructure to support compliance will include adequate compliance monitoring, enforcement, training, education and budget. (WAC 222-08-160(4))*

DNR developed the original Program design in 2006. A literature search to review various compliance monitoring efforts throughout the United States provided insights and ideas to implement a practical program, and it was understood that revisions and changes will take place after initial plan implementation.

The original Program was designed to 1) develop a data set that reasonably characterized the status of compliance with the 2001 rule package statewide prior to the end of the 2006/2007 biennium; and 2) achieve that goal within existing constraints of budget and allotted personnel. In addition, it was necessary to more precisely define ambiguous qualitative terminology in the rules, in order to measure compliance. For example, determine what it means to “minimize” a given impact.

Compliance consists of two components. The first is administrative compliance that asks the question, “How well does FPA documentation reflect actual conditions on the ground before and after the forest practices activities took place? The second is field compliance, which asks the question, “How well are the rules and the terms of the approved FPA being applied on the ground?” Although a few aspects of administrative compliance are be addressed, the Program focuses on field compliance. Most administrative, policy, and procedural activities are not included in the Program. By design, compliance and field audits (DNR, 2006) conducted within the Forest Practices Division’s regional jurisdictions is intended to satisfy administrative compliance evaluation. . Information on the forest practices field audit Final Work Plan is available at: <http://www.dnr.wa.gov/Search/Results.aspx?k=audits>

Efforts to establish a compliance monitoring program prior to 2006 suffered from limited resources, conflicting responsibilities, and a tendency to expand the scope of the program. This delayed actual implementation of a full-scale program until January 2006. Decisions were made to limit the scope and recognize that the following were out of the program scope.

- effectiveness monitoring
- direct water quality monitoring
- validation monitoring

- consideration as a scientifically exhaustive investigation
- consideration to cover all types of operations
- consideration as an enforcement program
- consideration as an audit of the DNR's regulatory staff
- consideration as a Cooperative Monitoring, Evaluation, and Research Committee (CMER) project

This program is now focused on providing a statistically sound determination of whether the rules are being implemented on the ground in compliance with the approved FPA and the forest practices rules; and reporting those findings to the Forest Practices Board.

There are no enforcement objectives within the Program. The program manager will, however, refer any findings of major non-compliance to the regions for enforcement consideration.

The original 2006 Program Design was developed in consultation with representatives from DNR, DOE, and WDFW. In May 2006, after internal review, it was distributed to the Forests and Fish caucuses comprised of the Conservation Caucus, Northwest Indian Fisheries Commission, Small Forest Landowners, Washington Forest Protection Association, Washington Farm Forestry Association, United States Fish and Wildlife Service, National Marine Fisheries Service, and the Washington Association of Counties. Each caucus chose a representative to collate and submit comments and suggestions. The Compliance Monitoring Program Manager together with agency representatives reviewed comments and modified the plan as necessary.

During the review process a few stakeholders wanted a detailed review of the Program by the Cooperative Monitoring, Evaluation and Research (CMER) Committee of the Adaptive Management Program. However, the Program is not a CMER project. Therefore, the Forest Practices Board approved a motion in February 2007 that required an independent technical review of the Program by four to five participants with operational monitoring experience (see description in Background). This effort was led by Darin Cramer, then Adaptive Management Program Manager; see Appendix F for results of this review.

DNR implements the Compliance Monitoring Program pursuant to WAC 222-08-160(4) and maintains a leadership position in the conduct of the Program. In response to the Technical Review Committee's recommendation, the Forest Practices Board requested a standing advisory committee be formed to propose future activities for the program, and to review and recommend program elements. The committee was formally established as the Compliance Monitoring Stakeholders Committee with a charter in August 2009. Its membership includes representatives from the Forests and Fish stakeholders having field experience.

## PROGRAM OBJECTIVES

The overall objective of the Compliance Monitoring Program is to determine the proportion of selected subsets of forest practices activities associated with approved FPAs that are in compliance with the forest practices rules in effect since July 2001. Specific elements of Program implementation are to:

1. Develop methods to streamline and maintain a cost effective compliance monitoring process.

2. Provide relevant and accurate information to the Adaptive Management Program for possible modification or clarification of the rules in order to improve compliance.
3. Identify opportunities to provide education (especially for complex rule categories) for landowners, regulators, consultants, and operators as suggested by non-compliance rates.
4. Provide information for rule and Forest Practices Board Manual revision if necessary.

**PROGRAM BUDGET**

DNR receives legislative funds to conduct compliance monitoring. Biennial pass-through funds are allocated to WDFW and DOE to assist in compliance monitoring. Outcomes and tasks outlined in inter-agency contracts include program development assistance, field participation, and review and assistance in data analysis. These tasks may change as priorities and/or special projects are established.

**PROGRAM ORGANIZATION**

The DNR Forest Practices Division is responsible for the administration of the Program and consists of a Program Manager and Field Coordinator with direct oversight and guidance by the Assistant Division Manager for Forest Practices Operations. The Program is a cooperative venture with DOE and WDFW staff.

The Compliance Monitoring Program Manager works in the Operations section of the DNR Forest Practices division and is responsible for the program development and implementation. The Compliance Monitoring Program coordinator is directed by the Program Manager and coordinates operational implementation of the program.

Program Manager	Program coordinator
<ul style="list-style-type: none"> <li>• Oversee Program development .</li> <li>• Oversee data acquisition.</li> <li>• Supervise and assist in training participating staff.</li> <li>• Assist in field protocol training.</li> <li>• Respond to intra- and inter-agency requests.</li> <li>• Assure that the project is completed on time.</li> <li>• Assume the ultimate responsibility for quality control.</li> <li>• Analyze field data to meet reporting requirements.</li> <li>• Make necessary adjustments to the Program based on end-of--year evaluations by the field assessment teams.</li> <li>• Adjust Program elements to reflect new or revised changes to the forest practices rules.</li> <li>• Adjust the Program when needed in response to the Compliance Monitoring Advisory Committee.</li> </ul>	<ul style="list-style-type: none"> <li>• Assist in designing field methods and protocols.</li> <li>• Organize and implement field training.</li> <li>• Create field notes templates in order to record field data consistently.</li> <li>• Organize interagency field teams.</li> <li>• Provide quality control, quality assurance protocols and data management.</li> <li>• Oversee and manage the FPA selection process.</li> <li>• Upon completion of the field season, conduct a post survey evaluation of the year's compliance monitoring field reviews and incorporate these comments and suggestions from the FPFs, DOE, WDFW, and tribal participants to improve the Program.</li> </ul>

DOE and WDFW will also supply experienced field staff with operational knowledge of the Forest Practices rules. They are responsible to participate in the field reviews, and contribute commentary to program documentation. As currently organized, WDFW maintains one

employee entirely dedicated the Compliance Monitoring program while DOE utilizes their region staff.

*Field Review organization*

Compliance monitoring is a DNR region performance deliverable for providing field facilitation. DNR is committed to utilizing Forest Practices Foresters (FPFs) for the compliance monitoring field assessments. It is the prerogative of each region to select the appropriate number of FPFs to complete the job.

Landowners are invited to attend field reviews and permission sought from them to allow Tribal representatives to participate.

*Review scheduling*

Compliance monitoring field reviews are scheduled to begin in late winter and end mid-autumn with an expected reduction of activity during peak fire season due to staff availability. Applications are scheduled based on their expected accessibility due to weather conditions.

DNR Region	WDFW, DOE	All
<p><u>Division</u> Be prepared to lead the review or assign to the DNR Region Designee.</p> <p>Contribute field equipment and supplies to the review activities</p> <p>Follow up to assure all field inspection records are archived</p> <p><u>Set a tone for constructive and professional discussions by team members, and make clear that time will be provided for each participant to evaluate the site and to discuss any concerns they have with the rest of the group.</u></p> <p><u>Region</u> Review the random sample FPAs for their region and determine if the forest practices activities have been completed. They will notify the Field Coordinator within 3-4 weeks of receiving their sample FPA list.</p> <p>Review the field schedule and confirm participation of DOE, WDFW and tribal participants by email or phone to confirm field dates. The goal will be to provide at least three weeks' notice and provide flexibility to avoid scheduling conflicts.</p> <p>Notify the landowner by phone</p>	<p>Respond to scheduling requests for field days in a timely manner.</p> <p>If unable to attend a scheduled field day, find a replacement from their respective agency or request a different date.</p> <p>Come prepared with at least the following field gear and supplies: Field vest, paper, pencils, permanent pen/paint pen, and loggers tape with diameter measurement, laser range finder, two way radios, etc., if available. Field forms, field notes templates, protocols and forest practices rules for reference.</p> <p>Discuss field issues with the Program Manager when clarity of the rules and protocols are uncertain.</p> <p>Complete outcomes per tasks assigned as outlined in their respective contracts.</p> <p>Submit all field notes and forms to the Forest Practices Division in a timely manner.</p>	<p>Participate in the field measurement process.</p> <p>Be versant in all the positions in the field: stream measurements, riparian measurements, tree counts, note-taking, etc. so that all team members can complete every field task. It is important to follow the Protocols and instructions from the DNR lead forester. If there are concerns over how the field work is being conducted, discuss with DNR lead and consult Protocols.</p> <p>Provide constructive discussion on the field forms. Consult the rules and participate in constructive discussion if there is disagreement about the rule in question.</p> <p>Acknowledge that the DNR FP Division lead has the final call on field procedures and answers on the field forms during Program site reviews.</p> <p>Contact the Program Field Coordinator first, then the Program Manager with any concerns. The Program Manger will consult with the DNR Operations Manager.</p>

<p>call with the date of the field review. Update online calendar to aid in scheduling field visits outside of the CMP.</p> <p>Perform the assessment surveys consistently and according to the established protocols throughout the field season.</p> <p>Assure that the FPF who approved the original FPA is available to provide site directions, logistical information, help with field measuring, and any information that may be helpful in understanding the application. However, the approving FPF will not make decisions related to compliance during the field reviews.</p> <p>Be responsible for maintaining or obtaining field notes as outlined in the Protocols during the review.</p> <p>Read and be familiar with all Compliance Monitoring Program protocols.</p> <p>Submit all field notes and forms to the Forest Practices Division in a timely manner.</p> <p>Provide constructive discussion on the field forms. Consult the rules and participate in constructive discussion if there is disagreement about the rule in question.</p>		
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*Staff Training*

DNR will conduct both classroom and field-based trainings as the primary means of assuring high-quality results and timely completion work. Training will be required of all FPFs, DOE, and WDFW participants. Tribal representatives who are interested in participating in this program will also be required to attend training. Training will stress the importance of consistent field method protocols, data collection procedures, use of field equipment, error analysis, and measuring parameters in reviewing the applications. A key topic will be maintaining the discipline to obtain consistent measurements throughout the field season, regardless of site conditions. Protocols for data collection will closely follow the methods available to landowners when designing their operations (*Protocols for Compliance Monitoring Field Reviews, DNR 2010*). Training will be scheduled as necessary and all participants are expected to demonstrate mastery of the training objectives to continue in the program.

### *Program quality control*

The following Program elements will help to maintain quality control for field reviews:

1. Assign a limited number of DNR personnel who will be dedicated to the Program.
2. Provide training in field protocol methods.
3. Ensure that DOE and WDFW provide designated representatives.
4. Provide direct oversight by ensuring that the Field Coordinator participates in at least 90% of the field reviews
5. Ensure that the Division Compliance Monitoring staff will work with the field teams on at least 95% of the FPAs to provide consistency, ongoing training, and decision making when issues arise in the field.
6. Provide a method to test protocols to achieve repeatable results overall. This will require participants from adjacent regions cross-checking a select number of FPAs. See *Protocols for Compliance Monitoring Field Reviews, DNR 2010* or more specific protocols on this topic.

## SAMPLING STRATEGY

### *Population description*

During the period from 2000 to 2006, an annual average of 6150 FPAs were submitted in Washington State. FPAs can, and often do, contain multiple activities that are subject to various rules. The term “compliance” applies to individual forest practice activities and consistency with individual rules. Thus, the target population is the set of activities conducted in the time frame being monitored. However, FPAs cannot be directly sampled because multiple activities are contained in individual FPAs, and the FPAs are not filed by activity type. Instead, FPAs must be sampled, even though the target populations consist of activities. In statistical terms, this can be thought of as cluster sampling, with each FPA consisting of a cluster of activities.

Because resources are limited, only a subset of activities is currently being monitored for compliance. The activities selected will vary based on stakeholder agreement of their importance to resource protection and the availability of reliable protocols for their evaluation. Activities sampled are described in the protocols for each sampling season.

The population of FPAs for annual field assessments will include *completed* Class III, and Class IV-Special FPAs approved or renewed within a one year period. This period begins August 1<sup>st</sup> two years prior the current sample year and ends July 31<sup>st</sup>, one year prior the current sample year. The program uses these dates as the time frame for each successive year of compliance monitoring. This consistent annual sampling period will ensure that no applications are excluded from selection due to submittal date. Also, obtaining landowner permission will not be required as these applications will be active during the field season that will expand for year round collection.

### *Quantitative objectives*

The sampling objective of this program is to estimate the proportion of forest practices activities of interest that have complied with applicable forest practices rules. An additional objective is to compare the proportions in compliance during 2008/2009 of compliant vs. non-compliant

activities of interest to those from previous biennia to determine if the compliance rate has increased or decreased during that time.

### *Sample size and allocation*

Sample size estimation is based on attaining a margin of error of +/- 5% for the statewide compliance proportion for riparian and road activities. This proportion is a combined ratio type of proportions. That is, the denominator is not fixed or known in advance. Direct estimation of sample size for this type of proportion is problematic, so the estimates here are based on some assumptions. First, we assume that the sample size estimate based on simple proportions is an adequate estimate for combined proportions. Second, we assume that the average number of road and riparian activities per FPA will be similar to that seen in the previous biennium. Using these assumptions, we first estimate the number of activities required to estimate a simple proportion with the desired precision, and then estimate the number of FPAs to sample using the average number of activities per FPA from the previous biennium.

### *Sample Selection methods and Screening*

The population to be sampled consists of FPAs containing specific activities. However, estimates of compliance apply to individual activities, rather than to FPAs. FPAs can contain numerous types of activities under each of the categories being monitored, and may contain one or more activities of each type. One of each of these forest activity types is randomly selected and assessed separately for the purposes of Compliance Monitoring field reviews. Each FPA was therefore selected at random, and each activity type that is part of the defined population of selected FPAs was analyzed for compliance.

### *Sample selection*

In order to ensure regional coverage of sampling, the FPAs are stratified by geographical region prior to sampling. DNR uses the following method for random sampling of FPAs for review within each region:

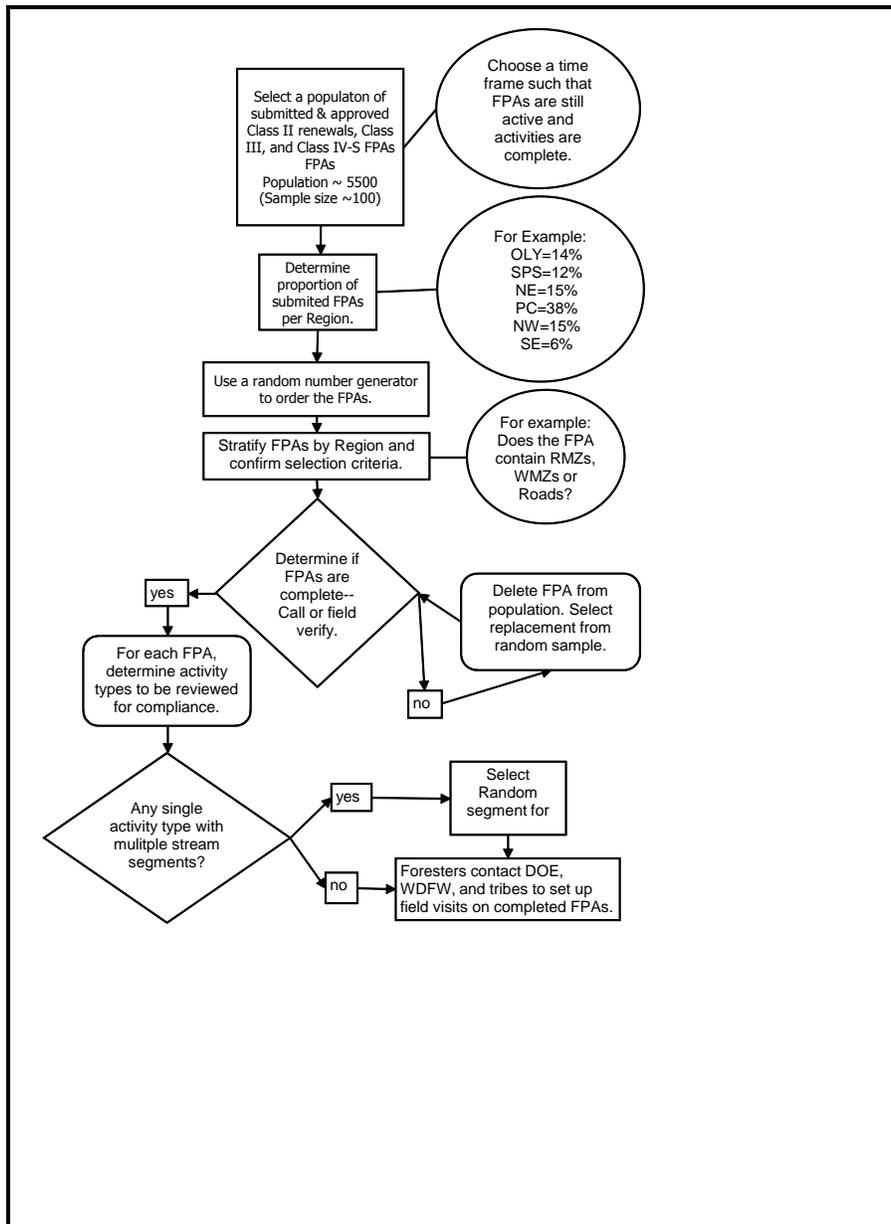
1. First, the population of FPAs approved between August 1 and July 31 of the chosen sample year is randomized using the DNR Oracle database. The FPAs are stratified by region, and a target sample size for each region is set based on a comparison of sample size calculators <http://www.surveysystem.com/sscalc.htm> and <http://www.raosoft.com/samplesize.html?nosurvey>.
2. Within each region, the randomized individual applications are opened and reviewed by the DNR Compliance Monitoring Program Manager, Field Coordinator, WDFW or DOE Compliance Monitoring participants assigned to this project. FPAs that include road and/or riparian activities are retained as part of the sample; others are removed from the population.
3. When the target sample size of FPAs fitting the population criteria is attained for each region, a list of these FPAs is sent to the region for confirmation of completed activities. FPAs for which activities are not completed are excluded from the population, and the next randomly selected FPA is chosen and submitted to the region for confirmation. This process is continued until the target sample size of completed FPAs fitting the population criteria is attained in each region.
4. The review of activity completion was conducted without the knowledge of the landowners for the 2006/2007 biennium and 2008 samples to avoid prior knowledge of

planned compliance review. In 2009 contact was made by phone to the landowner for several remote applications to determine completion for reasons of time and cost reduction. This was perceived as a possible source of bias by some stakeholders. For 2010 this practice will be avoided if at all possible. The expected protocol is as follows:

- a. The program coordinator will supply the region FP coordinator with the number of application reviews needed and a ranked list of applications. The count of highest ranked applications within the number needed for the region is considered the “first round”.
  - b. At the beginning of the sampling season the region lead will work with forest practices foresters to confirm which of the ranked FPAs are completed. Contact with the landowner about the FPA compliance monitoring selection is to be avoided.
  - c. Uncompleted applications that are in the “first round” need to be monitored by the forest practices forester to determine if they are likely to be completed within the sampling season.
  - d. For the number of applications that are not completed, select applications next down the ranked order and confirm their completion.
  - e. Scheduling of field reviews will emphasize the highest rankings earlier in the sampling cycle, providing time for the completion of the others selected in the first round.
  - f. The region Compliance Monitoring lead will notify the program coordinator if information on the application is inconsistent with ground conditions resulting in a situation where the activities the program assesses are not present.
5. Next, each FPA is examined for specific activities to be assessed. If there are multiple activity types on an FPA within a rule category (e.g., multiple riparian activity types), each activity type is assessed for compliance. Therefore, the sample size for activity compliance will not be the same as the sample size for FPAs. These sample sizes, then, are unknown prior to sampling, and will vary across activity type.
  6. There can also be multiple activities of a specific activity type (e.g., multiple stream segments with “No-Inner Zone Harvest” riparian activity) on a single FPA. In this case, only one stream segment is assessed due to personnel and resource limitations. The single stream segment to be assessed is selected at random using a standard process for stream numbering and a random number table.

Figure 1 displays a flow chart that illustrates how activities are chosen for field assessment.

Figure 1 Flow Chart of FPA selection for Compliance Monitoring field reviews.



Screening to determine if an FPA is selected is a multi-step process. First CM staff review the ordered selection to determine if the activities of interest for the sample year are present in the application. If not, the FPA is flagged as withdrawn and is no longer considered. If yes the region is asked to determine if the application is complete. The region is expected to field inspect, not call the landowner, to determine if the activities are complete. The information is returned to the program and those incomplete are flagged as withdrawn. The selected list is made available to field review team members. They are provided this opportunity to examine the documentation to evaluate if the application information is consistent with their understanding of actual conditions... If inconsistent, notify the Field Coordinator to determine if there is sufficient evidence to withdraw. Withdrawal must be due to overwhelming evidence that the activity is not present and must be documented.

Field review is the final step to determine whether an activity actually took place or not. If none of the activities in the sample strategy is present this is recorded on the form and the FPA is replaced with the next ordered application in the region sample list.

## COMPLIANCE DETERMINATIONS

According to WAC 222-08-160(4), the Compliance Monitoring Program must answer whether forest practices are being conducted in compliance with the rules and to provide statistically sound biennial audits and reports to the Forest Practices Board. This implies that the Board should receive information on compliance and non-compliance. This section summarizes the determinations that field personnel make and record during field reviews, and categories of information that the Program will report to the Board.

“Compliance” with the rules is assumed to protect public resources. However, simple “non-compliance” determinations – although they are relevant and necessary to report to the Board – do not indicate of the relative threat to public resources. There is some question as to how meaningful a compliance/non-compliance ratio can be in terms of impact to the resources. It is beyond the scope of the Program to create a methodology to accomplish reporting of impacts to public resources from levels of non-compliance, and any such considerations would overlap with effectiveness monitoring. However, the Compliance Monitoring Program has developed a subjective three-tiered “non-compliance” rating system to offer perspective to the compliance results.

### *The “compliant” determination*

“Compliant” in the context of the Compliance Monitoring Program means that a forest practice was conducted in conformance with the forest practices rules according to site-specific characteristics.

It is important to note that there can be situations where landowners are compliant with the rules associated with the site characteristics identified on the FPA, but because of a misidentification of a site characteristic, the field team must make a “non-compliance” with the rules determination.

For example, a landowner may specify in an FPA that a Type F stream less than or equal to 10 feet wide runs through the forest practices activity area and the landowner provides the RMZ width appropriate for a small stream on the ground. The FPA is selected for compliance monitoring, and the team measures the stream using the required protocols and determines the stream width is greater than 10 feet. Although the landowner was compliant with the FPA as it was approved for streams less than or equal to 10 feet, the compliance monitoring determination is “non-compliant” with the rules for that particular RMZ.

There also can be situations where landowners’ activities are more conservative than what the rules require. The landowner community has requested that these instances also be reported.

DNR, with input from other resource agencies and representatives of Forests and Fish Policy, has developed the following definition for the “compliant” category, and a definition and criteria for “exceeds.”

*The Compliant determination: The activity meets protection identified in the approved FPA and rules. Current practice of the Compliance Monitoring program reviews only those forest practice classification requiring applications. In these cases compliance is achieved only if the activity is compliant with both the application and the rules. Compliant: Meets protection identified in the approved FPA and rules.*

***Exceeds Rule:*** Landowners exceeded the protection identified in the rules for their forest practices activities. Common examples are:

For Type S or F Waters:

- Twice as many trees in the inner and outer zones of RMZs were retained as were required by rule or DFC worksheet.
- For Type S, F, or Np Waters: RMZ width is 20% greater than required by rule.-  
For Type Np Waters: No cut RMZ length is 20% greater than required by rule...
- Road improvements were more protective than required by rule.
- Road abandonment activities (e.g., mulching, distribution of trees and woody debris along road prism to deter off-road vehicle travel) were more protective than required by rule.

*The “non-compliant” determination*

*Non-compliant: Does not meet protection identified in the approved FPA and rules.*

Common examples are:

- RMZs were harvested beyond the pre-determined 5% measurement uncertainty protocol.
- Leave tree requirements were not met.
- Water-crossing structures were inadequate for stream protection standards.
- RMZ length reported on the Desired Future Condition (DFC) worksheet deviated by more than 10% from the distance measured during compliance monitoring in the field...

As indicated in the introductory portion of this section, a “non-compliant” determination is reported in absolute terms, but qualitative information derived from professional judgment in the field is also reported to the Board. After considering several ways to structure a system of reporting “non-compliant” determinations, DNR with the help of input from WDFW, developed the following categories to help field personnel use professional judgment in reporting their findings:

Non-compliant - Minor Impacts of short duration over a small area. This level of impact may be compared to the first level of DNR regulatory protocol: DNR informs the landowner, by phone or other informal means, of minor deviations from the rules. Common examples are:

- A few trees harvested in the inner or outer zone of the RMZ of beyond what the rules allow..
- Evidence of slight sediment delivery that does not appear to be persistent...

Non-compliant - Moderate Potential impacts to resources. This level of impact may be compared to the “Notice to Comply” level of DNR regulatory protocol where a landowner is informed that some mitigation is required. Common examples are:

- None of the required outer zone trees are retained.
- Culvert sizing is questionable, but potential impact to resources is not readily apparent...
- Soil stabilization activities have not occurred and there may be a potential for future impacts.

Non-compliant - Major Damage to public resources is evident or the potential for damage is high. These include situations normally referred to the DNR region for enforcement consideration. The comparative DNR regulatory protocol would likely be a Stop Work Order or possibly a Civil Penalty. Common examples are:

- Harvest in the core zone.-Harvest in areas not delineated on the FPA.
- Road construction without an FPA.

- Evidence of direct sediment delivery to typed water that appears to have been persistent.

Non-compliant - No consensus Participants cannot agree on the non-compliance level. Non-consensus is also recorded and reported to the Board.

It is important to note that these professional judgment non-compliance ratings should not be used to excuse activities that violate the rules or approved FPAs. This process helps to put some perspective rules in evaluating the environmental risk associated with the noncompliance statistics rules.

Implementing this system requires the following assumptions:

- All participants realize that this process relies on professional judgment and agree to the broad categories, and acknowledge that this process is not meant to represent any effectiveness determination.
- There will be no statistical analysis beyond the narrow scope intended. ..
- This is an educated assessment of the level of the non-compliance as it relates to the resource, not a surrogate for effectiveness monitoring.

#### *Analysis methods*

Analysis methods have consisted of random sampling of FPAs on a statewide basis using simple proportions and combined ratios depending on the annual sampling design. Descriptive statistics are used to convey the accuracy and precision of the estimates. Each sampling cycle has detailed explanation in biennial sections of this document

## DATA COLLECTION PROTOCOLS

### *ORGANIZATIONAL PROTOCOLS*

#### *Office review,*

Before embarking on field data collection, a general office review for both Eastern and Western Washington will determine which protocols to follow in the field. Part of the office review would include:

1. Obtaining FPAs (chosen at random by Forest Practices Division).
  - a. DNR Field Coordinator selecting the stream segment for review by random sampling and supplying all participants with this information
  - b. Determining if additional information for the FPA included in the file would be beneficial, such as:
    - i. Enforcement documentation,
    - ii. Water type verification forms,
    - iii. Interdisciplinary team notes, ICNs, etc.
    - iv. Additional reports.
    - v. Any adjacent FPA information that may be associated with the compliance monitoring FPA as a result of alternate plans or other set aside requirements.

2. Obtaining vicinity maps, LIDAR, and photos, including historic photos, which is particularly useful when evaluating the occurrence of channel migration on type F or S streams.
3. Examining the application to verify:
  - a. Stream lengths from map (scale from map, GIS, or orthophoto, etc.).
  - b. Site class for the segment being examined on the DNR internal Forest Practices Risk Assessment Tool\*).
  - c. If the application lies within any sensitive species areas, for example, within the Bull Trout overlay in Eastern Washington.
  - d. Harvest options used:
    - i. Determine applicable rules,
    - ii. Determine stream width,
    - iii. Inner zone width,
    - iv. Outer zone acres and required number of outer zone trees, and
    - v. Channel Migration Zone (CMZ) presence or log placement strategy used (if any).

\* FPFs will almost always utilize the Forest Practices Risk Assessment Tool, a GIS based data bank consisting of all the pertinent layers needed to review FPAs remotely.
4. If needed, contacting the local FPF who approved the FPA for assistance with any additional information they have.
5. Reviewing the RMZ field data collection form; determine types of data needed to complete the assessment.

The office review is necessary to mitigate complications which may ultimately arise. Evaluating compliance is complicated if the FPA maps are not clear, or if there is information pertaining to the application that is not included in the on-line versions of the FPA. Conducting an office review helps clear up any ambiguities or complexities of the field characteristics before going into the field so the review can proceed efficiently.

For example, riparian zones can be used to meet multiple requirements. An office review can determine the appropriate residual trees and basal area requirements in the riparian zone. All trees can be counted toward meeting the wildlife reserve trees (WRTs) and green tree recruitment (GRTs) requirements. The rules state that WRTs and GRTs left to meet other requirements of the rules shall be counted toward satisfying the requirements of this section [(WAC 222-30-020(11)(c), Wildlife reserve tree management]. Also, WAC 222-30-020(11)(e) states, "Wildlife retention trees and green recruitment retention areas may include, but are not limited to, riparian management zones, riparian leave tree areas, other regulatory leave areas, or voluntary leave areas that contain wildlife retention trees and/or green recruitment trees." While measurement of a riparian zone may indicate that enough basal area and trees per acre exist to comply with the riparian requirements, some of the residual trees may also have been counted toward green tree requirements.

Another example is that the Bull Trout Overlay in Eastern Washington requires a 75-foot shade buffer on all Type S and F streams. This element of the riparian rules will be evaluated first if applicable otherwise the rules for the various habitat types will be evaluated.

The office review is also important for the evaluation of compliance with the shade requirements, which is also subject to a general lack of precision based upon the use of a densiometer to quantify shade. It is impossible to reconstruct shade measurements once trees have been harvested. Compliance monitoring will determine if shade documentation was submitted when necessary, but the reviewer(s) will not try to replicate shade measurements.

#### *Scheduling protocol for field reviews*

1. When the list of completed FPAs is final, the regions will determine who will be the contact DNR FPFs for FPA reviews. This could be one person or many depending on the number of FPAs for review in a particular year.
2. Once step 1 is completed, the region FPF will notify the Compliance Monitoring Field Coordinator when he/she has decided on a field date.
3. The lead FPF will prioritize the FPAs for review based on geographic locations, expected time to complete assessment, and the need to minimize travel times.
4. The FPF will also email or call all other participants in his/her region - DOE, DFW, tribal representative, and landowner - with meeting location and time.
5. The timetable for field reviews will be finalized with DFW and DOE to ensure that at least one of these agency representatives attends each field assessment. However, scheduling will ultimately be at the discretion of the lead FPF... WDFW and DOE shall arrange schedules with the regional lead FPF.
6. The schedules will be sent to the Program Field Coordinator who will review and determine if there is overlap. This is necessary to ensure that WDFW and DOE participants will not be needed by two FPFs at the same time.
7. The Program Field Coordinator will establish a compliance monitoring FPA list to all participating field personnel before field season begins. The Scheduling goal is to provide at least three weeks' notice to all participants.
8. The Field Coordinator may call upon FPFs from other regions if help is needed to complete the reviews.
9. The lead FPF will notify landowners approximately one week before field assessments. Landowners are welcome to observe and answer questions, but the field team is not required to have the landowner on site during the visit.

#### *FIELD PROTOCOLS*

The methods for data collection are described in *Protocols for Compliance Monitoring Field Reviews, DNR 2010*. Separate forms for each activity within RMZs and road activities have been developed and are included in the *Western and Eastern Washington Field Forms rev 2010*. These field forms are the basis for the compliance determinations as the questions are derived from forest practices rules. Field Notes Templates are found in *Compliance Monitoring Field Note Templates, DNR 2008*. These templates provide a consistent method for recording field data.

Incidences of mistyped or unidentified streams, incorrect site class designations, incorrect tree species selection at planting, etc., will be noted but not disqualify an FPA for a compliance review.

All compliance monitoring information will be entered into an Excel database. DNR Forest Practices Division Information Technology personnel may create an Oracle database if DNR

determines it is necessary. The integration with the existing corporate Forest Practices Oracle database will allow professional technical support, greater analysis capability, and consistent biennial reporting. Available funds will decide this integration.

Data analysis will include all field observations for each activity. A summary of the questions on the forms that consistently indicate non-compliance with the rules will be reported. The analysis will also report comments on each non-compliance determination to fully understand these determinations. There is a mixture of both quantitative information generally subject to a single compliant/non-compliant decision and qualitative information that requires knowledge of a particular rule and site constraints.

1. Quantitative information includes answers to specific questions from the rules such as:
  - a. Are the core, inner and outer zone RMZ distances correct?
  - b. Did the landowner leave the appropriate RMZ width for WAC 222-30-021(1) (ii) (B) (II) Option 2?
  - c. Are the proper sizes of relief culverts installed as per WAC 222-24-020 (15)?
  - d. Were seeps and Type Np water confluences protected with the correct RMZs?
  
2. Qualitative information includes answers to questions from the rules such as:
  - a. Did the landowner outslope the road surface where practical?
  - b. Where outsloping is not practical, did they provide a ditch with a drainage structure on the inside of the road, except where roads are constructed in rock or other material not readily susceptible to erosion? (WAC 222-24-020 (17)). Such rules require a determination to what is “practical”, what is “susceptible to erosion”, and how much erosion is the “minimum”. Did the landowner make approximate determinations of the boundaries of forested wetlands greater than 3 acres [(WAC 222-30-020 (6) (e))]? Approximate boundaries and areas shall be deemed to be sufficient for harvest operations. Such approximate boundaries are commonly delineated by harvest managers using GPS points subject to considerable uncertainty, but acceptable for approximations. There is no guidance as to what approximate means; this further complicates compliance on these types of rules.
  - c. Was sediment delivery limited [(WAC 222-24-010 (2))]?

Depending upon the question, the answers could be Yes/ No/ Indeterminate/Not Applicable/ or No Consensus. All the participants on the field review will be trained in answering these questions to reduce inconsistency and bias. The following procedures will be adhered to in answering these questions:

- “Yes/No” answers will reflect consensus among all parties.
- “Not Applicable” answer will reflect that the rule question does not pertain to this particular activity.
- “Indeterminate” will reflect that the answer could not be answered with the information or information available at the time of the field visit.
- The “No Consensus” answer will reflect that there was non-concurrence in the field. When there is “No Consensus” it will be noted in the analysis and those in nonconcurrence will be provided an opportunity to document their position.

## *REPORTING*

The Compliance Monitoring Program reports to the Forest Practices Board and will provide data and summary tables that address the key question: “Are Forest Practices being conducted in compliance with the rules?” The 2006 interim report to the Forest Practices Board was presented at the February 2007 meeting and a final biennial report for 2006-2007 was presented to the Board at their May 2009 meeting . Subsequent reports will be presented to the Board after the close of each biennium.

Interpretation of findings will be minimized such that the Board may draw its conclusions from thorough, objective, and ample data sets. The reports will provide brief descriptions of the status of compliance with each rule category. In the early years of the program, statistical analyses will be limited by the amount of data available. But as more data is collected in subsequent years, more rigorous statistical comparison and analysis will be possible.

## REFERENCES

The Compliance Monitoring field forms are an integral part of the Compliance Monitoring program and can be downloaded from the Compliance Monitoring website  
<http://www.dnr.wa.gov/forestpractices/compliancemonitoring/>

Compliance Monitoring Field notes templates

These excel workbooks contain all the notes templates for completing riparian management zone compliance monitoring reviews. Field tests are currently being conducted with these templates and they may be updated after the 2007/08 field season. They can be downloaded at  
<http://www.dnr.wa.gov/forestpractices/compliancemonitoring/>

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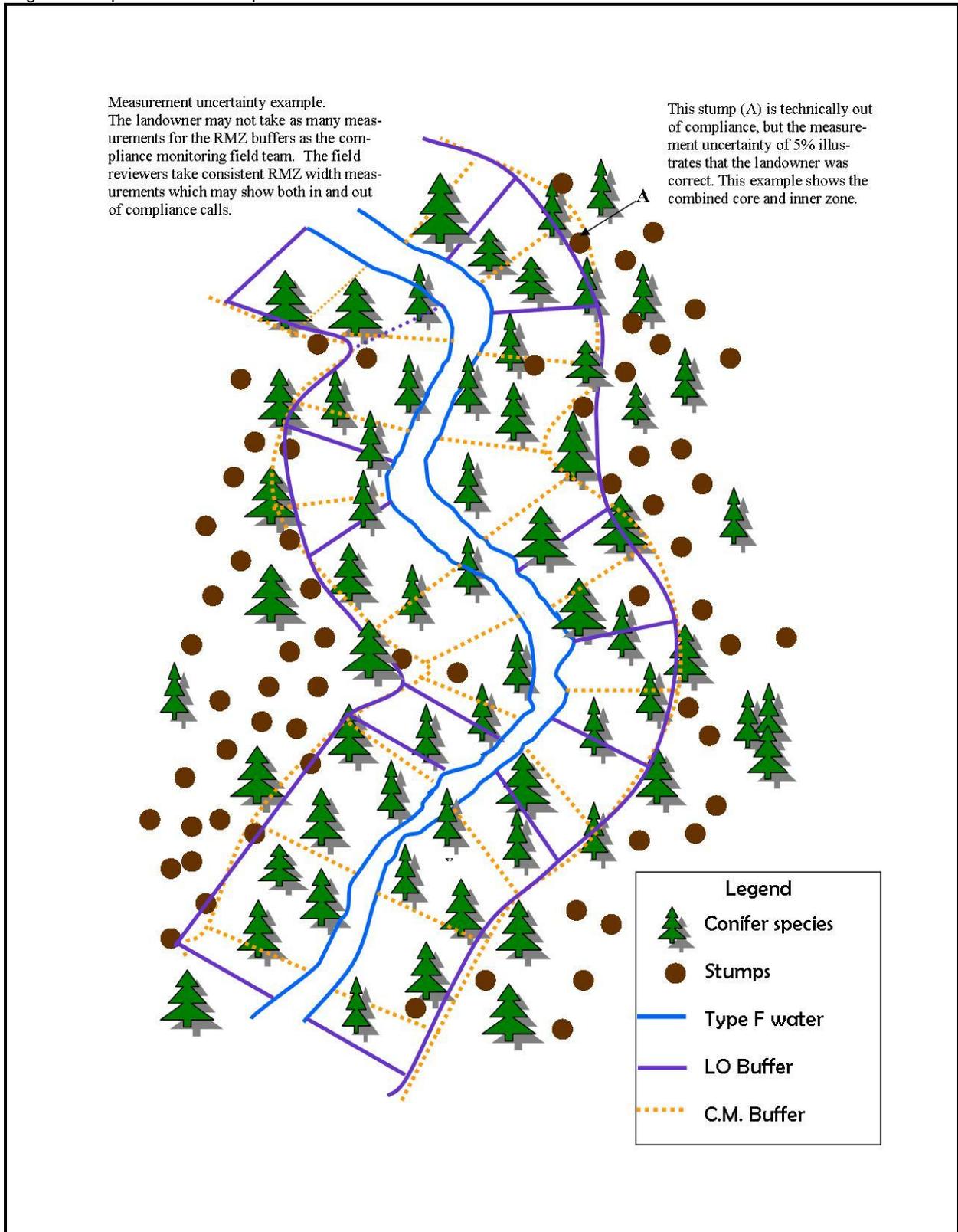
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## **Appendix A** -Methods to deal with levels of uncertainty

There are multiple sampling elements with uncertainty that lead to a final determination of compliance or non-compliance. For example, the position of the bank full width needs to be determined as accurately as possible before using a measuring tool to define the width of the buffer. Measuring RMZs is an exercise in sampling point analysis and such determinations can only be as exact as the measurement. Both landowners and the Compliance Monitoring Teams are subject to the same potential sources of error. The rules do not prescribe a protocol for sampling along the bank full width of a stream to define RMZ widths. Landowners and forest consultants determine the most cost effective and efficient methods to accomplish this task. In contrast, the Compliance Monitoring Program follows a set of field measurement protocols that result in consistent measurements of the RMZs

Figure 3 displays the incremental difference of two RMZ measurement schemes that result in similar but not exact RMZs on the ground. Technically, point A on the figure would be out of compliance. Both RMZ lines are within a measurement uncertainty. DNR has determined that a reasonable measurement uncertainty is 5%.% and thus differences within the 5% of the field teams RMZ measurement will be treated as if it is in compliance even though it may not be.

Figure 3. A stylized comparison of a landowner RMZ and a typical Compliance Monitoring RMZ is shown below which shows the locations of the measurements taken along the stream. Slight variations along the continuous buffer could target a stump in or out of compliance...



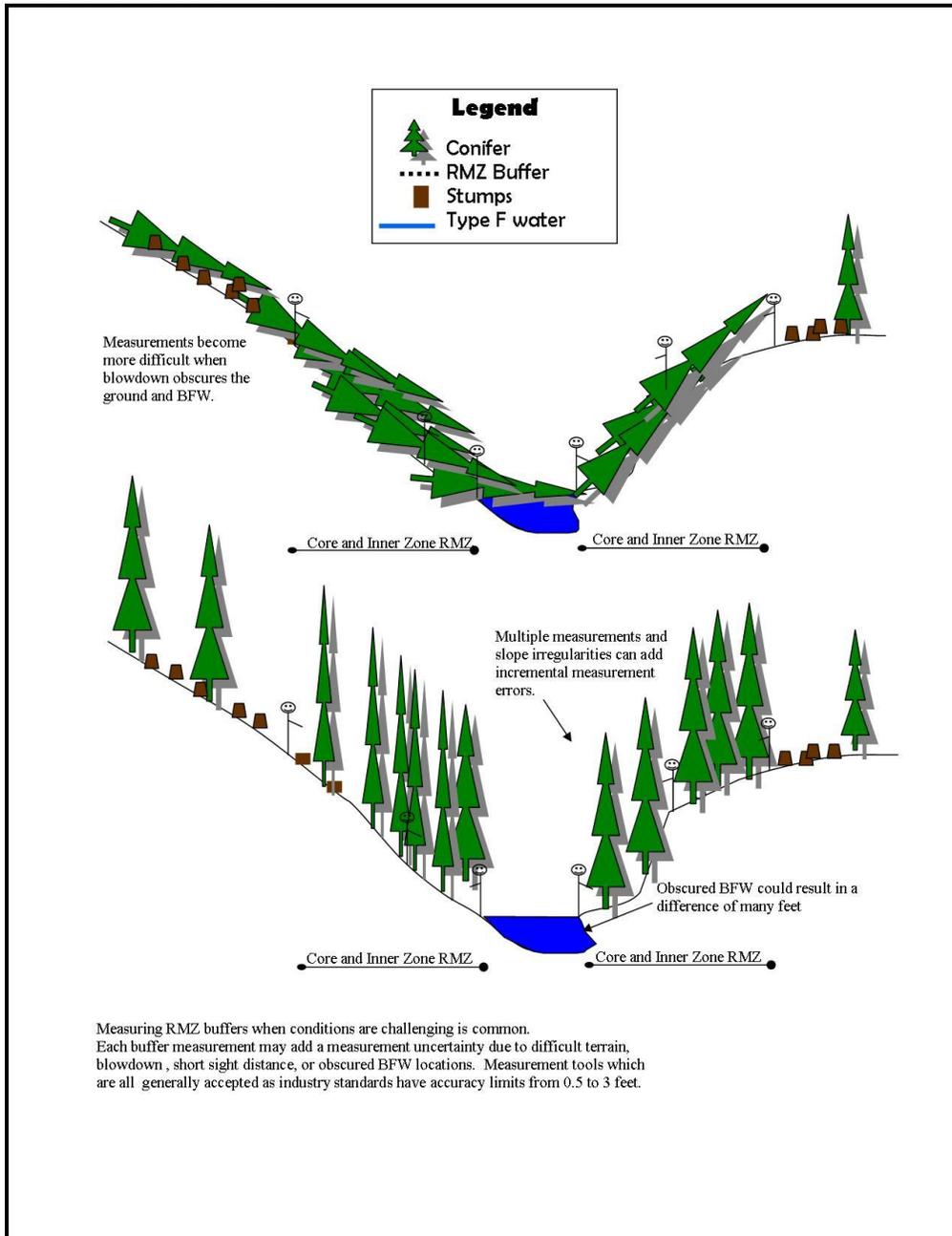
There are other reasons that support having a 5% measurement uncertainty.

1. The forest industry and FPFs commonly use a variety of measurement tools, each with their own inherent uncertainty. For example, foresters may use logger's tapes or string boxes, which have absolute uncertainties on the order of 0.5 feet, or laser range finders with absolute uncertainties of at least 0.5feet.
2. Uncertainty associated with the measurement tool is small as compared with uncertainty from physical factors in the field. Figure 4 illustrates a few of the many natural physical variables that affect the Compliance Monitoring Program's field assessments:
  - a. Channel margins (BFW locations) that are obscured by blow down, thick and impenetrable brush, sloughing or overhanging banks, bank instability, or other obstructions.
  - b. Stream characteristics such as deep incision, braided channels, or a high degree of sinuosity.
  - c. Steep channel side-slopes preclude accurate measurement due to the inability to see the edge of the stream; this requires multiple measurements because of a lack of continuous visibility Measurement on steep slopes is difficult with any measuring tool. If a tape is used, the slope distance must be corrected for slope angle using an inclinometer, which has its own relative uncertainty in measurement (and which increases as a function of slope angle). Steep side slopes are commonly such dangerous terrain that foresters cannot always obtain an accurate measurement. Furthermore, steep areas are commonly unstable, further compromising the position of the stream edge.

The absolute uncertainty from physical factors in the field is approximately one foot under perfect conditions, but more typically it is on the order of several feet. The rules do not contain measurement protocols so the Program must establish a reasonable field protocol to use in determining compliance.

These considerations indicate that a reasonable and conservative relative uncertainty for the Program as a whole is 5%. For example, a 47.5-foot measurement on a 50-foot buffer will represent a measurement uncertainty of 5%. The protocol requires documentation of all trees within this measurement uncertainty, and all trees harvested with required buffer widths. On-the-ground discussions of these measurements will determine if the activity is in compliance or not. The trees harvested within the measurement uncertainty would not be considered out of compliance unless there is a consistent "bias in RMZ buffer widths" as explained below.

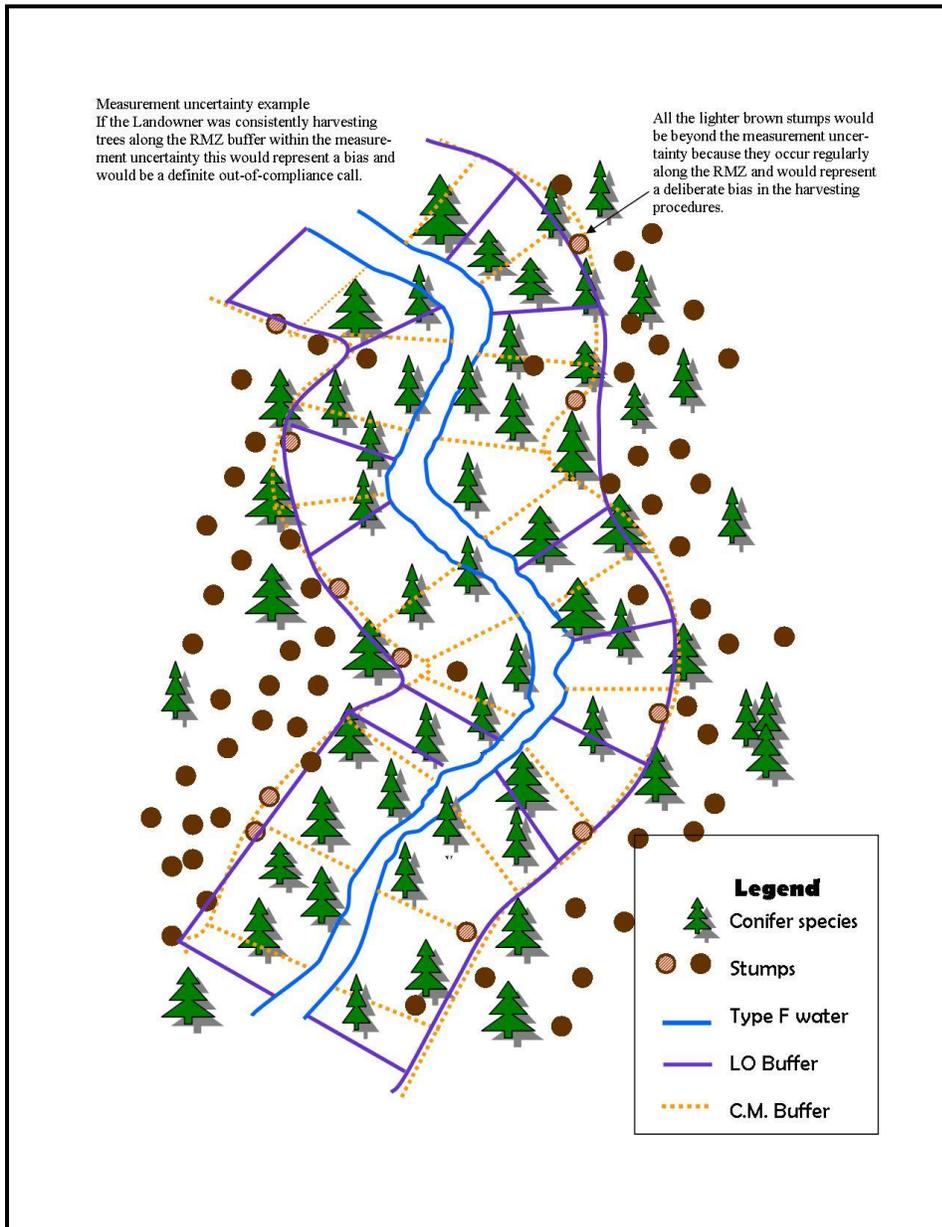
Figure 4. Natural variability in terrain, BFW, and other unforeseen circumstances such as blowdown can create minor measurement uncertainties.



## Bias in RMZ buffer widths

There is a need to allow some uncertainty in measuring RMZs as noted above. However, the program has limits to the tolerance for discrepancies, for example, when all measurements along an RMZ are pushing the uncertainty tolerances. Figure 5 illustrates a definite bias in RMZ determination which will not be tolerated. We will stress in training that if trees are consistently cut within the tolerance limits established (5%) along most of the RMZ, then this represents a deliberate choice on the part of the landowner to harvest within the RMZ requirements. This becomes clear when field teams are following the Standards and Guidelines protocols established for the field implementation portion of the compliance monitoring assessments.

Figure 5. An example of bias in RMZ measurements that will not be tolerated. The lighter brown stumps were too numerous to be measurement errors and reflect a bias in cutting within the RMZ.



## Determining Bankfull Width

The Board Manual (Sec 2.1.3) prescribes a sample of at least 10 evenly-spaced measurements to determine average bankfull width. Several cases have arisen using the board manual stream width protocol where the outcome of the review field sample average is very close the threshold value where the required RMZ width changes. For streams which look close to the threshold width the sample intensity may be doubled to narrow to improve the estimate of the mean value.

Use the following procedure:

- 1) Review team gives a cursory inspection on whether the stream width will be close to threshold and decides whether the 10 measurements will be sufficient. If close, double the intensity.
- 2) Team executes the sampling
- 3) Field calculate the bank full width mean.
- 4) Apply the mean value as the stream width and review the activity accordingly.

## APPENDIX B. Statistical Methods for Estimating Proportions

### Estimates for Simple Proportions

A simple compliance proportion is estimated within a region  $r$  as:

$$\hat{p}_r = \frac{X_r}{n_r},$$

where  $n_r$  = the number of activities assessed, and  $X_r$  = the number of activities that were compliant in the region. The statewide proportion will be estimated as a weighted mean of the regional proportion as follows:

$$\hat{p} = \frac{\sum_{r=1}^R N_r \hat{p}_r}{N},$$

where  $N_r$  is the number of FPAs in region  $r$  and  $N$  is the total number of FPAs in the population.

The standard error of the statewide proportion is:

$$SE(\hat{p}) = \sum_{r=1}^R \frac{N_r SE(\hat{p}_r)}{N},$$

where

$$SE(\hat{p}_r) = \frac{\hat{p}_r(1-\hat{p}_r)}{(n_r-1)}$$

and a 95% confidence interval is estimated by:

$$\hat{p} \pm t_{.025,df} \cdot SE(\hat{p}),$$

where  $t_{.025,df}$  is the 97.5<sup>th</sup> percentile of the student- $t$  distribution with  $df$  degrees of freedom, and  $df$  is estimated using Satterthwaite's (1941) formula:

$$df = \frac{\left[ \sum_{r=1}^R \frac{N_r}{n_r} \cdot (N_r - n_r) \cdot SE(\hat{p}_r) \right]^2}{\sum_{r=1}^R \frac{N_r^2 (N_r - n_r)^2 [SE(\hat{p}_r)]^2}{n_r^2 (n_r - 1)}}.$$

Note for all above equations that  $N$  and  $N_r$  are not directly known, but must be estimated.  $N$  is the number of FPAs that fit the population criteria, but some of these criteria are not known (e.g., contains a road or riparian activity) until the FPA is opened. Thus, we estimate  $N$  as follows:

$$\hat{N} = \frac{nM}{m},$$

Where  $n$  = the number of FPAs sampled,  $M$  = the total number of FPAs in the initial population (prior to opening), and  $m$  = the number of FPAs opened and reviewed in order to achieve  $n$  samples (i.e.,  $m-n$  FPAs were rejected as not part of the population upon opening.) Similarly,  $N_r$  has to be estimated for each region.

### Combined Ratio Estimates

For combined ratios, the estimated proportion of activities that are compliant is:

$$\hat{p} = \frac{\bar{y}}{\bar{x}}, \text{ where}$$

$$\bar{x} = \frac{\sum_{r=1}^R N_r \cdot \bar{x}_r}{N},$$

$$\bar{y} = \frac{\sum_{r=1}^R N_r \cdot \bar{y}_r}{N},$$

$\bar{y}_r$  is the average number of compliant activities per FPA in region  $r$ , and  $\bar{x}_r$  is the average number of activities per FPA in region  $r$ .

As before, a 95% confidence interval for the compliance proportion is formed as follows:

$$\hat{p} \pm t_{.025, df} \cdot SE(\hat{p}),$$

where  $t_{.025, df}$  is as defined above. The Satterthwaite degrees of freedom and  $SE(\hat{p})$  are estimated as before, with:

$$SE(\hat{p}_r) = \frac{\sqrt{n_r \cdot \left(1 - \frac{n_r}{N_r}\right) \cdot \sum_{i=1}^{n_r} (y_{ri} - \hat{p}x_{ri})^2}}{\sqrt{(n_r - 1) \cdot \sum_{i=1}^{n_r} x_{ri}}} \quad (\text{Cochran, 1977, p167}).$$

The compliance proportion estimates above will also be compared to the corresponding compliance proportion estimates from the 2006-2007 biennium.

**APPENDIX C - Report to The Forest Practices Board Regarding The Technical Review Of The Compliance Monitoring Program Design, February 22, 2008**

January 15, 2008

MEMORANDUM

TO: Forest Practices Board

FROM: Darin Cramer, Adaptive Management Program Administrator



SUBJECT: Compliance Monitoring Independent Technical Review

Per the Board's direction from the February 14, 2007 meeting, a technical review committee was established to provide independent peer review of the Compliance Monitoring Program Design. Five individuals participated on the review committee - one current and one former CMER member, one scientist from the USFS Pacific Northwest Research Station, one scientist from the Oregon Department of Forestry's monitoring program and one scientist from the Puget Sound Ambient Monitoring Program. The three outside reviewers have no direct involvement with the Washington Forest Practices Program. In addition to the review panel, I contracted with a professional statistician to specifically review the sampling design. Review guidance, compliance monitoring documents and 12 review questions were submitted to the review panel in mid-September 2007.

Most reviewers were generally complimentary of the overall design, stating it reflected good, practical thinking about the elements of a compliance monitoring program and the roles/responsibilities of participants. One reviewer noted that the complex and quantitative nature of the Forest Practices Rules, along with the consensus decision-making framework, creates similar complexity in the procedures used to monitor compliance.

The following is a summary of responses from reviewers on a few of the key issues of concern to stakeholders, along with my recommendations. The review questions and complete responses from reviewers 1 through 5 are attached.

Some reviewers think the program objectives need to be more concisely stated in a quantitative fashion; doing so will also more clearly determine the appropriate analysis methods and sampling design for each objective. Some reviewers also suggested a reorganization of the report would be helpful in more clearly presenting the objectives, methods and design. The professional statistician contracted to review the sampling design generally agreed with these points. Therefore, my recommendation is to secure technical assistance from this statistician to review and respond to these reviewer comments in a revised program design.

One reviewer suggested no more money should be spent on field sampling until this revision work is complete. I tend to disagree with this suggestion. Preliminary steps have already been

taken to address some of the monitoring objective and sampling design comments from the statistician, which were similar to review panel comments. Further, the statistician is available to provide additional assistance in this regard. Finally, work has already begun to prepare for the 2008 field sampling season. Delaying field sampling until the program design revisions are complete may result in little or no field data being collected in 2008. I suggest proceeding with both efforts at the same time with the goal of completing the design revisions as soon as possible, and making the revised design available for stakeholder review prior to analysis and reporting of 2008 field data.

The second key issue is whether verification of water typing should be done as part of compliance monitoring. Reviewer responses tended to be “no;” however, some reviewers suggested a separate targeted effort may be appropriate to address this issue. This question was discussed at the December 2007 Policy meeting; the result being compliance monitoring field crews will collect additional water typing information associated with each FPA surveyed.

A third concern is the use of subjective criteria or professional judgment, particularly when assessing the degree of non-compliance. Reviewers tended to think use of subjective criteria is appropriate in certain circumstances. Two reviewers included some good suggestions for how to collect and report this information in ways that would improve repeatability and increase transparency.

A fourth concern is how measurement error is addressed in the program design. Most reviewers thought measurement error was adequately addressed in the program design. However, one reviewer thought the description of measurement error was unnecessary and should be addressed through how compliance data are collected and reported. That is, assuming no directional bias exists, measurement error should occur equally in both directions and over repeated measurements the mean compliance value should approach the rule specification. Another reviewer suggested re-sampling some FPAs to ensure techniques are repeatable and error tolerances are acceptable. Again, consulting with the statistician on quantitative and qualitative data collection/reporting techniques is recommended.

Finally, reviewers were asked if there would be a benefit to the program in establishing a technical steering committee. Responses to this question ranged from a definite “yes” (three reviewers) to generally not in favor of permanent technical steering committees (one reviewer). Most reviewers thought such a committee would be helpful if appropriately focused, and comprised of monitoring and statistical expertise. In making this determination, my suggestion is to carefully consider the trade-offs associated with imposing additional committee staffing responsibility on a small program, and how that may affect the ability to conduct field surveys. Perhaps an acceptable solution would be to form an ad-hoc technical group with responsibility for reviewing the next version of the program design and subsequent field survey report. This could be repeated periodically on an as-needed basis.

In summary, I recommend the Compliance Monitoring Program consult with the contracted statistician to refine and revise the monitoring objectives, analysis/reporting methods and sampling design. Forming an ad-hoc technical steering committee to review these revisions and subsequent field survey report might be worth considering as well.

## **APPENDIX D – SAMPLE STRATEGY DESCRIPTIONS**

### **2006- 2007 SAMPLING STRATEGY ELEMENTS**

The 2006/07 Program provides evaluation of compliance primarily covering three major rule categories:

1. Forest Practices defined in rules WAC 222-30-021 Western Washington Riparian Management Zones, WAC 222-30-022 Eastern Washington Riparian Management Zones.
2. Road Construction, Maintenance, Landings, Road Abandonment, Permanent and Temporary Crossings on Type N water, and Fords from WAC 222-24 Road Construction and Maintenance.
- 3) Forest Practices defined in rules WAC 222-30-020 Wetlands management zones, Forested wetlands

FPA's can contain numerous harvest options or multiple road activities. A single FPA may contain a "No-Inner Zone Harvest", "harvest on a Type N stream", and a "Wetland Management Zone". There may also be "new or temporary road construction" and a "road abandonment" project. Each one of these Forest Practices is grouped into specific "activities" for the purposes of Compliance Monitoring field reviews. Successful Compliance Monitoring will be the result of asking questions with "Yes" and "No" answers to specific and direct requirements of the rules. All compliance questions are directly tied to specific WAC language

Other rules were not addressed due to a small incidence of occurrence or operational limitations for measuring compliance. They are:

- Forest Chemicals, WAC 222-28 -the ability to monitor chemical applications and the effects on soil and water are complicated and better addressed by effectiveness monitoring.
- Even-Aged Harvest-Size and Timing (WAC 222-30-025)
- Small Forest Landowner (SFL) 20-acre exemptions
- Alternate plans
- Cultural resources
- Hardwood conversions
- Unstable slopes delineation and avoidance, Class IV Specials
- Class II applications (non-renewals)

Applications where landowners have Federal HCPs regulating harvest activities are excluded from the sample.

Two activity types of low occurrence were sampled at a higher proportion during the 2007 and 2008 field seasons to assess compliance. These "Emphasis" activities are alternate plans and 20 acres Small Landowner Exemptions. Results from these samples will be presented in the 2008-2009 Biennium Report to the Forest Practices Board.

### **2008- 2009 SAMPLING STRATEGY ELEMENTS**

Three significant changes to sampling were implemented for 2008-2009. The first was adding a protocol to capture observed differences between water type classification at approval and at the time of the compliance review. This was instituted because the frequency of perceived differences between the approved FPA type and seen at the review during 2006-2007 and requested by the board to be addressed. The effort is an approach to quantify the extent of the

issue. Secondly, compliance with the rules is now assessed in addition to compliance with the approved application, allowing comparison of differences where the two are not the same.

The third change was to modify the FPA selection strategy to sample each DNR region proportional to their representation in the entire population of FPAs. This is to assure representation of each region in the sample.

Additionally, a wetlands emphasis sample was added to develop a better estimate of compliance specific to the rules covering forested and non-forested wetlands, and to assess how accurately the wetlands have been typed.

The sampled elements are the same three major rule categories as in the previous biennium:

1. Forest Practices defined in rules WAC 222-30-021 Western Washington Riparian Management Zones, WAC 222-30-022 Eastern Washington Riparian Management Zones.
2. Road Construction, Landings, Road Abandonment, Permanent and Temporary Crossings on Type N water, and Fords from WAC 222-24 Road Construction and Maintenance.
- 3) Forest Practices defined in rules WAC 222-30-020 Wetlands management zones, Forested wetlands

#### 2010- 2011 *SAMPLING STRATEGY ELEMENTS*

Stakeholders requested review of several compliance components for the program including features essential to complete the milestones necessary for the Clean Water Assurances (CWA). They require extensive testing prior to adoption.

#### 2010

The sample strategy for 2010 is the same strategy as previous years. Consideration will be given to enhance the sample size to determine between-region differences. The sampled elements are still the same three major rule categories:

1. Forest Practices defined in rules WAC 222-30-021 Western Washington Riparian Management Zones, WAC 222-30-022 Eastern Washington Riparian Management Zones.
2. Road Construction, Landings, Road Abandonment, Permanent and Temporary Crossings on Type N water, and Fords from WAC 222-24 Road Construction and Maintenance.
- 3) Forest Practices defined in rules WAC 222-30-020 Wetlands management zones, Forested wetlands

The field strategy in 2010 will also focus on field testing and verify protocols to implement CWA milestones regarding haul route protocols. It will also review CWA issues for: water typing, shade, wetlands, haul roads and channel migration zones. This work will help determine Determine what questions need to be answered, where existing Compliance Monitoring strategies might be deficient, and resolve a sampling design to meet those needs. The Program will also consider a strategy to incorporate more activity types into the sample population.

#### 2011

Continue the sample strategy for 2010 and add strategies deemed feasible from the 2010 review.

## APPENDIX E      Screening Protocols

Pre-season screening is the process to determine the sample from the population. For the 2010 season the following methodology is used

Step 1 – The population of interest is selected

Step 2 – A random number ranking assignment

Step 3 – Deselect Class II non-renewal and Class IV general and hardwood conversions

Step 4 – Deselect multiyear applications

Step 5- Deselect applications that are HPA only

Step 6 -Deselect applications under an HCP that cover both riparian harvest and road construction

Step 7 -Deselect application without riparian activities and without road construction or abandonment activities

Step 8 - Deselect applications under an HCP that covers harvest which has no road construction or abandonment

Step 9 - Deselect 20 Acre Exempt and Alternate Plan FPAs, except those having riparian or road activities which still fall under standard rules