TFW/Forests and Fish Policy
Forest Practices Board

P.O. Box 47012, Olympia, WA 98504-7012

Policy Co-Chairs: Stephen Bernath, Department of Ecology and Tom Robinson, Association of Counties

January 28, 2010

MEMORANDUM

To: Forest Practices Board

From: Stephen Bernath, Co-chair
Tom Robinson, Co-chair

Subject: Fixed-width Riparian Update

The Forest Practices Board (Board) sent a memorandum, dated May 21, 2009, to the Adaptive Management Program Administrator (AMPA) requesting Forests and Fish Policy (Policy) to examine and develop a "fixed-width, no-entry" riparian management option to be added to the Western Washington RMZs for Type S and F Waters rule in WAC 222-30-021(1). This memo also requested presentation to the Board of a consensus recommendation for a fixed-width, no-entry riparian option from Policy during the winter of 2009/2010. On August 6, 2009 the AMPA delivered to Policy the Board's request with his recommendations to form a Policy sub-group to utilize existing technical and policy information in the development of a fixed-width, no-entry riparian management proposal.

Policy accepted this recommendation and formed a sub-group with the responsibilities to develop a Charter, and oversee proposal development. The sub-group prepared, and Policy accepted, a Charter identifying the following two step process for the development of a fixed-width, no-entry riparian management zone (RMZ) option:

1. Initiate an adaptive management process to develop and evaluate a range of potential rule alternatives applicable to all landowners. This process would not be possible to complete within the time frame outlined in the Board request. Policy added this adaptive management proposal to the Policy work list.

2. Utilize the existing alternate plan template process to develop and present to the Board in February 2010, a fixed-width buffer applicable only to small forest landowners.

The goal of the sub-group was to complete the second step by developing a small forest landowner template offering a fixed-width RMZ buffer that achieves riparian function equivalent to the current rules. To achieve this, the sub-group, following the Charter, established a list of tasks and responsibilities to assure that the fixed-width buffer template would be developed according to guidance in rule and to meet the Board's development timeline.

The sub-group, by analyzing forest practice application data, established the fixed-width, no-harvest riparian harvest zone widths and the riparian buffer prescriptions for the template. A summary of the processes and analysis used by the sub-group and the proposed template incorporated into Board Manual Section 21, *Guidelines for Alternate Plans,* are attached for review.

Policy has approved this *Fixed Width Riparian Buffers for Small Forest Landowner's in Western Washington* template to the Board. We encourage the Board to approve this template. Making this template available to small forest landowners will fulfill the subcommittee's first step toward completing the Board's request to examine and develop a "fixed-width, no-entry" riparian management option for all landowners.

cc: Forest Practice Board Liaisons
Forests and Fish Policy Members

Process and Analysis used by the
Policy Fixed-Width Sub-Group for the Development of the
Small Forest Landowner Fixed Width Buffer Template

The Forest Practices Board requested the adaptive management program develop a "fixed-width, no-entry" management option to be added to WAC 222-30-021(1) Western Washington RMZs for Type S and F Waters. To accomplish this, Policy formed a sub-group whose charter established a two step approach to accomplishing the Board's request. This summary identifies the sub-group's analysis and conclusions in fulfilling the first step – to develop a proposal for small forest landowners that utilizes the existing alternate plan template process. The template achieves the goals in WAC 222-12-040(1) "… (to develop) a tool to deal with a variety of situations, including where the cumulative impacts of regulations disproportionately impact a landowner ... (the template provides) a plan that provides protection to public resources at least equal in overall effectiveness as provided by the act and rules while seeking to minimize constraints to the management of the affected lands."

Process and Analysis

The sub-group established a list of tasks and responsibilities to assure that the fixed-width buffer template was developed according to rule and the adaptive management process, and meets the Board's timeline:

1. Review and characterize small forest landowner riparian harvests (type, size, etc.) occurring under current rules.
2. Identify all caucus fixed-width buffer proposals.
3. Compare proposals with current rules.
4. Perform equivalency analyses.
5. Present results of equivalency analyses to the Small Forest Landowner Advisory Committee for input.
6. Scope and evaluate risk mitigation strategies (20 acre limit, length/size limit, implementation monitoring).
7. Prepare fixed-width riparian buffer template.
8. Present template to the Small Forest Landowner Advisory Committee for endorsement.
9. Present proposal to Policy at their January 2010 meeting for approval.
10. Present proposal to the Board at their February 2010 meeting for approval.

The sub-group first reviewed forest practices applications (FPAs) approved between January 1, 2005 and August 31, 2009 to determine the average small forest landowner harvest in Western Washington. This review found that few small forest landowner harvests utilized either of the DFC inner zone harvest options, that the average size of clear cut harvest units was 16.7 acres, and that the average size of thinning harvest units was 21 acres in size.

Then stand data was utilized from 100 FPAs randomly selected by DNR as part of the DFC SEPA analysis, plus 150 randomly selected FPAs used in the CMER DFC analysis. This sample included only FPAs that that were eligible to harvest within the RMZ inner zone under the old DFC rule. Eighty-six percent of these FPAs were eligible to harvest under the new DFC target (325 sq. ft. per acre).

To establish the proportion of RMZs across the forested landscape eligible for inner zone harvest, DNR evaluated two years of approved Western Washington FPAs, excluding alternate plans and hardwood conversions, and determined that RMZs were entered in 27% of the FPAs. In addition, a 2007 survey of WFPA members indicated that members entered the RMZ 42% of the time, based not on FPA count, but on actual RMZ length.

To correct for the true proportion of sites eligible for DFC inner zone harvest, the sub-group agreed to double the sample size by copying the existing 250 FPA sample and replacing the calculated DFC no harvest widths with the default no harvest widths in rule. These additional sample FPAs with default no harvest widths are meant to represent stands in reality that did not meet DFC, while maintaining the same distribution of site class and stream size found in the original samples. This resulted in a sample that had 34% of the sites entering the RMZ.

To see what, if any, differences would result in changing the proportion to 27%, we randomly selected from the sample sites 35 FPAs that entered the RMZ and changed the no harvest width from what was calculated from the model to the default no harvest widths in rule. While the buffer width increased across most sites, it was most significant in Site Class I and minimal on other sites. The sub-group agreed to perform the analysis utilizing the conservative estimate provided by the 27% proportion.

The next step was to account for the required outer zone and inner zone leave trees under the DFC rule. The sub-group agreed to evaluate "packing" these trees against the previously established no harvest widths. The DFC Model uses the minimum sized required leave tree (12 inches dbh) to calculate the basal area for the required leave trees within the harvested area of the inner zone and the outer zone leave trees. The sub-group used this same approach to calculate the additional buffer width required for each sample to account for the required number of leave trees within the harvest area of the inner zone and the outer zone. This width analysis is blind to tree size; it just adds width to the no harvest buffer to account for the required inner and outer zone leave trees. The sub-group acknowledges that, in practice, this will move "more trees" both greater and smaller than 12 inches dbh closer to the stream.

Since the focus of this template is to create simplicity for implementation, the group recognized that a minimum 75-foot no harvest buffer would be needed to remove the complexity associated with applying the shade rule. This approach affects harvest opportunities only along Site Class V streams and Site Class IV small streams. Landowners may forgo a small thinning opportunity by using the fixed-width template, but they will not be required to retain an outer zone. Since the focus of the development of the template was simplicity for implementation, the group recognized that on Site Class V ground a minimum 75 foot fixed-width, no- harvest buffer would be needed to remove the complexity associated with applying the shade rule.

The sub-group's final decision was to combine the calculated buffer widths for large and small streams into one buffer width by site class. This provides simplicity by eliminating the need to distinguish between stream sizes in implementing the template.

Results

The results are the fixed-width distances listed in Table 1. They represent an estimation of average buffer widths that account for a range of site class, stream size, and tree species, based on the proportion of stand conditions that meet the current Desired Future Condition metric of 325 square feet per acre of basal area.

Table 1. Fixed-width, no-harvest buffer widths by site class compared to outer edge of combined core and inner zone widths in current rule.

Site Class	**Fixed-Width, No- Harvest Zone Widths** (measured from outer edge of bankfull width or CMZ)	**Current Rule Buffer Width to the Outer Edge of the Inner Zone by Stream Size** (measured from outer edge of bankfull width or CMZ)	
		Stream Width ≤ 10 feet	Stream Width > 10 feet
I	145 feet	133feet	150 feet
II	118 feet	113 feet	128 feet
III	101 feet	93 feet	105 feet
IV	82 feet	73 feet	83 feet
V	75 feet	60 feet	68 feet

Section 21
Guidelines for Alternate Plans

This section provides guidelines for developing and analyzing alternate plans for activities that vary from specific forest practices rules. Alternate plans may be useful in a variety of situations. Examples could be:

- Where the cumulative impact of rules disproportionately affects a landowner's income production capability.
- Where a landowner's minor on-the-ground modifications could result in significant operational efficiencies.
- Where site conditions have created an economically inaccessible management unit when using the forest practices rules.
- Where local landforms lend themselves to alternate forest management practices.
- Where a landowner proposes methods to facilitate landscape, riparian or stream restoration.

In alternate plans, landowners develop management prescriptions that will achieve resource protection through alternative methods from those prescribed in the forest practices rules. Any rule prescription not changed as part of an alternate plan must be followed as outlined by rule. To be approved alternate plans must provide protection for public resources at least equal in overall effectiveness to the protection provided by the Forest Practices Act and rules. Alternate plans are an option for all landowners.

This Board manual section contains two parts. Part 1 provides a general discussion of alternate plan requirements and riparian function and pertains to all landowners. Part 2 provides information on alternate plan templates for small forest landowners and contains Template 1-Small Forest Landowner Western Washington Thinning Strategies for Overstocked Conifer-Dominated Riparian Management Zones. Additional technical assistance and scientific information to support proposed management prescriptions is available on the DNR Small Forest Landowner Office website at http://www.dnr.wa.gov/sflo/.

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PART 1. ALTERNATE PLANS

The alternate plan policy is described in WAC 222-12-040. The requirement for the application process, plan preparation responsibilities, required contents and plan review procedures are

described in WAC 222-12-0401. Key elements of alternate plans include a map showing locations of:

- Any affected streams and other waters, wetlands, unstable slopes, and existing roads.
- Proposed management activities.

Alternate plans also should include:

- Descriptions of the current conditions of the site, including upland and riparian conditions. For help in assessing riparian conditions see 1.1 Riparian Function Considerations.
- Descriptions of the proposed management activity, including all resource protection or enhancement activities. Make sure the scale of management descriptions fit the scope of the project. For example, the removal of a few specific riparian trees may require different protection or enhancement measures than a riparian thinning of an entire stream segment.
- A list of the forest practices rules that the alternate plan is intended to replace.
- Where applicable, a monitoring and adaptive management plan.
- Where applicable, an implementation schedule.

1.1 Riparian Function Considerations

Understanding riparian areas and riparian functions is important to building an alternate plan. Riparian areas are transitional zones between the aquatic and upland environments. (In contrast, Riparian Management Zones in the forest practices rules are minimum stream buffers.) Riparian areas contribute to overall stream health by maintaining essential riparian functions and productivity.

The forest practices rules for riparian areas are designed to protect aquatic resources and related habitat to achieve restoration of riparian function. Under the rules, “riparian function” includes bank stability, the recruitment of woody debris, leaf litter fall, nutrients, sediment filtering, shade, and other riparian features that are important to both riparian forest and aquatic system conditions.

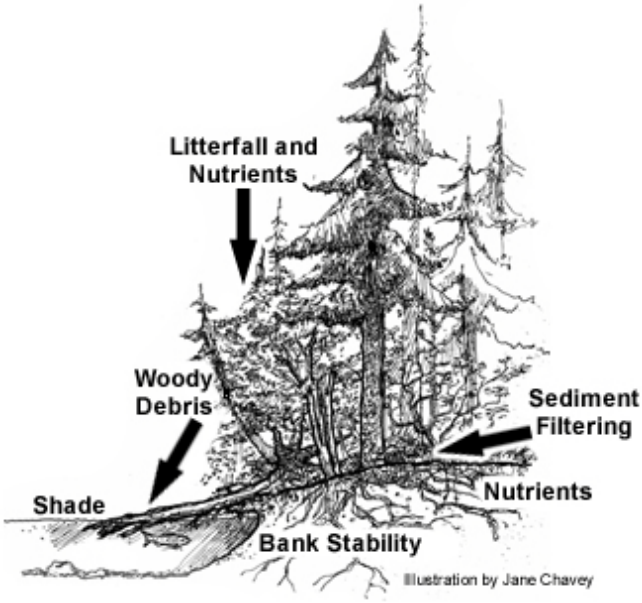

Figure 1. Riparian function.

The goal of this guidance is to help landowners identify, restore and maintain riparian function. This guidance focuses on:

- Stream shading
- Stream bank stability
- Woody debris availability and recruitment
- Sediment filtering
- Nutrients and leaf litter fall

Landowners should understand how riparian areas contribute to overall stream health in order to incorporate riparian functions maintenance and/or enhancement measures into their alternate plans. Considering site-specific conditions of the riparian area allows reviewers and landowners to make informed decisions about proposed management activities. Riparian areas are dynamic and the current condition of riparian functions will vary among individual stream segments and throughout the watershed.

As planning begins, landowners should consider:

- The makeup of the tree species within the riparian area, and the level to which the forest is currently providing the riparian functions to the stream.
- The potential level of the riparian functions that the forest could contribute to the stream.
- The potential level of functions that would be lost without management intervention.
- How the riparian areas could be managed to achieve sufficient levels of riparian function, and how to maintain these levels when achieved.

Areas of Influence

Before developing alternate plan prescriptions, the landowner or forester should identify the areas of influence for each riparian function. In this manual, the “area of influence” is the area that may affect a particular riparian function. Site specific conditions determine the size of the area of influence for each riparian function.

The figure below shows the general relationship between cumulative effectiveness of various riparian functions and a distance from the stream channel. Distance from channel is expressed as a proportion of tree height. (Bank stability is shown as root strength in this figure.) The descriptions under *Assessing Riparian Functions*, in the following pages, will help determine the appropriate widths of the areas of influence for each riparian function.

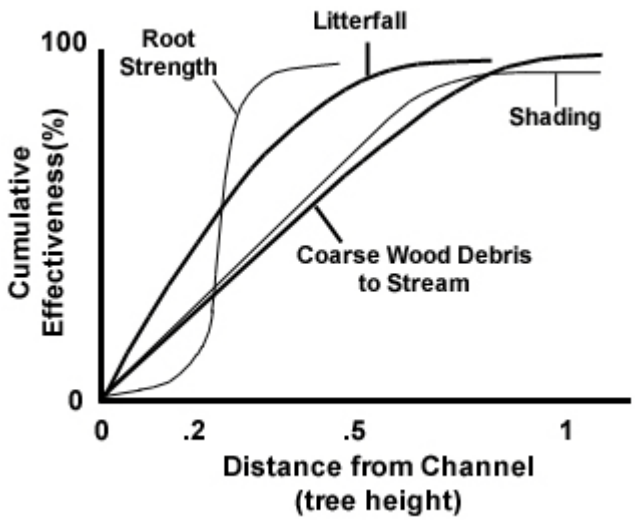

Figure 2. Cumulative effectiveness of various riparian functions.

From Forest Ecosystem Management Assessment Team (FEMAT), (1993). *Forest ecosystem management: an ecological, economic, and social assessment.* Washington DC: US Government Printing Office 1993-793-071.

Assessing Riparian Functions

The following descriptions of riparian functions are intended to help landowners and foresters determine current riparian conditions and how management strategies can result in properly functioning riparian areas.

Stream Shading

The most significant influence on stream temperature, under the control of forest managers, is shade from the canopy of the adjacent riparian area vegetation. An important function of canopy cover in the riparian area is to provide shade to maintain cool stream temperatures. This is a particularly vital function for fish and amphibians.

To determine the area of influence of the shade function, consider the guidance provided in Board Manual Section 1 Method for Determination of Adequate Shade Requirements on Streams. Following the steps of this manual can help the landowner to establish the minimum width of the riparian area needed to meet the water quality standards for stream temperature. For streams within channel migration zones, additional guidance may be obtained from Board Manual Section 2, *Standard Methods for Identifying Bankfull Channel Features and Channel Migration Zones.* The trees closest to the stream are the most important for shade. The area of influence of shade from trees usually extends for a distance of 75 feet measured from the outer edge of bankfull width (BFW) or the edge of the channel migration zone (CMZ).

When evaluating areas of influence for shade:

To understand the overall impact of management activities on the shade function, consider all of the forest characteristics in the riparian areas within the stream reach to be included in the alternate plan. The level of influence the overstory riparian canopy has on water temperature depends on a variety of factors, including:

- Stream size. Streams less than 30 feet wide are greatly influenced by riparian shading in the summer months. In larger streams, the influence of shade on water temperature will be site-specific.
- Topography. Local topography, such as steep hill slopes or cliffs may provide shading to the stream.
- Channel orientation. On east-west oriented channel segments, the shade from riparian vegetation on the south side of the stream has a greater and more direct influence on the stream than vegetation on the north side of the stream.
- Understory vegetation. Thick understory vegetation can contribute to stream shading, especially in entrenched or narrow stream channels.
- Canopy openings. Canopy openings naturally occur from bank erosion, vegetation succession, or stream bank disturbances such as flooding, debris flow, fire, or wind.

The best strategy for providing shade to protect stream temperature is to retain or develop a multi-storied riparian forest that is wide enough to minimize the impacts of solar radiation on the stream environment.

Stream Bank Stability

Maintaining stable stream banks will allow channel structure to develop naturally. Natural erosion of stream banks enhances channel function by:

- Recruiting sand, gravel, and other stream bank material needed for various in-stream habitats.
- Exposing tree root-wads on the stream bank that can provide cover for fish and eventually recruit large wood to the channel.

Maintaining stream bank vegetation is vital to maintaining stable stream banks. The roots of vegetation hold soil together, slow water velocities and facilitate deposition of sediments during high stream-flow events. Loss of stream bank vegetation can accelerate stream bank erosion which can destroy fish spawning and rearing habitats.

The area influencing stream bank stability usually extends a distance equal to ½ the average crown diameter of the dominant conifer trees closest to the outer edge of BFW or the CMZ, or to the top of the first terrace from the outer edge of BFW or the CMZ. However, streams showing evidence of channel movement may require protecting more area to accommodate future channel migration. A good reference for determining potential channel movement is Board Manual Section 2.

Determining Crown Diameter

To determine ½ the average crown diameter, measure the crown diameters of at least 10 dominant conifer trees within 30 feet of the edge of BFW or CMZ, and divide the average of those 10 diameters by 2.

When evaluating the areas of influence for stream bank stability:

- Look for connected root masses along the management area.

- Look for deeply undercut banks which indicate the channel is migrating.
- Anticipate which streamside trees could fall from root rot, stream undercutting, heavy lean, or susceptibility to windthrow; then consider which adjacent trees should be retained to maintain long-term bank stability.

The best strategy is to maintain live trees and vegetation within the area of influence to provide the greatest stability to stream banks.

Woody Debris Availability and Recruitment

Ecological functions associated with large woody debris (LWD) are an important part of productive in-stream habitat. LWD provides important habitat diversity by providing structure for stabilizing streambeds, building floodplains, storing sediment, retaining spawning gravels, maintaining flow complexity, storing nutrients, and providing habitat for fish and/or stream-associated amphibians. LWD should be of a size (length and width) and species to remain intact and stable for many years. See Board Manual Section 26 under "The criteria for wood placement" for more information.

Wood naturally enters streams from:

- Fallen dead trees.
- Trees undercut by stream flows.
- Disturbance events such as debris torrents, landslides, fire, insects, disease, and wind storms.

LWD from large trees forms pools and cascades in streams. However, many riparian areas no longer have large diameter trees available to fall into the streams. Small diameter wood may be available but is not necessarily adequate to provide optimum riparian woody debris function. Therefore, both short-term and long-term woody debris recruitment is desirable. Woody debris comes from the riparian forest adjacent to the stream and by water transport from areas upstream.

Any tree that has the potential to contribute wood to the stream is within the LWD area of influence. Trees closest to the stream have the highest potential to fall into the stream. To determine the width of the area influencing woody debris input and availability consider the potential tree height of the tallest (dominant) trees on the site. The area of influence for LWD recruitment may be estimated as the distance equal to 75 percent of the 100-year site-potential tree height of the dominant trees within the riparian area, measured from the outer edge of BFW or CMZ.

When evaluating the areas of influence for woody debris recruitment consider:

- Trees leaning towards the stream. The most likely candidate trees for entering a stream are those leaning towards the stream, and trees located on steep slopes, on the edge of the first terrace, and in inner gorges.
- Hardwood contribution for short-term benefit. Woody debris from hardwood forests decomposes faster than woody debris from conifer forests.
- Placing large wood to enhance the near-term function. This will allow the development of long-term woody debris recruitment opportunities within the riparian forest. For technical guidance on in-channel woody debris placement, see Board Manual Section 26.

- The extent and conditions of existing in-stream woody debris adjacent to the proposed area of harvest.
- The productivity of the soil. Higher soil productivity will grow taller trees for future supply of woody debris to the stream. More productive soils will have larger areas of influence.
- Promoting growth of existing understory conifer by releasing it from competing brush and hardwood vegetation. This may be preferable to relying on seedling growth.
- Extending the area of influence where there is the potential for channel migration. For guidance on the potential for channel migration, see Board Manual Section 2.

The best strategy for woody debris availability is to manage for the potential recruitment of LWD for the short- and long-term.

Sediment Filtering

Riparian vegetation helps to filter sediments, reduce the likelihood of landslide events, and regulate the natural erosion processes within riparian areas. Reducing the amount of fine sediment entering streams and other water bodies is a major function of the riparian area. Riparian vegetation can prevent sediment from entering the stream as a result of ground disturbance or skid trails in upland areas, and roads or road cross drains.

The width of the riparian area and the amount of riparian vegetation needed to perform filtering varies according to stream size and channel type. Large streams that connect to a floodplain at high flows require greater distances for sediment filtering than small, incised channels that rarely experience overbank flows.

Areas influencing sediment filtering are usually within 30 feet of the outer edge of BFW or CMZ, or to the top of the first terrace beyond the outer edge of BFW or CMZ. This area of influence may extend to the top of the second terrace if the first terrace is susceptible to frequent flood emersion or stream erosion.

When evaluating the areas of influence for sediment filtering consider that:

- Management activities on exposed soils in riparian areas have the potential to deliver to streams.
- Management activities on steeper ground have higher potential for sediment delivery to streams.

The best strategy to prevent sedimentation caused by management activities is to keep equipment from operating below the topographic break directly above a stream or within 30 feet of the stream.

Nutrients and Leaf Litter Fall

Riparian areas play a key role in determining the concentration of nutrients in stream water. Uptake and storage of various elements carried by overland flows and groundwater are influenced by both the width of riparian buffers and the species of vegetation present.

Organic input from riparian vegetation influences water quality and provides an important food source for aquatic organisms. The size, composition, and age of the riparian forest will determine the amount of organic material available to be deposited into the stream.

The area influencing nutrient input from litter fall is the maximum distance that leaf litter could be expected to reach the stream. This distance depends on tree species composition, understory riparian vegetation, height of the canopy, topographic features and prevailing winds.

When evaluating the areas of influence from nutrients and litter fall consider:

- The tree species composition of the riparian stands.
- The understory species composition of the riparian stands.
- Maintaining a portion of bank along the streams in hardwood forests.
- The long-term advantages of converting to conifer.

The best management strategy for nutrients and leaf litter fall is to ensure diverse vegetation composition within the area of influence.

1.2 Alternate Plan Evaluation for Riparian Areas

Because of the complexity of riparian areas, any given riparian area may not provide the ideal characteristics for each function. To be approved, alternate plans must be designed to provide for riparian function at least equal in overall effectiveness to the protection provided by the Forest Practices Act and rules.

When evaluating alternate plans consider:

- The goal of the riparian rules which is to protect aquatic resources and related habitat to achieve restoration of riparian function, and to maintain these resources once they are restored. The rules provide for the conversion and/or treatment of riparian forests which may be understocked, overstocked or uncharacteristically hardwood-dominated while maintaining minimum acceptable levels of riparian function.
- The extent to which each riparian function is currently found in the riparian area.
- Which site conditions (for example, topography, channel structure, elevation, site class, and soil type) may impact the risks from proposed management activities.
- Whether the overall benefit to the aquatic environment after proposed management activities would provide a greater long-term benefit in function than the potential short-term decrease in function.

PART 2. ALTERNATE PLAN TEMPLATES FOR SMALL FOREST LANDOWNERS

The Forest Practices Act and rules require developing simple, easy to apply small forest landowner options for alternate plans or alternate harvest restrictions on smaller harvest units that may have a relatively low impact on aquatic resources. These alternate plans are intended to provide flexibility to small forest landowners that will still provide protection of riparian functions based on specific field conditions or stream conditions on the landowner's property.

Small forest landowners as defined in WAC 222-21-010(13) and RCW 76.13.120(2)(c), are landowners who have harvested from their own lands in the state of Washington less than 2 million board feet per year for the three years prior to the year of application, and certify at the time of application that they do not expect to harvest more than 2 million board feet per year during the ten years following application.

Template 1. Small Forest Landowner Western Washington Thinning Strategies for Overstocked Conifer-Dominated Riparian Management Zones

Background

With the 2001 Forest Practices rules, riparian management zones (RMZ) on forested streams became wider and required more leave trees than previously required under the forest practices rules. Reforestation from previous forest management activities, and in some cases natural stocking levels, has resulted in high tree densities of conifer species within riparian areas. These managed stands were densely planted with the intent to commercially thin, to promote growth of superior trees and to generate income to the small forest landowner. Without thinning, the canopies of these stands will begin to close, causing the trees to compete for resources, slowing the overall growth of the plantation, and increasing tree mortality.

Purpose

The purpose of this overstocked stand template is to increase riparian function on stands that have or will show signs of suppressed growth, and to increase the economic viability of the small forest landowner in these situations. Through commercial thinning, these stands can be managed in a manner that will establish understory vegetation and achieve larger tree diameters of the residual stands faster than would have occurred under a no thinning option.

This template provides flexibility for small forest landowners to harvest while protecting riparian functions. The harvest strategies for this template includes a no harvest zone and a thinning zone that meets or exceeds the stand requirements to achieve the goal in WAC 222-30-010(2): " . . . to protect aquatic resources and related habitat to achieve restoration of riparian function; and the maintenance of these resources once they are restored."

Process

Adherence to all of the strategies within this template will meet the riparian function requirements for the approval of an alternate plan as described in WAC 222-12-0401(6): "An alternate plan must provide protection for public resources at least equal in overall effectiveness to the protection provided in the act and rules." An alternate plan must include the template form, available through the DNR. The form must be included with the forest practices application. This form provides the technical justification as required in WAC 222-12-0401(3)(b), (c), and (d), identifying how the alternate plan addresses the various functional requirements of the RMZ.

Qualifying Stands

Qualifying stands are stands with at least 70% conifer with a canopy that is closing, having a minimum of 300 trees per acre (TPA) at the time of stand initiation and located within an RMZ adjacent to Type S, F or Np waters. Landowners planning to thin a qualifying stand within an RMZ protected by the Shoreline Management Act (RCW 76.09.910) must consult with the county of jurisdiction and include written documentation from the county stating that the

operation complies with the Shoreline Management Act. This documentation must be included with the forest practices application.

Riparian Management Zones

This template differs from standard rules by:

- Allowing thinning of conifer within RMZs for Type S, F, and Np Waters; and
- Requiring an RMZ for the entire length of the Type Np Water length, not just 50% of the length.

The total RMZ widths of Type S, F, and Np Waters are the same as in standard rules. The template separates the RMZ into three management zones (no harvest, thinning, and outer) for Type S and F Waters, and two management zones (no harvest and thinning) for Type Np Waters.

RMZ widths are measured horizontally from the outer edge of bankfull width (BFW) or the channel migration zone (CMZ) on Type S and F Waters or the outer edge of BFW on Type Np Waters (see Board Manual Section 2).

Harvest Prescriptions

Type S and F Water Thinning Strategy

No Harvest Zone: The width of the no harvest zone is measured horizontally from the outer edge of BFW or the CMZ and is determined according to the following criteria:

- A distance equal to 1/2 the average crown diameter of the dominant conifer trees closest to the edge of the BFW or CMZ. To determine this distance, measure the crown diameters of at least 10 dominant conifer trees within 30 feet of BFW.
- The no harvest zone must include all conifer trees within the first row nearest the outer edge of BFW or the CMZ.
- The no harvest zone must be between 14 and 30 feet from BFW or CMZ.
- Measured trees cannot be harvested to allow for compliance and monitoring. Each tree must be marked and numbered.

Thinning Zone: The thinning zone is measured from the outer edge of the no harvest zone. The combined distance of the no harvest and thinning zone, as measured from the outer edge of BFW or CMZ, can be no less than 75 feet. To determine the total widths of the no harvest and thinning zone use the following table.

Site Class	**Combined Widths of No Harvest and Thinning Zones** (Measured from the outer edge of bankfull width or channel migration zone)	
	Stream BFW width ≤ 10 feet	Stream BFW width > 10 feet
I	133 feet	150 feet
II	113 feet	128 feet
III	93 feet	105 feet
IV	75 feet	83 feet
V	75 feet	75 feet

The harvesting strategies for the thinning zone are:

- Maintain a minimum of 100 conifer trees per acre post harvest with a maximum harvest of 65% of the trees cut in any one entry. The shade requirements must be met within 75 feet of the stream, as described in WAC 222-30-040 and Board Manual Section 1;
- Thin from below, where at the end of harvest the average stand diameter will be the same or larger than the average stand diameter before harvest. The guideline for this is d/D<1.

To determine d/D<1, first calculate the quadratic mean diameter of the trees to be cut (d), next calculate the quadratic mean diameter of the stand prior to thinning (D), then compare the ratio of d/D to assure the value is less than one.

- Follow the Large Woody Debris Placement Strategy (see below) when the thinning results in a stand less than 180 trees per acre.
- Thinning must not result in a stand with fewer than 100 well-distributed conifer trees per acre.
- Maintain an equipment limitation zone (ELZ) of 30 feet, as measured from the outer edge of BFW or CMZ.
- Soil disturbance within the ELZ cannot result in sediment delivery to the stream.
- Suspend one end of the log during yarding within the ELZ. Use directional falling away from the stream to minimize stream bank disturbance. In the thinning zone, use ground-based yarding systems only on slopes less than 35%.
- On slopes greater than 35% fully suspend all trees yarded through the thinning zone.

Outer Zone: Harvest according to the outer zone rule outlined in WAC 222-30-021(1)(c).

Type Np Waters Thinning Strategy

One of two harvesting practices can be applied along Type Np Waters, but not both in any one harvest entry. The standard RMZ buffer as outlined in WAC 222-30-021(2) may be applied or the thinning strategy as described may be applied.

Establish a 50-foot RMZ for the total length of the Type Np Water. Within this RMZ, establish a no harvest zone and thinning zone.

No Harvest Zone: Measure the width of the no harvest zone horizontally from the outer edge of bankfull width according to the following criteria:

- A distance equal to 1/2 the average crown diameter of the dominant conifer trees closest to the edge of BFW. To determine this distance, measure the crown diameters of a minimum of 10 dominant conifer trees within 30 feet of BFW.
- The no harvest zone must include all conifer trees within the first row nearest the outer edge of BFW.
- The no harvest zone must be between 14 feet and 30 feet in width.
- No allowable harvesting of measured trees. Each tree must be marked and numbered.

Harvesting must not occur within any sensitive site buffers. Sensitive sites include the 56-foot radius buffer patch centered on the point of intersection of two or more Type Np Waters,

headwall seeps, sidewall seeps, headwater springs or the points at the upper most extent of Type Np Waters, or within an alluvial fan. See WAC 222-30-021(2)(b)(i) through (vi).

Thinning Zone: The harvesting strategies for the thinning zone are:

- Maintain a minimum of 100 conifer trees per acre with a maximum harvest of 65% of the trees cut in any one entry.
- Thin from below, where at the end of harvest the average stand diameter will be the same or larger than the average stand diameter before harvest. The guideline for this is d/D<1.

To determine d/D<1, first calculate the quadratic mean diameter of the trees to be cut (d), next calculate the quadratic mean diameter of the stand prior to thinning (D), then compare the ratio of d/D to assure the value is less than one.

- Follow the Large Woody Debris Placement Strategy (see below) when the thinning results in a stand less than 180 trees per acre.
- Maintain at least 100 well-distributed conifer trees per acre after thinning.
- Maintain an ELZ of 30 feet, as measured from the outer edge of BFW during all harvest activities.
- Soil disturbance within the ELZ must not result in sediment delivery to the stream.
- Suspend one end of the log during yarding within the ELZ. Use directional falling away from the stream to minimize stream bank disturbance. In the thinning zone, use ground-based yarding systems only on slopes less than 35%.
- All trees yarded through the thinning zone using cable thinning on slopes greater than 35% must be fully suspended.

Large Woody Debris Placement Strategy

Ecological functions associated with large woody debris (LWD) are an important part of productive in-stream habitat. While riparian forests mature, certain management techniques in these areas can help tree-growing conditions to achieve the overall objective of growing larger diameter trees to contribute to long term riparian and in-stream habitat function. However, if thinning results in a residual stand below 180 TPA, the addition of LWD into streams is required except when WDFW has granted a wood placement exemption. The LWD placement is intended to substitute for wood harvested under this template that otherwise had the potential to recruit to the stream. This strategy is intended to provide woody debris to the stream in the short term (< 50 years) until the remaining unharvested trees within the RMZ are available to naturally recruit to the stream over the long term (> 50 years). The LWD placement strategy is intended to encourage instream pool formation for fish habitat. However, woody debris placement should not create barriers to fish migration.

Large Woody Debris Placement Target

Depending on site conditions, this strategy may require the placement of up to 4 pieces of LWD per 300 lineal feet of stream (approximately 4 pieces per acre of RMZ).

Small forest landowners are encouraged to consult with the SFLO for technical assistance in identifying the preferred locations for LWD placement. Among those sites that are appropriate,

different restrictions or levels of consultation may be necessary. Technical staff can determine whether it is appropriate to place wood in the stream (taking into account stream size, sediment delivery concerns, etc.), help locate the most effective stream reaches for the placement of LWD, or determine if there is any need for additional LWD to be placed into the stream. At a minimum, the following locations should be avoided:

- Channels that have a history of debris torrents and/or other mass wasting activity.
- Channels that have a near-future likelihood of a debris torrent and/or other mass wasting activity.
- Locations immediately above permanent culverts.
- Confined channels where the valley floor width is less than twice the bankfull width (see Board Manual Section 2 for identifying CMZs and bankfull channel features).

Large Woody Debris Guidelines

The small forest landowner shall follow these guidelines for LWD placement:

- The priority for LWD placement, from high to low preference, is:
  (a) Root wads with tree boles attached.
  (b) Tree boles with no root wad.
  (c) Root wads without tree boles attached.
- Larger diameter wood is preferred over smaller diameter wood. However, LWD should be representative of the trees removed from the riparian stand.
- Landowners are encouraged to leave limbs and branches attached to logs that are placed.
- Trees may be felled directly into the stream.
- Trees may be bucked, and the bucked pieces may be placed in the stream.
- It is recommended that the boles of trees or rootwads be placed such that they are partially in the water and partially on the bank.
- Large woody debris should be placed so that part of it is in the water at low summer stream flows as well as during high stream flows, to create pools and cover for fish.
- The wood should not be held in place by anchoring or cabling.
- No bank excavation should occur during wood placement.
- The placement of LWD will likely need to occur when the local fish spawning populations are absent. This typically occurs during summer and fall low water flow periods.

Type of Wood and Wood Quality

For this template, LWD is the available wood found on the property of a small forest landowner. The landowner may utilize any living or dead trees for LWD except those required to provide a live root mass to maintain bank stability. The first row of living trees adjacent to the edge of BFW or the CMZ provides bank stability to the stream. Do not use these trees as LWD. Acceptable wood for LWD consists of:

- Conifer trees or logs, such as cedar, Douglas-fir, or hemlock. These are the preferred species for LWD placement because they will remain (i.e., decay slower) and will provide woody debris over a longer period. Hardwood or pine species should be avoided.
- Logs from trees felled at time of harvest or downed logs with a solid core. If logs are from an upland source, they must not include downed log requirements for wildlife as described in WAC 222-30-020(11). Downed logs and standing snags already within the RMZ should be retained for wildlife habitat, floodplain function, and stand regeneration rather than moved into the channel.

- Trees, including root wads, harvested during road construction are a good source of LWD.

Minimum Wood Length
The length of logs placed in the stream should be at least two times the bankfull width of the stream. If the log has a root wad attached, the log length should be no less than 1.5 times the bankfull width of the stream. The SFLO, in consultation with the WDFW or a tribal representative, shall determine if shorter wood lengths are acceptable.

Minimum Wood Diameter
The placement of large diameter woody debris is encouraged if it is available. However, LWD should be representative of the trees removed from the riparian stand. At a minimum, a piece of LWD measured at the small end must be at least 4 inches in diameter.

This strategy does not require the placement of large dimensional wood into the stream, but placement of large wood is encouraged if it is available. While it is recognized that most trees harvested under this template will not be greater than 22 inches diameter breast height (dbh), the landowner may place LWD obtained from off site. The table below from Board Manual Section 26 gives guidance for optimal LWD piece size in different sized streams.

BFW (in feet)	Minimum Diameter
< 5 feet	12 inches
> 5 and < 16 feet	16 inches
> 16 and < 32 feet	22 inches
> 32 feet	26 inches

Restrictions to Riparian Zone Disturbances
Minimize ground disturbance from machinery to reduce sediment delivery to a stream. Disturbed soils with the potential to erode and directly deliver to the stream shall be treated with erosion control measures available and appropriate for the site. Appropriate control measures may include water bars, grass seeding, mulching, hay bales or silt fences.

The ELZ is 30 feet, measured horizontally, from the outer edge of the BFW or CMZ (see Board Manual Section 2). Equipment may operate within this zone, but soil disturbance within the ELZ from ground based equipment or cable-logging systems must not result in sediment delivery to the stream. If LWD placement activities could expose more than 10% of the soil in the ELZ, there is potential for sediment delivery to the stream and the landowner must consult with DNR a Forest Practices forester before placement.

Other Permits
A Hydraulic Project Approval (HPA) review is triggered for Type F and S Waters when a forest practices application is submitted to DNR with an attached Western Washington Overstocked Stand Template Addendum that proposes to retain less than 180 trees per acre. An HPA is required for all woody debris placement in Type F and S Waters and is issued by the WDFW to regulate construction or other activities that "*use, divert, obstruct, or change the natural flow or bed of any. . . waters of the state. . .*" (chapter 220-110 WAC).

Summary

Applying this template will allow small forest landowners to submit an alternate plan for a Western Washington overstocked conifer thinning prescription as part of a completed forest practices application (FPA). The FPA will be processed as an alternate plan as outlined in WAC 222-12-0401. The template form, must be included with the forest practices application, and is available through DNR. This form provides the technical justifications, as required in WAC 222-12-0401(3)(b), (c), and (d), identifying how the alternate plan addresses the various functional requirements of the RMZ. Review of the proposed harvest may require an Interdisciplinary (ID) Team (see WAC 222-12-0401(5)). However, by adhering to the guidelines in this template, the need for an ID Team will be minimal and only necessary if specific issues arise.

NEW TEMPLATE

Template 2. Fixed Width Riparian Buffers for Small Forest Landowner's in Western Washington

Background

Many small forest landowners find the forest practices process to determine if their timber stands are eligible for riparian inner zone harvest to be onerous in complexity and expensive to implement. The effect can often be a loss of timber income.

Purpose

Using this template allows small forest landowners a simplified "fixed width" riparian buffer option for Western Washington Type S and F Waters. The template establishes a fixed width riparian buffer equal on average to the buffer widths occurring when the model is applied to meet desired future conditions as provided in rule, WAC 222-30-021. Providing a fixed width riparian buffer for small forest landowners using this template will also achieve the goal of WAC 222-30-010(2) ". . . to protect aquatic resources and related habitat to achieve restoration of riparian function; and the maintenance of these resources once they are restored."

Process

The landowner submits a fixed width riparian buffer on a template form, available from DNR. This form provides the technical justification required by WAC 222-12-0401(3) (b), (c), and (d), explaining how the alternate plan enhances riparian function and provides details of the landowner's plan. The template form must be included with the forest practices application (FPA).

Landowners planning to conduct a conifer restoration harvest within a riparian management zone (RMZ) adjacent to Type S Waters (protected by the Shoreline Management Act, RCW 76.09.910) must consult with the city or county of jurisdiction to determine if the proposed activities comply with the local shorelines master plan. If a Substantial Development Permit is required include a copy of the permit with your application.

As for any proposed Alternate Plan, an Interdisciplinary (ID) Team may be called to review the proposed fixed width riparian buffer (see WAC 222-12-0401(5)). However, by following the provisions in this template, an ID team will only be necessary if site – specific issues arise.

Eligible Stands

This template can be used for RMZs that are:

- Adjacent to Type S and F Waters; and
- Located in Western Washington.

Riparian Buffer Prescription:

This template establishes a fixed width, no harvest riparian buffer for Type S and F Waters. Use the following steps to determine the fixed width buffer for your stream:

1. Determine the outer edge of bankfull width (BFW) or the channel migration zone (CMZ), see Board Manual Section 2.
2. Determine the Site Class for the RMZ adjacent to the stream. To determine site class, download a Forest Practices Application/ Notification activity map for your area and activate the site class layer. Go to http://www.dnr.wa.gov/BusinessPermits/Topics/ForestPracticesApplications/Pages/fp_forms.aspx, and under the heading, "Forest Practices Application/Notification", click on "Print an activity map." After navigating to the location of your activity, in the left corner under the "Select a map" button, choose Site Class Map. In the upper right corner, click on the "Legend" button to find the site class of your activity.
3. Determine the width of the fixed width riparian zone using Table 1.
4. Establish the buffer on the ground by measuring horizontally from the outer edge of BFW or the CMZ, whichever is greater.

Table 1

Fixed Width, No Harvest Buffer Widths by Site Class

Site Class	**No Harvest Zone width** (measured from outer edge of BFW or outer edge of CMZ)
I	145 feet
II	118 feet
III	101 feet
IV	82 feet
V	75 feet