



~~May 26~~ July 9, 2015

MEMORANDUM

TO: Hans Berge, Adaptive Management Program Administrator

FROM: Adrian Miller and Chris Hanlon-Meyer, TFW Policy Co-Chairs

SUBJECT: Proposal Initiation: Defining Off-Channel Habitat (OCH) associated with Type F Waters and developing guidance for delineating OCH.

The Department of Natural Resources (DNR) ~~requests and~~ the TFW Policy Committee (Policy) submit to the Adaptive Management Program Administrator (AMPA) this Proposal Initiation ~~request~~ for an Adaptive Management Program review to define and delineate off-channel habitat. With this request, the AMPA will make recommendations for Policy's consideration on how to develop recommendations ~~to be included in the Type-F rule recommendations to be presented~~ to the Forest Practices Board (Board). ~~This proposal is to establish of the:~~

- Development track(s) and timeline(s) for completion of the description of and methods to delineate OCH;
- When developed, these products will be included in the Policy recommendations to the Board for
  - Inclusion in a Water Typing rule making and associated board manual guidance, and
  - Potential identification of additional research.

The following information is presented based on the requirements for a complete request for proposal initiation beginning on page M22-7 in Board Manual Section 22.

1. *The affected forest practices rule, guidance, or DNR product.*

WAC 222-16-010, "General Definitions"

WAC 222-16-030, "Water Typing system"

WAC 222-12-090 (23) "Guidelines for Field Protocol to Locate Divisions between Stream Types and Perennial Stream Identification"

2. *The urgency based on scientific uncertainty and resource risk.*

The Board through their motion dated February 11, 2014 directed the TFW Policy Committee to complete and report to the Board recommendations for options on a permanent water typing rule including "(1)(b) An evaluation of the process to identify off-channel habitat under the interim water typing rule, including recommended clarifications in field implementation guidance, or rule language. The evaluation must be based, in part, on field review of approved Forest Practices Applications and water type modification forms."

This request for Proposal Initiation identifies the need for Policy to approve the development track(s) and timeline(s) for completion of the task to prepare and recommend to the Board for inclusion of descriptions of off-channel habitat in the permanent water typing rule.

The Legislature and the Board determined how the permanent water typing rule will be established through the incorporation of the Forests and Fish Report (FFR) into the Forest Practices Act and subsequent Board action adopting water typing rules using the provisions of FFR. The Board, per direction of the Legislature in RCW 76.09.370, followed the recommendations of the Forests and Fish Report in the development and adoption of the current water typing rules. The adaptive management program, Policy, must be mindful of the following statute driven requirements in the development of a permanent water type rule:

- The Board is strongly encouraged to follow the recommendations of the forests and fish report;
- The permanent rules must accomplish the policies stated in RCW 76.09.010 without jeopardizing the economic viability of the forest products industry;
- Changes to the rules and any new rules covering aquatic resources may be adopted by the Board but only if the changes or new rules are consistent with recommendations resulting from the scientifically based adaptive management process;
- The adaptive management process shall incorporate the best available science and information and provide recommendations to the Board on proposed changes to forest practices rules to meet timber industry viability and salmon recovery.

**The elements of the proposal:**

**DNR Policy**, based on the Board's February, 2014 motion, requests **Policy forward this proposal to the Adaptive Management Program Administrator to begin Stage 1: Initiation and Screening of Proposals** as outlined beginning on page M22-8 in the board manual. With the requested tasks and supporting information contained in the proposal, the AMPA will assemble and present a proposal review packet for Policy's review and approval, page M22-10. The packet shall include a summary of the proposal, recommendations of proposed tracks for adaptive management program development and proposed timeline for completion.

**Tasks: Define and Describe Off-Channel Habitat. Initiate AMP process to address the following elements –**

**1. DNR's request to:**

- A. Review the existing guiding language in the Forest Practices Act, forest practices rules, and FFR establishing bankfull width and depth to calculate the edge of the stream and the stream flow level to establish OCH, and the start of the riparian management zone (except when a channel migration zone is present), the site must be connected to a fish habitat stream and accessible during some period of the year, and the off-channel water must be accessible to fish (WAC 222-16-030(2)(d), and through a drainage with less than a 5% gradient (WAC 222-30-031(2));**
- B. Review the existing science based definitions of bankfull width and depth in the forest practices rules and the FFR, and determine if an additional definition establishing bankfull elevation would better serve the determination of OCH. The rule**

currently defines bankfull width as “The measurement of the lateral extent of the water surface elevation perpendicular to the channel at bankfull depth”; and

C. Review the OCH description developed during Policy field site visits to determine if this description adequately covers off channel habitat as currently described in rule.

The site visits found “*Off Channel Habitat consists of waters connected to and draining into Type S and F waters by inundation at bank full elevation of the Type S or F water and encompassed by that area of inundation at bank full width and elevation;*

2. Board motion requirement to-D-P perform field reviews of approved Forest Practices Applications and water type modification forms, as called for in Board’s motion;

3. Policy caucuses requests to . . .

a. . .How much OCH is being omitted from either the existing or proposed rule descriptions? describe these habitats in a manner that would facilitate coverage under rule. – From WDFW/Ecology caucus (and potentially others)

b. . .and,What flood return interval defines 95% of OCH? What field methods delineate that flood return interval? – From federal caucus (and potentially others)

c. What is the definition of OCH in the current rule? – From WDFW/Ecology caucus (and potentially others)

4. -E- If necessary, identify the need(s) to initiate additional scientific review-; and,

5. Include timeframes for any recommended actions-;

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3. Any outstanding TFW, FFR, or Policy agreements supporting the proposal.

#### Forests & Fish Report and Statute

The Washington State Legislature found that the 1999 Salmon Recovery Act and the resulting Forests and Fish Rules “...taken as a whole, constitute a comprehensive and coordinated program to provide substantial and sufficient contributions to salmon recovery and water quality enhancement in areas impacted by forest practices...” (RCW 77.85.180(2)). It also recognized that federal and state agencies, tribes, county representatives, and private timberland owners have spent considerable effort and time to develop the Forests and Fish Report (RCW 76.09.055), and authorized the development of forest practices rules based on the analyses and conclusions of the Forests and Fish Report. The rules include the development of an adaptive management program to: . . . *make adjustments as quickly as possible to forest practices that are not achieving the resources objectives . . . (and) shall incorporate the best available science and information, include protocols and standards, regular monitoring, a scientific and peer review process, and provide recommendations to the board on proposed changes to forest practices rules to meet timber industry viability and salmon recovery.* (RCW 76.09.370(7)).

The Forests and Fish Report called for a forest practices Adaptive Management Program in Appendix L. The AMP is designed to meet the goals and objectives for water quality and fish habitat within the jurisdiction of the Forest Practices Program.

#### Board Manual Section 22, Guidelines for Adaptive Management Program

This manual fulfills the objectives outlined in Appendix L of the Forests and Fish Report. It provides a technical advisory supplement to the Forest Practices act and rules and provides guidance to the AMP. The process to request an AMP review and subsequent preparation of recommendations to present to the Board for potential rules changes is found in Part 3.1 Stage 1: Initiation and Screening of Proposals.

4. *How the results of the proposal could address Adaptive Management Program key questions and resource objectives or other rule, guidance, or DNR product.*

This proposal follows the Adaptive Management Program goals expressed in FFR Appendix L, *Adaptive Management*, and embraces the Policy and science based process to develop recommendations for rule change to present to the Board. FFR called for the establishment of:

- A science-based adaptive management program to monitor the relationships and evaluate the effectiveness of rules and guidance toward achieving the target forest conditions and processes;
- Forest Practices Board adopted rules and guidance designating the required elements of an adaptive management process;
- Forest Practices Board set priorities for action as guided by information developed through the adaptive management process; and
- TFW (Policy) recommendations to the (Board) are to be accompanied by formal petitions for rulemaking and guidance.

5. *Available literature, data and other information supporting the proposal.*

The Board adopted forest practices rules protecting aquatic resources consistent with the recommendations contained in the forests and fish report. The following information lists the intent and direction from the Legislature to the Forest Practices Board through the Forest Practices Act (Chapter 76.09 RCW), and descriptions of OCH based on forest practices rules (Chapter 222 WAC) and the Forests and Fish Report.

**Forest Practices Act, Chapter 76.09 RCW**

**RCW 76.09.010 Legislative Finding and Declaration**

(1) The legislature hereby finds and declares that the forest land resources are among the most valuable of all resources in the state; that a viable forest products industry is of prime importance to the state's economy; that it is in the public interest for public and private commercial forest lands to be managed consistent with sound policies of natural resource protection; that coincident with maintenance of a viable forest products industry, it is important to afford protection to forest soils, fisheries, wildlife, water quantity and quality, air quality, recreation, and scenic beauty.

(2) The legislature further finds and declares it to be in the public interest of this state to create and maintain through the adoption of this chapter a comprehensive statewide system of laws and forest practices rules which will achieve the following purposes and policies:

- (a) Afford protection to, promote, foster and encourage timber growth, and require such minimum reforestation of commercial tree species on forest lands as will reasonably utilize the timber growing capacity of the soil following current timber harvest;
- (b) Afford protection to forest soils and public resources by utilizing all reasonable methods of technology in conducting forest practices;
- (c) Recognize both the public and private interest in the profitable growing and harvesting of timber;
- (d) Promote efficiency by permitting maximum operating freedom consistent with the other purposes and policies stated herein;
- (e) Provide for regulation of forest practices so as to avoid unnecessary duplication in such rules;

- (f) Provide for interagency input and intergovernmental and tribal coordination and cooperation;
  - (g) Achieve compliance with all applicable requirements of federal and state law with respect to nonpoint sources of water pollution from forest practices;
  - (h) To consider reasonable land use planning goals and concepts contained in local comprehensive plans and zoning regulations;
  - (i) Foster cooperation among managers of public resources, forest landowners, Indian tribes and the citizens of the state;
  - (j) Develop a watershed analysis system that addresses the cumulative effect of forest practices on, at a minimum, the public resources of fish, water, and public capital improvements of the state and its political subdivisions; and
  - (k) Assist forest landowners in accessing market capital and financing for the ecosystem services provided to the public as a result of the protection of public resources.
- (3) The legislature further finds and declares that it is also in the public interest of the state to encourage forest landowners to undertake corrective and remedial action to reduce the impact of mass earth movements and fluvial processes.
- (4) The legislature further finds and declares that it is in the public interest that the applicants for state forest practices permits should assist in paying for the cost of review and permitting necessary for the environmental protection of these resources.

**RCW 76.09.370 Findings – Forests and Fish Report**

- (1) The legislature finds that the process that produced the forests and fish report was instigated by the forest practices board, the report is the product of considerable negotiations between several diverse interest groups, and the report has the support of key federal agencies. When adopting permanent rules under this section, the forest practices board is strongly encouraged to follow the recommendations of the forests and fish report, but may include other alternatives for protection of aquatic resources. If the forest practices board chooses to adopt rules under this section that are not consistent with the recommendations contained in the forests and fish report, the board must notify the appropriate legislative committees of the proposed deviations, the reasons for the proposed deviations, and whether the parties to the forests and fish report still support the agreement. The board shall defer final adoption of such rules for sixty days of the legislative session to allow for the opportunity for additional public involvement and legislative oversight.
- (2) The forest practices board shall follow the regular rules adoption process contained in the administrative procedure act, chapter 34.05 RCW, when adopting permanent rules pertaining to forest practices and the protection of aquatic resources except as limited by subsection (1) of this section. The permanent rules must accomplish the policies stated in RCW 76.09.010 without jeopardizing the economic viability of the forest products industry.
- (3) The rules adopted under this section should be as specific as reasonably possible while also allowing an applicant to propose alternate plans in response to site-specific physical features. Alternate plans should provide protection to public resources at least equal in overall effectiveness by alternate means.
- (4) Rule making under subsection (2) of this section shall be completed by June 30, 2001.
- (5) The board should consider coordinating any environmental review process under chapter 43.21C RCW relating to the adoption of rules under subsection (2) of this section with any review of a related proposal under the national environmental policy act (42 U.S.C. Sec. 4321, et seq.).

(6) After the board has adopted permanent rules under subsection (2) of this section, changes to those rules and any new rules covering aquatic resources may be adopted by the board but only if the changes or new rules are consistent with recommendations resulting from the scientifically based adaptive management process established by a rule of the board. Any new rules or changes under this subsection need not be based upon the recommendations of the adaptive management process if: (a) The board is required to adopt or modify rules by the final order of any court having jurisdiction thereof; or (b) future state legislation directs the board to adopt or modify the rules.

(7) In adopting permanent rules, the board shall incorporate the scientific-based adaptive management process described in the forests and fish report which will be used to determine the effectiveness of the new forest practices rules in aiding the state's salmon recovery effort. The purpose of an adaptive management process is to make adjustments as quickly as possible to forest practices that are not achieving the resource objectives. The adaptive management process shall incorporate the best available science and information, include protocols and standards, regular monitoring, a scientific and peer review process, and provide recommendations to the board on proposed changes to forest practices rules to meet timber industry viability and salmon recovery.

## **Forest Practices Rules, Chapter 222 WAC**

### **WAC 222-16-010 \*General definitions.**

Unless otherwise required by context, as used in these rules:

**"Bankfull depth"** means the average vertical distance between the channel bed and the estimated water surface elevation required to completely fill the channel to a point above which water would enter the flood plain or intersect a terrace or hillslope. In cases where multiple channels exist, the bankfull depth is the average depth of all channels along the cross-section. (See board manual section 2.)

**"Bankfull width"** means:

(a) For streams - **The measurement of the lateral extent of the water surface elevation perpendicular to the channel at bankfull depth.** In cases where multiple channels exist, bankfull width is the sum of the individual channel widths along the cross-section (see board manual section 2).

(b) For lakes, ponds, and impoundments - Line of mean high water.

(c) For tidal water - Line of mean high tide.

(d) For periodically inundated areas of associated wetlands - Line of periodic inundation, which will be found by examining the edge of inundation to ascertain where the presence and action of waters are so common and usual, and so long continued in all ordinary years, as to mark upon the soil a character distinct from that of the abutting upland.

**"Riparian management zone (RMZ)"** means:

(1) **For Western Washington**

(a) The area protected on each side of a Type S or F Water measured horizontally from the outer edge of the bankfull width or the outer edge of the CMZ, whichever is greater

(b) The area protected on each side of Type Np Waters, measured horizontally from the outer edge of the bankfull width. (See WAC 222-30-021(2).)

(2) **For Eastern Washington**

(a) The area protected on each side of a Type S or F Water measured horizontally from the outer edge of the bankfull width or the outer edge of the CMZ, whichever is greater

(b) The area protected on each side of Type Np Waters, measured horizontally from the outer edge of the bankfull width.

"**RMZ core zone**" means:

(1) **For Western Washington**, the 50 foot buffer of a Type S or F Water, measured horizontally from the outer edge of the bankfull width or the outer edge of the channel migration zone, whichever is greater.

(2) **For Eastern Washington**, the thirty foot buffer of a Type S or F Water, measured horizontally from the outer edge of the bankfull width or the outer edge of the channel migration zone, whichever is greater.

#### **WAC 222-16-030 Water Typing system**

Until the fish habitat water type maps described below are adopted by the board, the Interim Water Typing System established in WAC 222-16-031 will continue to be used. The department in cooperation with the departments of fish and wildlife, and ecology, and in consultation with affected Indian tribes will classify streams, lakes and ponds. The department will prepare water type maps showing the location of Type S, F, and N (Np and Ns) Waters within the forested areas of the state. The maps will be based on a multiparameter, field-verified geographic information system (GIS) logistic regression model. The multiparameter model will be designed to identify fish habitat by using geomorphic parameters such as basin size, gradient, elevation and other indicators. The modeling process shall be designed to achieve a level of statistical accuracy of 95% in separating fish habitat streams and nonfish habitat streams. Furthermore, the demarcation of fish and nonfish habitat waters shall be equally likely to over and under estimate the presence of fish habitat. These maps shall be referred to as "fish habitat water typing maps" and shall, when completed, be available for public inspection at region offices of the department.

Fish habitat water type maps will be updated every five years where necessary to better reflect observed, in-field conditions. Except for these periodic revisions of the maps, on-the-ground observations of fish or habitat characteristics will generally not be used to adjust mapped water types. However, if an on-site interdisciplinary team using nonlethal methods identifies fish, or finds that habitat is not accessible due to naturally occurring conditions and no fish reside above the blockage, then the water type will be immediately changed to reflect the findings of the interdisciplinary team. The finding will be documented on a water type update form provided by the department and the fish habitat water type map will be updated as soon as practicable. If a dispute arises concerning a water type the department shall make available informal conferences, as established in WAC 222-46-020 which shall include the departments of fish and wildlife, and ecology, and affected Indian tribes and those contesting the adopted water types.

The waters will be classified using the following criteria:

**\*(1) "Type S Water"** means all waters, within their bankfull width, as inventoried as "shorelines of the state" under chapter 90.58 RCW and the rules promulgated pursuant to chapter 90.58 RCW including periodically inundated areas of their associated wetlands.

**\*(2) "Type F Water"** means segments of natural waters other than Type S Waters, which are within the bankfull widths of defined channels and periodically inundated areas of their associated wetlands, or within lakes, ponds, or impoundments having a surface area of 0.5 acre or greater at

seasonal low water and which in any case contain fish habitat or are described by one of the following four categories:

(a) Waters, which are diverted for domestic use by more than 10 residential or camping units or by a public accommodation facility licensed to serve more than 10 persons, where such diversion is determined by the department to be a valid appropriation of water and the only practical water source for such users. Such waters shall be considered to be Type F Water upstream from the point of such diversion for 1,500 feet or until the drainage area is reduced by 50 percent, whichever is less;

(b) Waters, which are diverted for use by federal, state, tribal or private fish hatcheries. Such waters shall be considered Type F Water upstream from the point of diversion for 1,500 feet, including tributaries if highly significant for protection of downstream water quality. The department may allow additional harvest beyond the requirements of Type F Water designation provided the department determines after a landowner-requested on-site assessment by the department of fish and wildlife, department of ecology, the affected tribes and interested parties that:

(i) The management practices proposed by the landowner will adequately protect water quality for the fish hatchery; and

(ii) Such additional harvest meets the requirements of the water type designation that would apply in the absence of the hatchery;

(c) Waters, which are within a federal, state, local, or private campground having more than 10 camping units: Provided, That the water shall not be considered to enter a campground until it reaches the boundary of the park lands available for public use and comes within 100 feet of a camping unit, trail or other park improvement;

(d) Riverine ponds, wall-based channels, and other channel features that are used by fish for off-channel habitat. These areas are critical to the maintenance of optimum survival of fish. This habitat shall be identified based on the following criteria:

(i) The site must be connected to a fish habitat stream and accessible during some period of the year; and

(ii) The off-channel water must be accessible to fish.

(3) "Type Np Water" means all segments of natural waters within the bankfull width of defined channels that are perennial nonfish habitat streams. Perennial streams are flowing waters that do not go dry any time of a year of normal rainfall and include the intermittent dry portions of the perennial channel below the uppermost point of perennial flow.

(4) "Type Ns Water" means all segments of natural waters within the bankfull width of the defined channels that are not Type S, F, or Np Waters. These are seasonal, nonfish habitat streams in which surface flow is not present for at least some portion of a year of normal rainfall and are not located downstream from any stream reach that is a Type Np Water. Ns Waters must be physically connected by an above-ground channel system to Type S, F, or Np Waters.

\* (5) For purposes of this section:

(a) "Residential unit" means a home, apartment, residential condominium unit or mobile home, serving as the principal place of residence.

(b) "Camping unit" means an area intended and used for:

(i) Overnight camping or picnicking by the public containing at least a fireplace, picnic table and access to water and sanitary facilities; or

(ii) A permanent home or condominium unit or mobile home not qualifying as a "residential unit" because of part time occupancy.



(c) "Public accommodation facility" means a business establishment open to and licensed to serve the public, such as a restaurant, tavern, motel or hotel.

(d) "Natural waters" only excludes water conveyance systems which are artificially constructed and actively maintained for irrigation.

(e) "Seasonal low flow" and "seasonal low water" mean the conditions of the 7-day, 2-year low water situation, as measured or estimated by accepted hydrologic techniques recognized by the department.

(f) "Channel width and gradient" means a measurement over a representative section of at least 500 linear feet with at least 10 evenly spaced measurement points along the normal stream channel but excluding unusually wide areas of negligible gradient such as marshy or swampy areas, beaver ponds and impoundments. Channel gradient may be determined utilizing stream profiles plotted from United States geological survey topographic maps (see board manual section 23).

(g) "Intermittent streams" means those segments of streams that normally go dry.

(h) "Fish habitat" means habitat which is used by any fish at any life stage at any time of the year, including potential habitat likely to be used by fish which could be recovered by restoration or management and includes off-channel habitat.

WAC 222-30-021 \*Western Washington riparian management zones.

Until the fish habitat water type maps mentioned above are available, waters will be classified according to the interim water typing system described below. If a dispute arises concerning a water type, the department shall make available informal conferences, which shall include the departments of fish and wildlife, ecology, and affected Indian tribes and those contesting the adopted water types. These conferences shall be established under procedures established in WAC 222-46-020.

For the purposes of this interim water typing system see the following table:

**Water Type Conversion Table**

<b>Permanent Water Typing</b>	<b>Interim Water Typing</b>
Type "S"	Type 1 Water
Type "F"	Type 2 and 3 Water
Type "Np"	Type 4 Water
Type "Ns"	Type 5 Water

\*(1) "**Type 1 Water**" means all waters, within their ordinary high-water mark, as inventoried as "shorelines of the state" under chapter 90.58 RCW and the rules promulgated pursuant to chapter 90.58 RCW, but not including those waters' associated wetlands as defined in chapter 90.58 RCW.

\*(2) "**Type 2 Water**" means segments of natural waters which are not classified as Type 1 Water and have a high fish, wildlife, or human use. These are segments of natural waters and periodically inundated areas of their associated wetlands, which:

(a) Are diverted for domestic use by more than 100 residential or camping units or by a public accommodation facility licensed to serve more than 10 persons, where such diversion is determined by the department to be a valid appropriation of water and only considered Type 2 Water upstream from the point of such diversion for 1,500 feet or until the drainage area is reduced by 50 percent, whichever is less;

(b) Are diverted for use by federal, state, tribal or private fish hatcheries. Such waters shall be considered Type 2 Water upstream from the point of diversion for 1,500 feet, including tributaries if highly significant for protection of downstream water quality. The department may allow additional harvest beyond the requirements of Type 2 Water designation provided by the department of fish and wildlife, department of ecology, the affected tribes and interested parties that:

(i) The management practices proposed by the landowner will adequately protect water quality for the fish hatchery; and

(ii) Such additional harvest meets the requirements of the water type designation that would apply in the absence of the hatchery;

(c) Are within a federal, state, local or private campground having more than 30 camping units: Provided, That the water shall not be considered to enter a campground until it reaches the boundary of the park lands available for public use and comes within 100 feet of a camping unit.

(d) Are used by fish for spawning, rearing or migration. Waters having the following characteristics are presumed to have highly significant fish populations:

(i) Stream segments having a defined channel 20 feet or greater within the bankfull width and having a gradient of less than 4 percent.

(ii) Lakes, ponds, or impoundments having a surface area of 1 acre or greater at seasonal low water; or

(e) Are used by fish for off-channel habitat. These areas are critical to the maintenance of optimum survival of fish. This habitat shall be identified based on the following criteria:

(i) The site must be connected to a fish bearing stream and be accessible during some period of the year; and

(ii) The off-channel water must be accessible to fish through a drainage with less than a 5% gradient.

\*(3) "**Type 3 Water**" means segments of natural waters which are not classified as Type 1 or 2 Waters and have a moderate to slight fish, wildlife, or human use. These are segments of natural waters and periodically inundated areas of their associated wetlands which:

(a) Are diverted for domestic use by more than 10 residential or camping units or by a public accommodation facility licensed to serve more than 10 persons, where such diversion is determined by the department to be a valid appropriation of water and the only practical water source for such users. Such waters shall be considered to be Type 3 Water upstream from the point of such diversion for 1,500 feet or until the drainage area is reduced by 50 percent, whichever is less;

(b) Are used by fish for spawning, rearing or migration. The requirements for determining fish use are described in the board manual section 13. If fish use has not been determined:

(i) Waters having any of the following characteristics are presumed to have fish use:

(A) Stream segments having a defined channel of 2 feet or greater within the bankfull width in Western Washington; or 3 feet or greater in width in Eastern Washington; and having a gradient of 16 percent or less;

(B) Stream segments having a defined channel of 2 feet or greater within the bankfull width in Western Washington; or 3 feet or greater within the bankfull width in Eastern Washington, and having a gradient greater than 16 percent and less than or equal to 20 percent, and having greater than 50 acres in contributing basin size in Western Washington or greater than 175 acres contributing basin size in Eastern Washington, based on hydrographic boundaries;

(C) Ponds or impoundments having a surface area of less than 1 acre at seasonal low water and having an outlet to a fish stream;

(D) Ponds of impoundments having a surface area greater than 0.5 acre at seasonal low water.

(ii) The department shall waive or modify the characteristics in (i) of this subsection where:

(A) Waters have confirmed, long term, naturally occurring water quality parameters incapable of supporting fish;

(B) Snowmelt streams have short flow cycles that do not support successful life history phases of fish. These streams typically have no flow in the winter months and discontinue flow by June 1; or

(C) Sufficient information about a geomorphic region is available to support a departure from the characteristics in (i) of this subsection, as determined in consultation with the department of fish and wildlife, department of ecology, affected tribes and interested parties.

\* (4) **"Type 4 Water"** means all segments of natural waters within the bankfull width of defined channels that are perennial nonfish habitat streams. Perennial streams are flowing waters that do not go dry any time of a year of normal rainfall and include the intermittent dry portions of the perennial channel below the uppermost point of perennial flow.

\* (5) **"Type 5 Waters"** means all segments of natural waters within the bankfull width of the defined channels that are not Type 1, 2, 3, or 4 Waters. These are seasonal, nonfish habitat streams in which surface flow is not present for at least some portion of the year and are not located downstream from any stream reach that is a Type 4 Water. Type 5 Waters must be physically connected by an above-ground channel system to Type 1, 2, 3, or 4 Waters.

\* (6) For purposes of this section:

(a) "Residential unit" means a home, apartment, residential condominium unit or mobile home, serving as the principal place of residence.

(b) "Camping unit" means an area intended and used for:

(i) Overnight camping or picnicking by the public containing at least a fireplace, picnic table and access to water and sanitary facilities; or

(ii) A permanent home or condominium unit or mobile home not qualifying as a "residential unit" because of part time occupancy.

(c) "Public accommodation facility" means a business establishment open to and licensed to serve the public, such as a restaurant, tavern, motel or hotel.

(d) "Natural waters" only excludes water conveyance systems which are artificially constructed and actively maintained for irrigation.

(e) "Seasonal low flow" and "seasonal low water" mean the conditions of the 7-day, 2-year low water situation, as measured or estimated by accepted hydrologic techniques recognized by the department.

(f) "Channel width and gradient" means a measurement over a representative section of at least 500 linear feet with at least 10 evenly spaced measurement points along the normal stream channel but excluding unusually wide areas of negligible gradient such as marshy or swampy areas, beaver ponds and impoundments. Channel gradient may be determined utilizing stream profiles plotted from United States geological survey topographic maps. (See board manual section 23.)

**WAC 222-30-021 \*Western Washington riparian management zones.**

These rules apply to all typed waters on forest land in Western Washington, except as provided in WAC 222-30-023. RMZs are measured horizontally from the outer edge of the bankfull width or channel migration zone, whichever is greater, and extend to the limits as described in this section. See board manual section 7 for riparian design and layout guidelines.

\*(1) **Western Washington RMZs for Type S and F Waters** have three zones: The core zone is nearest to the water, the inner zone is the middle zone, and the outer zone is furthest from the water. (See definitions in WAC 222-16-010.) RMZ dimensions vary depending on the site class of the land, the management harvest option, and the bankfull width of the stream. See tables for management options 1 and 2 below.

None of the limitations on harvest in each of the three zones listed below will preclude or limit the construction and maintenance of roads for the purpose of crossing streams in WAC 222-24-030 and 222-24-050, or the creation and use of yarding corridors in WAC 222-30-060(1).

The shade requirements in WAC 222-30-040 must be met regardless of harvest opportunities provided in the inner zone RMZ rules. See board manual section 1.

(a) **Core zones.** No timber harvest or construction is allowed in the core zone except operations related to forest roads as detailed in subsection (1) of this section. Any trees cut for or damaged by yarding corridors in the core zone must be left on the site. Any trees cut as a result of road construction to cross a stream may be removed from the site, unless used as part of a large woody debris placement strategy or as needed to reach stand requirements.

(b) **Inner zones.** Forest practices in the inner zone must be conducted in such a way as to meet or exceed stand requirements to achieve the goal in WAC 222-30-010(2). The width of the inner zone is determined by site class, bankfull width, and management option. Timber harvest in this zone must be consistent with the stand requirements in order to reach the desired future condition targets.

"**Stand requirement**" means a number of trees per acre, the basal area and the proportion of conifer in the combined inner zone and adjacent core zone so that the growth of the trees would meet desired future conditions. The following table defines basal area targets when the stand is one hundred forty years old.

Site Class	Desired future condition target basal area per acre (at 140 years)
I	325 sq. ft.
II	325 sq. ft.
III	325 sq. ft.
IV	325 sq. ft.
V	325 sq. ft.

Growth modeling is necessary to calculate whether a particular stand meets stand requirement and is on a trajectory towards these desired future condition basal area target. The appropriate growth model will be based on stand characteristics and will include at a minimum, the following components: The number of trees by diameter class, the percent of conifer and hardwood, and the age of the stand. See board manual section 7.

(i) **Hardwood conversion in the inner zone.** When the existing stands in the combined core and inner zone do not meet stand requirements, no harvest is permitted in the inner zone, except in connection with hardwood conversion.

The landowner may elect to convert hardwood-dominated stands in the **inner zone** to conifer-dominated stands. Harvesting and replanting shall be in accordance with the following limits:

(A) Conversion activities in the **inner zone** of any harvest unit are only allowed where all of the following are present:

- Existing stands in the combined core and inner zone do not meet stand requirements (WAC 222-30-021 (1)(b));
- There are fewer than fifty-seven conifer trees per acre eight inches or larger dbh in the conversion area;
- There are fewer than one hundred conifer trees per acre larger than four inches dbh in the conversion area;
- There is evidence (such as conifer stumps, historical photos, or a conifer understory) that the conversion area can be successfully reforested with conifer and support the development of conifer stands;
- The landowner owns five hundred feet upstream and five hundred feet downstream of the harvest unit;
- The core and inner zones contain no stream adjacent parallel roads;
- Riparian areas contiguous to the proposed harvest unit are owned by the landowner proposing to conduct the conversion activities, and meet shade requirements of WAC 222-30-040 or have a seventy-five foot buffer with trees at least forty feet tall on both sides of the stream for five hundred feet upstream and five hundred feet downstream of the proposed harvest unit (or the length of the stream, if less);
- If the landowner has previously converted hardwood-dominated stands, then postharvest treatments must have been performed to the satisfaction of the department.

(B) In addition to the conditions set forth above, permitted conversion activities in the **inner zone** of any harvest unit are limited by the following:

- Each continuous conversion area is not more than five hundred feet in length; two conversion areas will be considered "continuous" unless the no-harvest area separating the two conversion areas is at least half the length of the larger of the two conversion areas.
- Type S and F (Type 1, 2, or 3) Water: Up to fifty percent of the inner zone area of the harvest unit on one side of the stream may be converted provided that:
  - ◆ The landowner owns the opposite side of the stream and the landowner's riparian area on the opposite bank meets the shade requirements of WAC 222-30-040 or has a seventy-five foot buffer of trees at least forty feet tall or:
  - ◆ The landowner does not own land on the opposite side of the stream but the riparian area on the opposite bank meets the shade requirements of WAC 222-30-040 or has a seventy-five foot buffer of trees at least forty feet tall.
- Not more than twenty-five percent of the inner zone of the harvest unit on both sides of a Type S or F Water may be converted if the landowner owns both sides.

(C) Where conversion is allowed in the **inner zone**, trees within the conversion area may be harvested except that:

- Conifer trees larger than twenty inches dbh shall not be harvested;
- Not more than ten percent of the conifer stems greater than eight inches dbh, exclusive of the conifer noted above, within the conversion area may be harvested; and
- The landowner must exercise reasonable care in the conduct of harvest activities to minimize damage to all residual conifer trees within the conversion area including conifer trees less than eight inches dbh.

(D) Following harvest in conversion areas, the landowner must:

- Reforest the conversion area with **conifer** tree species suitable to the site in accordance with the requirements of WAC 222-34-010; and

- Conduct postharvest treatment of the site until the conifer trees necessary to meet acceptable stocking levels in WAC 222-34-010(2) have crowns above the brush or until the conversion area contains a minimum of one hundred fifty conifer trees greater than eight inches dbh per acre.

- Notify the department in writing within three years of the approval of the forest practices application for hardwood conversion, if the hardwood conversion has been completed.

(E) **Tracking hardwood conversion.** The purpose of tracking hardwood conversion is to determine if hardwood conversion is resulting in adequate enhancement of riparian functions toward the desired future condition while minimizing the short term impacts on functions. The department will use existing or updated data bases developed in cooperation with the Washington Hardwoods Commission to identify watershed administrative units (WAUs) with a high percentage of hardwood-dominated riparian areas and, thus have the potential for excessive hardwood conversion under these rules. The department will track the rate of conversion of hardwoods in the riparian zone: (1) Through the application process on an annual basis; and (2) at a WAU scale on a biennial basis as per WAC 222-30-120 through the adaptive management process which will develop thresholds of impact for hardwood conversion at the watershed scale.

(ii) **Harvest options.**

(A) No inner zone management. When the existing stands in the combined core and inner zone do not meet stand requirements, no harvest is permitted in the inner zone. When no harvest is permitted in the inner zone or the landowner chooses not to enter the inner zone, the width of core, inner and outer zones are as provided in the following table:

**No inner zone management RMZ widths for Western Washington**

Site Class	RMZ width	Core zone width (measured from outer edge of bankfull width or outer edge of CMZ of water)	Inner zone width (measured from outer edge of core zone)		Outer zone width (measured from outer edge of inner zone)	
			stream width ≤10'	stream width >10'	stream width ≤10'	stream width >10'
I	200'	50'	83'	100'	67'	50'
II	170'	50'	63'	78'	57'	42'
III	140'	50'	43'	55'	47'	35'
IV	110'	50'	23'	33'	37'	27'
V	90'	50'	10'	18'	30'	22'

(B) Inner zone management. If trees can be harvested and removed from the inner zone because of surplus basal area consistent with the stand requirement, the harvest and removal of the trees must be undertaken consistent with one of two options:

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

- Residual trees left in the combined core and inner zones must meet stand requirements necessary to be on a trajectory to desired future condition. See board manual section 7 for guidelines.

- Thinning must be from below, meaning the smallest dbh trees are selected for harvest first, then progressing to successively larger diameters.

- Thinning cannot decrease the proportion of conifer in the stand.
- Shade retention to meet the shade rule must be confirmed by the landowner for any harvest inside of seventy-five feet from the outer edge of bankfull width or outer edge of CMZ, whichever is greater.
- The number of residual conifer trees per acre in the inner zone will equal or exceed fifty-seven.

**Option 1. Thinning from below.**

Site class	RMZ width	Core zone width (measured from outer edge of bankfull width or outer edge of CMZ of water)	Inner zone width (measured from outer edge of core zone)		Outer zone width (measured from outer edge of inner zone)	
			stream width ≤10'	stream width >10'	stream width ≤10'	stream width >10'
I	200'	50'	83'	100'	67'	50'
II	170'	50'	63'	78'	57'	42'
III	140'	50'	43'	55'	47'	35'
IV	110'	50'	23'	33'	37'	27'
V	90'	50'	10'	18'	30'	22'

(II) **Option 2. Leaving trees closest to the water.** Management option 2 applies only to riparian management zones for site class I, II, and III on streams that are less than or equal to ten feet wide and RMZs in site class I and II for streams greater than ten feet wide. Harvest must comply with the following:

- Harvest is not permitted within thirty feet of the core zone for streams less than or equal to ten feet wide and harvest is not permitted within fifty feet of the core zone for streams greater than ten feet wide;
- Residual leave trees in the combined core and inner zone must meet stand requirements necessary to be on a trajectory to desired future condition. See board manual section 7 for calculating stand requirements;
- A minimum of twenty conifers per acre, with a minimum twelve inch dbh, will be retained in any portion of the inner zone where even-age harvest occurs. These riparian leave trees will be counted

towards meeting applicable stand requirements. The number of riparian leave trees cannot be reduced below twenty for any reason.

- Trees are selected for harvest starting from the outer most portion of the inner zone first then progressively closer to the stream.

- If (b)(ii)(B)(II) of this subsection results in surplus basal area per the stand requirement, the landowner may take credit for the surplus by harvesting additional riparian leave trees required to be left in the adjacent outer zone on a basal area-for-basal area basis. The number of leave trees in the outer zone can be reduced only to a minimum of ten trees per acre.

**Option 2. Leaving trees closest to water.**

Site Class	RMZ width	Core zone width (measured from outer edge of bankfull width or outer edge of CMZ of water)	Inner zone width				Outer zone width (measured from outer edge of inner zone)	
			stream width ≤10'	stream width ≤10'	stream width >10'	stream width >10'	stream width ≤10'	stream width >10'
				minimum floor distance		minimum floor distance		
			(measured from outer edge of core zone)	(measured from outer edge of core zone)	(measured from outer edge of core zone)	(measured from outer edge of core zone)		
I	200'	50'	84'	30'	84'	50'	66'	66'
II	170'	50'	64'	30'	70'	50'	56'	50'
III	140'	50'	44'	30'	**	**	46'	**

\*\* Option 2 for site class III on streams >10' is not permitted because of the minimum floor (100') constraint.

(iii) **Where the basal area components of the stand requirement cannot be met** within the sum of the areas in the inner and core zone due to the presence of a stream-adjacent parallel road in the inner or core zone, a determination must be made of the approximate basal area that would have been



present in the inner and core zones if the road was not occupying space in the core or inner zone and the shortfall in the basal area component of the stand requirement. See definition of "stream-adjacent parallel road" in WAC 222-16-010.

(A) Trees containing basal area equal to the amount determined in (b)(iii) of this subsection will be left elsewhere in the inner or outer zone, or if the zones contain insufficient riparian leave trees, substitute riparian leave trees will be left within the RMZ width of other Type S or F Waters in the same unit or along Type Np or Ns Waters in the same unit in addition to all other RMZ requirements on those same Type S, F, Np or Ns Waters.

(B) When the stream-adjacent road basal area calculated in (b)(iii) of this subsection results in an excess in basal area (above stand requirement) then the landowner may receive credit for such excess which can be applied on a basal area-by-basal area basis against the landowner's obligation to leave trees in the outer zone of the RMZ of such stream or other waters within the same unit, provided that the number of trees per acre in the outer zone is not reduced to less than ten trees per acre.

(C) When the basal area requirement cannot be met, as explained in (b)(iii) of this subsection, the shortfall may be reduced through the implementation of an acceptable large woody debris placement plan. See board manual section 26 for guidelines.

(iv) If a harvest operation includes both yarding and harvest activities within the RMZ, all calculations of basal area for stand requirements will be determined as if the yarding corridors were constructed prior to any other harvest activities. If trees cut or damaged by yarding are taken from excess basal area, these trees may be removed from the inner zone. Trees cut or damaged by yarding in a unit which does not meet the basal area target of the stand requirements cannot be removed from the inner zone. Any trees cut or damaged by yarding in the core zone may not be removed.

(c) **Outer zones.** Timber harvest in the outer zone must leave twenty riparian leave trees per acre after harvest. "**Outer zone riparian leave trees**" are trees that must be left after harvest in the outer zone in Western Washington. Riparian leave trees must be left uncut throughout all future harvests:

**Outer zone riparian leave tree requirements**

<b>Application</b>	<b>Leave tree spacing</b>	<b>Tree species</b>	<b>Minimum dbh required</b>
Outer zone	Dispersed	Conifer	12" dbh or greater
Outer zone	Clumped	Conifer	12" dbh or greater
Protection of sensitive features	Clumped	Trees representative of the overstory including both hardwood and conifer	8" dbh or greater

The twenty riparian leave trees to be left can be reduced in number under the circumstances delineated in (c)(iv) of this subsection. The riparian leave trees must be left on the landscape according

to one of the following two strategies. A third strategy is available to landowners who agree to a LWD placement plan.

(i) **Dispersal strategy.** Riparian leave trees, which means conifer species with a diameter measured at breast height (dbh) of twelve inches or greater, must be left dispersed approximately evenly throughout the outer zone. If riparian leave trees of twelve inches dbh or greater are not available, then the next largest conifers must be left. If conifers are not present, riparian leave trees must be left according to the clumping strategy in (c)(ii) of this subsection.

(ii) **Clumping strategy.** Riparian leave trees must be left clumped in the following way:

(A) Clump trees in or around one or more of the following **sensitive features** to the extent available within the outer zone. When clumping around sensitive features, riparian leave trees must be eight inches dbh or greater and representative of the overstory canopy trees in or around the sensitive feature and may include both hardwood and conifer species. Sensitive features are:

(I) Seeps and springs;

(II) Forested wetlands;

(III) Topographic locations (and orientation) from which leave trees currently on the site will be delivered to the water;

(IV) Areas where riparian leave trees may provide windthrow protection;

(V) Small unstable, or potentially unstable, slopes not of sufficient area to be detected by other site evaluations. See WAC 222-16-050 (1)(d).

(VI) Archaeological sites or historic archaeological resources as defined in RCW 27.53.030;

(VII) Historic sites eligible for listing on the National Register of Historic Places or the Washington Heritage Register as determined by the Washington state department of archaeology and historic preservation. See WAC 222-16-050 (1)(f); or

(VIII) Sites containing evidence of Native American cairns, graves or glyptic records as provided for in chapters 27.44 and 27.53 RCW. See WAC 222-16-050 (1)(f).

(B) If sensitive features are not present, then clumps must be well distributed throughout the outer zone and the leave trees must be of conifer species with a dbh of twelve inches or greater. When placing clumps, the applicant will consider operational and biological concerns. Tree counts must be satisfied regardless of the presence of stream-adjacent parallel roads in the outer zone.

(iii) **Large woody debris in-channel placement strategy.**

(A) In order to reduce the number of required outer zone trees, a landowner may design a LWD placement plan for department approval consistent with guidelines in board manual sections 5 and 26. Landowners are encouraged to consult with the department and the department of fish and wildlife while designing the plan and prior to submitting a forest practices application.

(B) Reduction of trees in the outer zone must not go below a minimum of ten trees per acre.

(C) If this strategy is chosen, a complete forest practices application must include the LWD placement plan.

(iv) **Twenty riparian leave trees must be left after harvest** with the exception of the following:

(A) If a landowner agrees to implement a placement strategy, see (iii) of this subsection.

(B) If trees are left in an associated channel migration zone, the landowner may reduce the number of trees required to be left according to the following:

(I) Offsets will be measured on a basal area-for-basal area basis.

(II) Conifer in a CMZ equal to or greater than six inches dbh will offset conifer in the outer zone at a one-to-one ratio.

(III) Hardwood in a CMZ equal to or greater than ten inches dbh will offset hardwood in the outer zone at a one-to-one ratio.

(IV) Hardwood in a CMZ equal to or greater than ten inches dbh will offset conifer in the outer zone at a three-to-one ratio.

**\*(2) Western Washington protection for Type Np and Ns Waters.**

(a) An equipment limitation zone is a thirty-foot wide zone measured horizontally from the outer edge of the bankfull width of a Type Np or Ns Water where equipment use and other forest practices that are specifically limited by these rules. It applies to all perennial and seasonal streams.

(i) On-site mitigation is required if any of the following activities exposes the soil on more than ten percent of the surface area of the zone:

- (A) Ground based equipment;
- (B) Skid trails;
- (C) Stream crossings (other than existing roads); or
- (D) Cabled logs that are partially suspended.

(ii) Mitigation must be designed to replace the equivalent of lost functions especially prevention of sediment delivery. Examples include water bars, grass seeding, mulching, etc.

(iii) Nothing in this subsection (2) reduces or eliminates the department's authority to prevent actual or potential material damage to public resources under WAC 222-46-030 or 222-46-040 or any related authority to condition forest practices notifications or applications.

(b) **Sensitive site and RMZs protection along Type Np Waters.** Forest practices must be conducted to protect Type Np RMZs and sensitive sites as detailed below:

(i) A fifty-foot, no-harvest buffer, measured horizontally from the outer edge of bankfull width, will be established along each side of the Type Np Water as follows:

**Required no-harvest, 50-foot buffers on Type Np Waters.**

<b>Length of Type Np Water from the confluence of Type S or F Water</b>	<b>Length of 50' buffer required on Type Np Water (starting at the confluence of the Type Np and connecting water)</b>
Greater than 1000'	500'
Greater than 300' but less than 1000'	Distance of the greater of 300' or 50% of the entire length of the Type Np Water
Less than or equal to 300'	The entire length of Type Np Water

(ii) No timber harvest is permitted in an area within fifty feet of the outer perimeter of a soil zone perennially saturated from a headwall seep.

(iii) No timber harvest is permitted in an area within fifty feet of the outer perimeter of a soil zone perennially saturated from a side-slope seep.

(iv) No timber harvest is permitted within a fifty-six foot radius buffer patch centered on the point of intersection of two or more Type Np Waters.

(v) No timber harvest is permitted within a fifty-six foot radius buffer patch centered on a headwater spring or, in the absence of a headwater spring, on a point at the upper most extent of a Type Np Water as defined in WAC 222-16-030(3) and 222-16-031.

(vi) No timber harvest is permitted within an alluvial fan.

(vii) At least fifty percent of a Type Np Waters' length must be protected by buffers on both sides of the stream (2-sided buffers). Buffered segments must be a minimum of one hundred feet in length. If an operating area is located more than five hundred feet upstream from the confluence of a Type S or F Water and the Type Np Water is more than one thousand feet in length, then buffer the Type Np Water according to the following table. If the percentage is not met by protecting sensitive sites listed in (b)(i) through (vii) of this subsection, then additional buffers are required on the Type Np Water to meet the requirements listed in the table.

**Minimum percent of length of Type Np Waters to be buffered when more than 500 feet upstream from the confluence of a Type S or F Water**

Total length of a Type Np Water upstream from the confluence of a Type S or F Water	Percent of length of Type Np Water that must be protected with a 50 foot no harvest buffer more than 500 feet upstream from the confluence of a Type S or F Water
1000 feet or less	Refer to table in this subsection (i) above
1001 - 1300 feet	19%
1301 - 1600 feet	27%
1601 - 2000 feet	33%
2001 - 2500 feet	38%
2501 - 3500 feet	42%
3501 - 5000 feet	44%
Greater than 5000 feet	45%

The landowner must select the necessary priority areas for additional two-sided buffers according to the following priorities:

- (A) Low gradient areas;
- (B) Perennial water reaches of nonsedimentary rock with gradients greater than twenty percent in the tailed frog habitat range;
- (C) Hyporheic and groundwater influence zones; and
- (D) Areas downstream from other buffered areas.

Except for the construction and maintenance of road crossings and the creation and use of yarding corridors, no timber harvest will be allowed in the designated priority areas. Landowners must leave additional acres equal to the number of acres (including partial acres) occupied by an existing stream-adjacent parallel road within a designated priority area buffer.

(c) None of the limitations on harvest in or around Type Np Water RMZs or sensitive sites listed in (b) of this subsection will preclude or limit:

(i) The construction and maintenance of roads for the purpose of crossing streams in WAC 222-24-030 and 222-24-050.

(ii) The creation and use of yarding corridors in WAC 222-30-060(1).

To the extent reasonably practical, the operation will both avoid creating yarding corridors or road crossings through Type Np Water RMZ or sensitive sites and associated buffers, and avoid management activities which would result in soil compaction, the loss of protective vegetation or sedimentation in perennially moist areas.

Where yarding corridors or road crossings through Type Np Water RMZs or sensitive sites and their buffers cannot reasonably be avoided, the buffer area must be expanded to protect the sensitive site by an area equivalent to the disturbed area or by providing comparable functions through other management initiated efforts.

Landowners must leave additional acres equal to the number of acres (including partial acres) occupied by an existing stream-adjacent parallel road within a Type Np Water RMZs or sensitive site buffer.

**WAC 222-30-022 \*Eastern Washington riparian management zones.**

For eastside forests, riparian management is intended to provide stand conditions that vary over time. It is designed to mimic eastside disturbance regimes within a range that meets functional conditions and maintains general forest health. These desired future conditions are a reference point on the pathway to restoration of riparian functions, not an end point of riparian stand development. These rules apply to all typed waters on forest land in Eastern Washington, except as provided in WAC 222-30-023. RMZs are measured horizontally from the outer edge of the bankfull width or channel migration zone, whichever is greater, and extend to the limits as described in the following section.

**Eastern Washington RMZ for streams with bankfull width of less than or equal to 15 feet wide**

Site Class	Total RMZ Width	Core Zone Width From outer edge of bankfull width or outer edge of CMZ, whichever is greater	Inner Zone Width	Outer Zone Width
I	130'	30'	45'	55'
II	110'	30'	45'	35'
III	90'	30'	45'	15'
IV	75'	30'	45'	0'
V	75'	30'	45'	0'

**Eastern Washington RMZ for streams with bankfull width of greater than 15 feet wide**

Site Class	Total RMZ Width	Core Zone Width From outer edge of bankfull width or outer edge of CMZ, whichever is greater	Inner Zone Width	Outer Zone Width
I	130'	30'	70'	30'
II	110'	30'	70'	10'
III	100'	30'	70'	0'
IV	100'	30'	70'	0'
V	100'	30'	70'	0'

\*(1) **Eastern Washington RMZs on Type S and F Waters** have three zones: The core zone is nearest to the edge of the bankfull width or outer edge of the CMZ, whichever is greater. The inner zone is the middle zone, and the outer zone is furthest from the water. Permitted forest practices vary by timber habitat type and site class.

None of the limitations on harvest in each of the three zones listed below will preclude or limit the construction and maintenance of roads for the purpose of crossing streams in accordance with WAC 222-24-030 and 222-24-050, or the creation and use of yarding corridors in accordance with WAC 222-30-060(1).

The shade requirements in WAC 222-30-040 must be met regardless of harvest opportunities provided in the inner zone RMZ rules. See board manual section 1.

(a) **Core zones.** The core zone extends thirty feet measured horizontally from the edge of the bankfull width or outer edge of the CMZ, whichever is greater, for all timber habitat types. No harvest or construction is allowed in the core zone except as detailed in subsection (1) of this section. Any trees cut for or damaged by yarding corridors must be left on site. Any trees cut as a result of road construction to cross a stream may be removed from the site unless used as part of a large woody debris replacement strategy.

(b) **Inner zones.** Width and leave tree requirements of the inner zone vary by timber habitat type as outlined below.

(i) **Ponderosa pine timber habitat type.**

(A) The width of the inner zone is seventy feet measured horizontally from the outer edge of the core zone on streams greater than fifteen feet bankfull width or forty-five feet measured horizontally from the outer edge of the core zone on streams with a bankfull width of fifteen feet or less.

(B) No harvest is allowed in the inner zone except as described in (b)(i)(C) or (D) of this subsection, and as allowed for stream crossings and yarding corridors as described in this subsection (1).

(C) **Stands with a high basal area:** Harvest is permitted in the inner zone if the basal area in the inner zone is greater than one hundred ten square feet per acre for conifer and hardwood trees equal to

or greater than six inches dbh. The harvest must leave at least fifty trees per acre AND subject to (b)(i)(C)(III) of this subsection, a minimum leave tree basal area of at least sixty square feet per acre. The trees to be left shall be selected as follows:

(I) The twenty-one largest trees per acre must be left; and

(II) An additional twenty-nine trees per acre that are 10-inch dbh or greater must be left. If there are less than twenty-nine ten-inch dbh or greater trees per acre, leave the twenty-nine largest trees. If there are more than twenty-nine ten-inch dbh or greater trees per acre, leave twenty-nine ten-inch dbh or greater trees per acre based on the following priority order:

- Trees that provide shade to water;
- Trees that lean towards the water;
- Trees of the preferred species, as defined in WAC 222-16-010;
- Trees that are evenly distributed across the inner zone.

(III) If more than fifty trees per acre are needed to meet the minimum leave tree basal area of sixty square feet per acre, then additional trees greater than six-inch dbh must be left. If the minimum basal area cannot be met with fewer than one hundred trees of at least six inches dbh, then no more than one hundred trees per acre of the largest remaining trees will be required to be left regardless of the basal area.

(D) **Stands with low basal areas and high density:** Thinning is permitted if the basal area of all species is less than sixty square feet per acre AND there are more than one hundred trees per acre. The thinning must leave a minimum of one hundred trees per acre. The trees to be left must be selected as follows:

(I) The fifty largest trees per acre must be left; and

(II) An additional fifty trees per acre that are greater than six inches dbh must be left. If there are not fifty six-inch dbh or greater trees per acre, then all six-inch dbh or greater trees per acre must be left plus the largest remaining trees to equal fifty trees per acre. Select the additional fifty trees based on the following priority order:

- Trees that provide shade to water;
- Trees that lean towards the water;
- Trees of the preferred species, as defined in WAC 222-16-010;
- Trees that are evenly distributed across the inner zone.

(E) To the extent down wood is available on site prior to harvest, at least twelve tons of down wood per acre must be left following harvest as follows:

(I) Six pieces greater than sixteen inches diameter and twenty feet in length; and

(II) Four pieces greater than six inches in diameter and twenty feet in length.

(III) Landowner/operator is not required to create down wood.

(F) See **stream-adjacent parallel roads for all timber habitat types** in (iv) of this subsection if there is a stream-adjacent parallel road in this zone.

(ii) **Mixed conifer timber habitat type.**

(A) The width of the inner zone is seventy feet measured horizontally from the outer edge of the core zone on streams greater than fifteen feet bankfull width or forty-five feet measured horizontally from the outer edge of the core zone on streams with a bankfull width of fifteen feet or less.

(B) No harvest is allowed in the inner zone except as described in (b)(ii)(C) or (D) of this subsection, and as allowed for stream crossings and yarding corridors as described in subsection (1).

(C) **Stands with a high basal area:**

(I) Harvest is permitted in the inner zone if the combined conifer and hardwood basal area for trees greater than six inches dbh is:

- Greater than one hundred ten square feet per acre on low site indexes (site index less than ninety); or

- Greater than one hundred thirty square feet per acre on medium site indexes (site index between ninety and one hundred ten); or

- Greater than one hundred fifty square feet per acre on high site indexes (site index greater than one hundred ten).

(II) The harvest must leave at least fifty trees per acre AND a minimum leave tree basal area of at least:

- Seventy square feet per acre on low site indexes; or

- Ninety square feet per acre on medium site indexes; or

- One hundred ten square feet per acre on high site indexes.

(III) The trees to be left shall be selected as follows:

- The twenty-one largest trees per acre must be left; and

- An additional twenty-nine trees per acre that are ten-inch dbh or greater must be left. If there are less than twenty-nine ten-inch dbh or greater trees per acre, leave the twenty-nine largest trees. If there are more than twenty-nine ten-inch dbh or greater trees per acre, leave twenty-nine ten-inch dbh trees per acre based on the following priority order:

- Trees that provide shade to water;

- Trees that lean towards the water;

- Trees of the preferred species, as defined in WAC 222-16-010; or

- Trees that are evenly distributed across the inner zone.

- If more than fifty trees per acre are needed to meet the minimum leave tree basal area for the site index in (b)(ii)(C)(II) of this subsection, then additional trees greater than six inches dbh must be left. If the minimum basal area cannot be met with fewer than one hundred trees at least six inches dbh, then no more than one hundred trees per acre of the largest remaining trees will be required to be left regardless of the basal area.

(D) **Stands with low basal areas and high density:** Thinning is permitted if the basal area of all species is less than the minimum requirements for the site index in (b)(ii)(C)(II) of this subsection AND there are more than one hundred twenty trees per acre. The thinning must leave a minimum of one hundred twenty trees per acre. The trees to be left shall be selected as follows:

(I) The fifty largest trees per acre must be left; and

(II) An additional seventy trees per acre greater than six inches dbh must be left. If there are not seventy six-inch dbh or greater trees per acre, then all six-inch dbh or greater trees per acre must be left plus the largest remaining trees to equal seventy trees per acre. Select the additional seventy trees based on the following priority order:

- Trees that provide shade to water;

- Trees that lean towards the water;

- Trees of the preferred species, as defined in WAC 222-16-010; or

- Trees that are evenly distributed across the inner zone.

(E) To the extent down wood is available on site prior to harvest, twenty tons of down wood per acre is required to be left following harvest as follows:

(I) Eight pieces greater than sixteen inches diameter and twenty feet in length; and

(II) Eight pieces greater than six inches in diameter and twenty feet in length.



(III) Landowner/operator is not required to create down wood.

(F) See **stream-adjacent parallel roads for all timber habitat types** in (b)(iv) of this subsection if there is a parallel road in this zone.

(iii) **High elevation timber habitat type.**

(A) The width of the inner zone is forty-five feet measured horizontally from the outer edge of the core zone on streams equal to or less than fifteen feet bankfull width or seventy feet measured horizontally from the outer edge of the core zone on streams with a bankfull width of greater than fifteen feet.

(B) Follow stand requirements for Western Washington riparian management zones, WAC 222-30-021 (1)(b).

Note: Option 2 is not permitted for eastside use, because of the minimum floor (100') constraint.

(C) To the extent down wood is available prior to harvest, thirty tons per acre of down wood per acre must be left following harvest as follows:

(I) Eight pieces greater than sixteen inches diameter and twenty feet in length; and

(II) Eight pieces greater than six inches in diameter and twenty feet in length.

(III) Landowner/operator is not required to create down wood.

(D) See **stream-adjacent parallel roads for all timber habitat types** in (b)(iv) of this subsection if there is a parallel road in this zone.

(iv) **Stream-adjacent parallel roads for all timber habitat types in the inner zone.** The shade rule, WAC 222-30-040, must be met whether or not the inner zone includes a stream-adjacent parallel road. Where a stream-adjacent parallel road exists in the inner zone and the minimum required basal area cannot be met due to the presence of the road, then the location of the road determines the allowable operations as follows:

(A) For streams with a bankfull width that is greater than fifteen feet:

(I) If the edge of the road closest to the stream is seventy-five feet or more from the outer edge of bankfull width of the stream or outer edge of CMZ, whichever is greater, **no harvest is permitted in the inner zone.** This includes trees within the inner zone on the uphill side of the road.

(II) No harvest is permitted within the inner zone on the streamside of the road. If the edge of the road closest to the stream is less than seventy-five feet from the outer edge of bankfull width of the stream or outer edge of CMZ, whichever is greater then:

- Additional leave trees equal in total basal area to the trees lost due to the road must be left near the streams in or adjacent to the unit to be harvested; (See board manual section 7.)

- Where the additional leave trees providing fish habitat for water quality function are determined to be not available or not practical by the department, landowners and operators will employ site specific management activities to replace lost riparian functions that may include placement of large woody debris in streams. (See board manual section 7.)

(B) For streams with a bankfull width less than fifteen feet:

(I) If the edge of the road closest to the stream is fifty feet or more from the outer edge of bankfull width or outer edge of CMZ, whichever is greater, no harvest is permitted in the inner zone. This includes trees within the inner zone on the uphill side of the road.

(II) No harvest is permitted within the inner zone on the stream side of the road. If the edge of the road closest to the stream is less than fifty feet from the bankfull width or CMZ, whichever is greater then:

- Additional leave trees equal in total basal area to the trees lost due to the road must be left near the streams in or adjacent to the unit to be harvested. (See board manual section 7.)

- Where the additional leave trees providing fish habitat for water quality function are determined to be not available or not practical by the department, landowners and operators will employ site specific management activities to replace lost riparian functions that may include placement of large woody debris in streams. (See board manual section 7.)

(C) **Wildlife reserve trees.** Leave all wildlife reserve trees within the inner zone of the riparian management zone where operations in the vicinity do not violate the safety regulations (chapter 296-54 WAC and chapter 49.17 RCW administered by the department of labor and industries, safety division). Live wildlife reserve trees will contribute to the basal area requirements for inner zone leave trees and to leave tree counts if they are among the twenty-one largest trees per acre; or meet the requirement of an additional twenty-nine leave trees per acre as per (b)(ii)(E) of this subsection.

(c) **Outer zones.** This zone has three categories based on timber habitat type: Ponderosa pine, mixed conifer and high elevation. The width of this zone is zero to fifty-five feet measured horizontally from the outer edge of the inner zone depending on the site class and stream width. (See WAC 222-16-010 definition of "RMZ outer zone.")

(i) Tree counts that must be left per acre, regardless of the presence of an existing stream-adjacent parallel road in the zone, are:

(A) Ponderosa pine habitat type - Ten dominant or codominant trees.

(B) Mixed conifer habitat type - Fifteen dominant or codominant trees.

(C) High elevation habitat type - See requirements for Western Washington RMZs in WAC 222-30-021 (1)(c).

(ii) Outer zone leave tree requirements in (c)(i) of this subsection may be reduced to five trees per acre in the ponderosa pine zone, eight trees per acre in the mixed forest habitat type and ten trees per acre in the high elevation habitat type, if the landowner voluntarily implements a LWD placement plan consistent with board manual sections 5 and 26. Landowners are encouraged to consult with the department and the department of fish and wildlife while designing the plan and prior to submitting a forest practices application. If this strategy is chosen, a complete forest practices application must include the LWD placement plan.

**\*(2) Eastern Washington protection along Type Np and Ns Waters.**

(a) An **equipment limitation zone** is a thirty-foot wide zone measured horizontally from the outer edge of bankfull width of a Type Np or Ns Water where equipment is limited. It applies to all perennial and seasonal streams.

(i) On-site mitigation is required if any of the following activities exposes the soil more than ten percent of the surface area of the zone:

(A) Ground based equipment;

(B) Skid trails;

(C) Stream crossings (other than existing roads); or

(D) Cabled logs that are partially suspended.

(ii) Mitigation must be designed to replace the equivalent of lost functions, especially prevention of sediment delivery. Examples include water bars, grass seeding, mulching, etc.

(iii) Nothing in this subsection reduces or eliminates the department's authority to prevent actual or potential material damage to public resources under WAC 222-46-030 or 222-46-040 or any related authority to condition forest practices notifications or applications.

(b) **Type Np Waters.**

Within fifty horizontal feet of the outer edge of bankfull width of the stream, the landowner must identify either a partial cut and/or clearcut strategy for each unit to be harvested:

Once approved by the department, the selected strategy will remain in effect until July 1, 2051. If a landowner transfers title of the harvest unit, the landowner must provide written notice of this continuing obligation to the new owner and send a copy to the department. See WAC 222-20-055.

(i) **For partial cuts:**

(A) Basal areas requirements are the same as those specified for the timber habitat type in the Eastern Washington RMZ inner zone.

(B) Where a stream-adjacent parallel road exists, the basal area required in (b)(i)(A) of this subsection is required to be left. (See stream-adjacent parallel roads for Type Np Waters in (c) of this subsection.)

(C) The trees to be included in the basal area determination and left after harvest must include:

(I) The ten largest trees per acre;

(II) Up to an additional forty trees per acre greater than or equal to ten inches dbh must be left. If all or some of the trees are not at least ten inches dbh, then the largest of the remaining trees must be left. Select trees based on the following priority order:

- Provide streambank stability;
- Provide shade to water;
- Lean towards the water;
- Preferred species, as defined in WAC 222-16-010; or
- Evenly distributed; and

If the basal area target has not been met with the trees required above, up to an additional fifty trees are required greater than six inches in dbh based on the above priority order.

(D) Side slope seeps must be protected with a fifty-foot partial cut buffer that meets the basal area and leave tree requirements of (b)(i)(A), (B), and (C) of this subsection. The buffer shall be measured from the outer perimeter of the perennially saturated soil zone.

(ii) **For clearcuts:**

When the clearcut strategy in this subsection is selected, the landowner must simultaneously designate a two-sided no-harvest fifty-foot buffer along the stream reach in the harvest unit that:

(A) Is equal in total length to the clearcut portion of the stream reach in the harvest unit; and

(B) Meets the upper end of basal area requirements for each respective timber habitat type in the Eastern Washington RMZ inner zone. See WAC 222-30-022 (1)(b)(i), (ii) or (iii).

(C) The streamside boundary of all clearcuts must:

(I) Not exceed in total thirty percent of the length of the stream reach in the harvest unit;

(II) Not exceed three hundred continuous feet in length;

(III) Not be located within five hundred feet of the intersection of a Type S or F Water; and

(IV) Not occur within fifty feet of the following sensitive sites as defined in WAC 222-16-010:

- The outer perimeter of a soil zone perennially saturated from a headwall seep;
- The outer perimeter of a soil zone perennially saturated from a side-slope seep;
- The center of a headwater spring;
- An alluvial fan;
- The center point of intersection of two or more Type Np Waters.

(c) **Stream-adjacent parallel roads for Type Np Waters.** If a road exists in a Type Np RMZ and the basal area required to be left cannot be met within fifty feet of the outer edge of bankfull width of the stream measured horizontally due to the presence of the road, then the distance of the road to the stream determines the allowable operations as follows:

(i) A road that is within thirty to forty-nine feet measured horizontally from the outer edge of bankfull width of the stream requires:

(A) A total of one hundred feet of riparian management zone measured horizontally (both sides of the stream count towards the total) must be left in a manner to provide maximum functions for nonfish use streams. If harvest is taking place on only one side of the stream, then fifty feet of RMZ width must be left, regardless of presence of a stream-adjacent parallel road. The width of the road is not counted as part of the total width of the RMZ.

(B) The location of the riparian management zone required in (A) of this subsection shall be based on the following priority order:

(I) Preferred: The area between the stream and the stream side edge of the road.

(II) The area that provides the most shade to the channel.

(III) The area that is most likely to deliver large woody debris to the channel.

(ii) A road that is within less than thirty feet from the outer edge of bankfull width of the stream measured horizontally requires, in addition to (c)(i)(A) and (B) of this subsection, that all trees between the stream and the streamside edge of the road must be left.

**WAC 222-30-023 Riparian management zones for exempt 20-acre parcels.**

Note: Compliance with this section does not ensure compliance with the federal Endangered Species Act or the Clean Water Act.

On parcels of 20 contiguous acres or less, landowners with total parcel ownership of less than 80 forested acres shall not be required to leave the riparian buffers described in WAC 222-30-021 and 222-30-022. These landowners are required to follow applicable watershed analysis riparian prescriptions in effect as of January 1, 1999, or if there are no watershed analysis riparian prescriptions in effect these landowners are required to follow the riparian management zone rules below.

**\* (1) Western Washington RMZs for exempt 20-acre parcels.** Riparian management zones are measured horizontally from the outer edge of bankfull width of a Type S or F Water and extend to the line where vegetation changes from wetland to upland plant community, or the line required to leave sufficient shade as required by WAC 222-30-040, whichever is greater, but must not be less than 29 feet in width nor more than the maximum widths described in (f) of this subsection, provided that the riparian management zone width shall be expanded as necessary to include wetlands or ponds adjacent to the stream. When the riparian management zone overlaps a Type A or B Wetland or a wetland management zone, the requirement which best protects public resources shall apply.

(a) Harvest units shall be designed so that felling, bucking, yarding or skidding, and reforestation can be accomplished in accordance with these rules, including those rules relating to stream bank integrity and shade requirements to maintain stream temperature. Where the need for additional actions or restrictions adjacent to waters not covered by the following become evident, WAC 222-12-050 and 222-12-060 may apply.

(b) When requested in writing by the applicant, the department shall assist in preparation of an alternate plan for the riparian management zone.

(c) Landowners must meet the following shade requirements in effect January 1, 1999, to maintain stream temperature.

**\* (i) Determination of adequate shade.** The temperature prediction method in (c)(ii) and (iii) of this subsection shall be used to determine appropriate shade levels for flowing Type S and F Waters to prevent excessive water temperatures which may have detrimental impact on aquatic resources.

\*(ii) Temperature prediction method. In addition to the riparian management zone requirements described in (f) of this subsection, leave trees shall be retained within the maximum riparian management zones on flowing Type S and F Waters as provided by the method described in the board manual which includes the following considerations:

- (A) Minimum shade retention requirements; and
- (B) Regional water temperature characteristics; and
- (C) Elevation; and
- (D) Temperature criteria defined for stream classes in chapter 173-201A WAC.

\*(iii) Leave tree requirements for shade. The method described in (c)(ii) of this subsection shall be used to establish the minimum shade cover based on site-specific characteristics. When site-specific data indicate that preharvest conditions do not meet the minimums established by the method, no additional shade removal from riparian management zones will be allowed.

(iv) Waivers. The department may waive or modify the shade requirements where:

- (A) The applicant agrees to a staggered setting program producing equal or greater shade requirements to maintain stream temperature; or
- (B) The applicant provides alternative means of stream temperature control satisfactory to the department; or
- (C) The temperature method indicates that additional shade will not affect stream temperature.

(d) For wildlife habitat within the riparian management zone, leave an average of 5 undisturbed and uncut wildlife trees per acre at the ratio of 1 deciduous tree to 1 conifer tree equal in size to the largest existing trees of those species within the zone. Where the 1 to 1 ratio is not possible, then substitute either species present. Forty percent or more of the leave trees shall be live and undamaged on completion of harvest. Wildlife trees shall be left in clumps whenever possible.

(e) When 10 percent or more of the harvest unit lies within any combination of a riparian management zone of Type S or F Waters or a wetland management zone and the harvest unit is a clearcutting of 20 acres or less, leave not less than 50 percent of the trees required in (f) of this subsection.

(f) Within the riparian management zone, trees shall be left for wildlife and fisheries habitat as provided for in the chart below. Fifty percent or more of the trees shall be live and undamaged on completion of the harvest. The leave trees shall be randomly distributed where feasible; some clumping is allowed to accommodate operational considerations. The number, size, species and ratio of leave trees, deciduous to conifer, is specified by the bed material and average width of the water type within the harvest unit. Trees left according to (c) of this subsection may be included in the number of required leave trees in this subsection.

**Western Washington Riparian Leave Tree Requirements  
For exempt 20-acre parcels**

<b>Water Type/Average Bankfull Width</b>	<b>RMZ Maximum Width</b>	<b>Ratio of Conifer to Deciduous/Minimum Size Leave Trees</b>	<b># Trees/1000 ft. each side</b>	
			<b>Gravel/Cobble &lt;10" Diameter</b>	<b>Boulder/Bedrock</b>
S or F Water greater than or equal to 75'	115'	representative of stand	58 trees	29 trees
S Water less than 75' and F	86'	representative of	115 trees	60 trees

Water Type/Average Bankfull Width	RMZ Maximum Width	Ratio of Conifer to Deciduous/ Minimum Size Leave Trees	# Trees/1000 ft. each side	
			Gravel/Cobble <10" Diameter	Boulder/Bedrock
Water less than 75' and greater than or equal to 10'		stand		
F Water less than 10' and greater than or equal to 5'	58'	2 to 1 12" or next largest available <sup>1</sup>	86 trees	29 trees
F Water less than 5'	29'	1 to 1 6" or next largest available <sup>1</sup>	29 trees	29 trees

<sup>1</sup> "Or next largest available" requires that the next largest trees to those specified in the rule be left standing when those available are smaller than the size specified.

Ponds or lakes which are Type S or F Waters shall have the same leave tree requirements as boulder/bedrock streams.

**\*(2) Eastern Washington riparian management zones for exempt 20-acre parcels.** These zones shall be measured horizontally from the outer edge of bankfull width of Type S or F Waters and extend to the line where vegetation changes from wetland to upland plant community, or to the line required to leave sufficient shade as required by WAC 222-30-040, whichever is greater, but shall not be less than the minimum width nor more than the maximum widths described in (c) of this subsection, provided that the riparian management zone width shall be expanded as necessary to include wetlands or ponds adjacent to the stream. When the riparian management zone overlaps a Type A or B Wetland or a wetland management zone, the requirement which best protects public resources shall apply.

(a) Harvest units shall be designed so that felling, bucking, yarding or skidding, and reforestation can be accomplished in accordance with these rules, including those rules relating to stream bank integrity and shade requirements to maintain stream temperature. Where the need for additional actions or restrictions adjacent to waters not covered by the following become evident, WAC 222-12-050 and 222-12-060 may apply.

(b) When requested in writing by the applicant, the department shall assist in preparation of an alternate plan for the riparian management zone.

(c) Within the riparian management zone, trees shall be left for wildlife and fisheries habitat as provided for below. Fifty percent or more of the trees shall be live and undamaged on completion of the harvest. The leave trees shall be randomly distributed where feasible; some clumping is allowed to accommodate operational considerations.

(i) The width of the riparian management zone shall be based on the adjacent harvest type as defined in WAC 222-16-010 "Partial cutting." When the adjacent unit harvest type is:

Partial cutting - The riparian management zone width shall be a minimum of 35 feet to a maximum of 58 feet on each side of the stream.

Other harvest types - The riparian management zone shall average 58 feet in width on each side of the stream with a minimum width of 35 feet and a maximum of 345 feet on each side of the stream.

(ii) Leave tree requirements within the riparian management zones of Type S or F Waters:

- (A) Leave all trees 12 inches or less in diameter breast height (dbh); and
- (B) Leave all wildlife reserve trees within the riparian management zone where operations in the vicinity do not violate the state safety regulations (chapter 296-54 WAC and chapter 49.17 RCW administered by department of labor and industries, safety division); and
- (C) Leave 18 live conifer trees per acre between 12 inches dbh and 20 inches dbh distributed by size, as representative of the stand; and
- (D) Leave 4 live conifer trees per acre 20 inches dbh or larger and the 2 largest live deciduous trees per acre 16 inches dbh or larger. Where these deciduous trees do not exist, and where 2 wildlife reserve trees per acre 20 inches or larger do not exist, substitute 2 live conifer trees per acre 20 inches dbh or larger. If live conifer trees of 20 inches dbh or larger do not exist within the riparian management zone, then substitute the 5 largest live conifer trees per acre; and
- (E) Leave 3 live deciduous trees per acre between 12 inches and 16 inches dbh where they exist.
- (iii) Minimum leave tree requirements per acre for Type S or F Waters. Trees left for (c)(ii) of this subsection shall be included in the minimum counts.
  - (A) On streams with a boulder/bedrock bed, the minimum leave tree requirements shall be 75 trees per acre 4 inches dbh or larger.
  - (B) On streams with a gravel/cobble (less than 10 inches diameter) bed, the minimum leave tree requirement shall be 155 trees per acre 4 inches dbh or larger.
  - (C) On lakes or ponds, the minimum leave tree requirement shall be 86 trees per acre 4 inches dbh or larger.

Note: See the board manual for guidelines for calculating trees per acre and average RMZ widths.

(d) When 10 percent or more of the harvest unit lies within any combination of a riparian management zone of Type S or F Waters or a wetland management zone and the harvest unit is 20 acres or less, leave not less than 50 percent of the trees required in (c) of this subsection. (See WAC 222-16-010 "Partial cutting.")

\***(3) Riparian leave tree areas for exempt 20-acre parcels.** The department will require trees to be left along Type Np Waters where such practices are necessary to protect public resources. Where such practices are necessary, leave at least 29 conifer or deciduous trees, 6 inches in diameter or larger, on each side of every 1000 feet of stream length within 29 feet of the stream. The leave trees may be arranged to accommodate the operation.

(4) For the purposes of this section RMZ means: A specified area alongside Type S and F Waters where specific measures are taken to protect water quality and fish and wildlife habitat.

### **Forests and Fish Report, dated April 29, 1999**

The goals of the Forests and Fish Report are:

- (1) To provide compliance with the Endangered Species Act for aquatic and riparian- dependent species on non-federal forest lands;
- (2) To restore and maintain riparian habitat on non-federal forest lands to support a harvestable supply of fish;
- (3) To meet the requirements of the Clean Water Act for water quality on non-federal forest lands; and
- (4) To keep the timber industry economically viable in the State of Washington.

Appendix A – Definitions

“Bankfull Depth” means the elevation difference between the water surface of a stream flow having a return period of approximately 1.5 years and the thalweg. The horizontal projection of this water surface elevation to the stream bank or the top of the geomorphic flood plain indicates bankfull depth. The top of the active flood plain of a stream is often indicated by the top of the point bar, by a change in vegetation from bare surfaces or water-tolerant species to water-intolerant shrubs and trees, by a break in slope, or by a change in the size distribution of surface sediments.

“Bankfull width” means, for any stream, the average distance between the elevation indicated by bankfull depth. The top of the active flood plain of a stream is often indicated by the top of the point bar, by a change in vegetation from bare surfaces or water-tolerant species to water-intolerant shrubs and trees, by a break in slope, or by a change in the size distribution of surface sediments.

## Appendix B – Riparian Strategies

### B.1 – Stream Typing

(ii) “Type F waters” include all segments of natural waters within the bankfull widths of defined channels. . .

(iii) “Type N waters” include all segments of natural waters within the bankfull widths of defined channels. . .