

# Appendix J

## Management Standards for Aquatic and Riparian Areas



The *Northwest Oregon State Forests Management Plan* uses a blended approach for the aquatic and riparian strategies. The first component is the landscape management strategies described in Chapter 4 of the plan. Over time, these strategies will create properly functioning riparian and aquatic conditions and processes. The second component a set of more site-specific strategies for aquatic and riparian areas, is discussed in detail in this appendix.

The second component of the blended approach is a set of more site-specific or prescriptive strategies designed to protect key resource elements or provide for specific functional elements not necessarily addressed by the landscape strategies.

In Chapter 4, Aquatic and Riparian Strategy 2 states:

**Apply management standards for aquatic and riparian areas. Establish and maintain riparian management areas adjacent to all streams, in accordance with the standards described in Appendix J of this plan and species of concern where they apply.**

The site-specific, prescriptive standards in this appendix will guide forest management activities to achieve properly functioning aquatic and riparian habitat conditions over time. Management actions will be consistent with these standards, except where specific exceptions are documented and authorized by the District Forester. As information from monitoring efforts, watershed assessment and analysis, and other sources becomes available, specific standards may be changed or modified as necessary to meet the overall goal of maintaining and restoring properly functioning aquatic habitats.

## Riparian Management Areas (RMAs)

Riparian management areas will be established immediately adjacent to waterways for the purpose of protecting aquatic and riparian resources, and maintaining the functions and ecological processes of the waterways. Within these areas, special management considerations and operational restrictions will be applied, and the protection of aquatic resources will be a high priority.

The width of riparian management areas will vary by the type and classification of the water body. These widths were developed by considering the functions and processes to be achieved or maintained by management activities. The width of a riparian management area (RMA) is measured horizontally beginning at the average high water level of the water body, or the edge of stream-associated wetland, side channel, or channel migration zone (whichever is farthest from the waterway), and extending toward the uplands. The width of these areas will be expanded, if necessary, to fully encompass certain sensitive sites such as inner gorge areas, or other special sites noted in the management prescriptions. See the “Key Terms” box on the next page for definitions.

Riparian management area widths are intended to be averages applied over the length of a management site. The actual extent of a specific RMA can be varied to tailor vegetation retention to site-specific conditions, or to address special resource considerations. For example, an RMA boundary will be expanded where a potentially unstable slope adjacent to a stream could deliver materials to the stream. The intent of this action is to increase the potential for large wood delivery should a disturbance event occur. Variations in RMA design will always be completed in a manner consistent with the management objectives for the specific aquatic or riparian area.

On the next several pages, guidelines are given for defining the four zones of a riparian management area and classifying streams. See “Basic Concepts for Aquatic and Riparian Conservation” in Chapter 4 for discussion of the functions and processes of healthy aquatic systems and the desired future condition for streams.

## Key Terms

**Active channel width** — The average width of the stream channel at the normal high water level. The normal high water level is the stage reached during average annual high flow. This high water level mark often corresponds with the edge of streamside terraces; a change in vegetation, soil or litter characteristics; or the uppermost scour limit (bankfull stage) of a channel.

**Average high water level** — The stage reached during the average annual high flow period. This level often corresponds with the edge of streamside terraces, marked changes in vegetation, or changes in soil or litter characteristics.

**Bog** — A wetland that is characterized by the formation of peat soils and that supports specialized plant communities. A bog is a hydrologically closed system without flowing water. It is usually saturated, relatively acidic, and is dominated by ground mosses, especially sphagnum. Bogs are distinguished from other wetlands by the dominance of mosses and the presence of extensive peat deposits.

**Channel migration zone (CMZ)** — An area adjacent to an unconfined stream channel where channel migration is likely to occur during high flow events. The presence of side channels or oxbows, stream-associated wetlands, and low terraces are indicators of these zones. The extent of these areas will be determined through site inspections using professional judgment.

**Inner gorge** — An area next to a stream or river where the adjacent slope is significantly steeper than the gradient of the surrounding hillsides. In the absence of an on-site inspection and determination by a Department of Forestry geotechnical specialist or other qualified person, these areas are defined as having a slope gradient adjacent to the stream of 70 percent (35 degrees) or greater, and where the height of the slope break is at least 15 feet (measured vertically) above the elevation of the channel.

## Guidelines: The Four Zones of a Stream Riparian Management Area

Riparian management areas established along streams will contain four zones. The purposes and differences between these four zones are defined below and on the next page.

**Aquatic zone** — The aquatic zone is the area that includes the stream channel(s) and associated aquatic habitat features. This zone includes beaver ponds, stream-associated wetlands, side channels, and the channel migration zone. The other zones of a riparian management area are established upslope from the outer edge of these features.

**Stream bank zone** — The stream bank zone is the land closest to the stream, including the stream banks. Most riparian functions are supported to some extent by vegetation in this zone, including providing aquatic shade, the delivery of down wood and organic inputs (leaves and tree litter) to the stream and riparian area, stabilizing the stream bank, contributing to floodplain functions, and influencing sediment routing processes.

- The stream bank zone is defined as the area within 25 feet of the outer edge of the aquatic zone for all streams. This zone exists on both sides of a stream.

**Inner RMA zone** — The inner RMA zone is the next area away from the stream, adjacent to the stream bank zone. Vegetation within this zone contributes substantially to desired riparian functions, including providing aquatic shade, delivering a high proportion of the potential large wood available, and contributing organic inputs to the stream. Vegetation within this area also provides some protection to certain aspects of riparian micro-climate. Because vegetation in this zone has a relatively greater role in supporting riparian functions and processes, a high priority is being placed on management actions in this area.

- The inner RMA zone extends from 25 feet (the outer edge of the stream bank zone) to 100 feet from the stream. This zone exists on both sides of a stream.

**Outer RMA zone** — The outer RMA zone is the portion of the riparian management area farthest away from the stream. Vegetation within this zone may still contribute to certain riparian functions and processes, but to a lesser extent than the two zones closest to the stream. The primary functions provided by vegetation in this area include additional contributions of large wood to the riparian zone and stream channel, and the protection of riparian micro-climate. In some cases, the outer zone may also partially buffer the two inner zones from certain disturbance events such as windthrow.

- The outer RMA zone extends from the edge of the inner zone at 100 feet out to 170 feet from the stream. This zone exists on both sides of a stream.

## **Guidelines: Stream Classification**

Determination of the applicable management standards for riparian areas is based on a stream classification system. Streams are grouped into two major categories based on the primary beneficial uses of the stream. Streams are further classified according to size, based on average annual flow. Flow pattern (perennial and seasonal) is also considered for small non-fish-bearing waters. This classification system is generally consistent with the method used for administration of the Oregon Forest Practices Act, as described in the Department of Forestry's Forest Practice Technical Note FP1 — Water Classification (Oregon Department of Forestry 1994).

## **Beneficial Use Classifications**

Streams, and other aquatic habitats, are classified into two major groups based on the presence or absence of certain fish species. The following definitions will be applied in classifying streams.

**Fish-bearing (Type F)** — Waters that are inhabited at any time of the year by anadromous or game fish species, or by fish species that are listed as threatened or endangered under either federal or state Endangered Species Acts.

**Non-fish-bearing (Type N)** — Waters that are not fish-bearing (see previous definition).

## **Stream Size Classifications**

Streams are further classified by size, based on estimated average annual flow. The following definitions apply to these size categories.

- **Small** — Average annual flow of 2 cfs (cubic feet per second) or less.
- **Medium** — Average annual flow greater than 2 cfs, but less than 10 cfs.
- **Large** — Average annual flow of 10 cfs or greater.

## **Flow Pattern Classifications**

Small non-fish-bearing (Type N) streams are also classified according to the flow pattern exhibited in normal water years. For the purposes of this plan, the following definitions will be used.

- **Perennial Type N streams** — streams that are expected to have summer surface flow after July 15.
- **Seasonal Type N streams** — streams that only flow during portions of the year; these streams are not expected to have summer surface flow after July 15.

Some seasonal non-fish-bearing streams are further classified as:

- **Seasonal high energy streams** — Seasonal streams with physical conditions that favor the periodic transport of coarse sediments and woody materials during high flow events. For the purposes of this plan, and in the absence of specific geomorphologic identification, stream reaches with an average gradient exceeding 15 percent, and an active channel width of five (5) feet or more will be defined as seasonal high energy streams.
- **Potential debris flow track reaches** — Potential debris flow track reaches are reaches on seasonal Type N streams that have been determined to have a high probability of delivering woody debris to a Type F stream.

Oregon Department of Forestry field staff will make the determination of the probability that a reach will deliver woody debris to a Type F stream, using the following criteria:

1. The seasonal stream reach must terminate at or below a high risk site. High risk sites include:
  - a. Active landslides (slopes with tension cracks, unvegetated soil scarps, or jackstrawed trees caused by slope movement).
  - b. Slopes steeper than 80 percent, excluding competent rock outcrops.
  - c. Headwalls or draws steeper than 70 percent.
  - d. Abrupt slope breaks, where the lower slope is the steeper and exceeds 70 percent, except where the steeper slope is a competent rock outcrop.
  - e. Incised channels (hill slopes adjacent to the channel and steeper than the upland slope) with slopes steeper than 60 percent.
  - f. Any other site determined to be of marginal stability by a Department of Forestry geotechnical specialist.
  
2. The path of a potential debris flow and the likelihood that a debris flow will reach a Type F stream. If any one of the following three conditions is present along the path from the high risk site to the Type F stream, then a debris flow is likely to stop and the stream reach would be determined to have a low probability of woody debris delivery:
  - a. The presence of a channel junction that is 70 degrees or more, provided the channel downstream of the junction is less than 35 percent gradient.
  - b. The presence of a stream reach which is less than 6 percent gradient for at least 300 feet.
  - c. An average slope from the high risk site along the potential landslide path to the stream that is less than 20 percent.

## **Management Standards for RMAs**

The following standards will guide management activities so that properly functioning riparian and aquatic conditions will be created over time. These standards will apply until alternative standards are identified through the adaptive management process. As new information and a better understanding of the watershed functions and processes become available, this knowledge will be integrated into the management of riparian and aquatic habitat through the adaptive management process. The management standards are presented in Tables J-1 and J-2.

**Table J-1. Management Standards for Type F Stream RMAs**

All Stream Sizes: Large, Medium, and Small	
Stream bank zone 0-25 ft.	<ul style="list-style-type: none"> <li>• No harvest.</li> <li>• Less than 10% vegetative disturbance.</li> <li>• Full suspension required during cable yarding.</li> <li>• No ground-based equipment operation.</li> <li>• Leave any trees damaged or felled from yarding activities.</li> </ul>
Inner RMA zone 25 to 100 ft.	<ul style="list-style-type: none"> <li>• Manage for mature forest condition.<sup>1</sup></li> <li>• No management activity where mature forest condition (MFC) exists, or where conditions are suitable for development of MFC in a reasonable time frame without further treatment.</li> <li>• Actively manage where necessary to achieve the desired future condition in a timely manner.</li> <li>• Minimum 15-year interval between harvest entries, and minimum number of entries necessary to achieve the desired future condition.</li> <li>• Partial cutting will maintain a conifer density of at least SDI 25%, and will retain at least 50 TPA.</li> <li>• No more than 10% vegetative disturbance allowed from cable yarding.</li> <li>• Full suspension wherever possible, or one-end suspension on all cable-yarded material.</li> <li>• Ground-based equipment operation limited to area more than 50 ft. from aquatic zone and slopes less than 35%, and allowed on no more than 10% of area.</li> <li>• Leave any trees damaged or felled from yarding activities and additional felled, girdled or topped trees to contribute toward down wood targets.<sup>2</sup></li> <li>• Retain all dead and down material that was present prior to the operation.</li> </ul>
Outer RMA zone 100 to 170 ft.	<ul style="list-style-type: none"> <li>• Retain at least 10 to 45<sup>3</sup> conifer trees and snags per acre (15 to 70 trees per 1,000 ft. of RMA).<sup>4</sup></li> <li>• Retain all snags as safety permits.</li> <li>• Less than 10% ground disturbance from yarding activities.</li> <li>• Retain all dead and down material that was present prior to the operation.</li> </ul>

1. Desired mature forest condition consists of a stand dominated by large conifer trees, or where hardwood-dominated conditions are expected to be the natural plant community, a mature hardwood/shrub community. For conifer stands, this equates to a basal area of 220 square feet or more per acre, inclusive of all conifers over 11 inches DBH. At a mature age (80-100 years or greater), this equals 40-45 conifer trees 32 inches in DBH per acre.
2. Up to 10 trees per acre will be retained as felled, girdled, or topped trees during partial cutting, to reach a target of 600-900 cubic feet per acre of hard down wood.
3. Outer zone tree retention target will be increased when less than the target number of conifers is present in the inner zone. The process for calculating the outer zone retention target is described in the section following the RMA prescription tables.
4. All trees retained will be dominant or co-dominant conifer trees (if available). In order to balance the need for short-term and long-term recruitment of large wood to the aquatic zone,

preference will be given to retaining trees on adjacent slopes, trees leaning toward the aquatic zone, and trees closest to the channel.

**Table J-2. Management Standards for Type N Stream RMAs**

Large and Medium Type N Streams	
Stream bank zone 0-25 ft.	<ul style="list-style-type: none"> <li>• No harvest.</li> <li>• Less than 10% vegetative disturbance from cable yarding.</li> <li>• Full suspension required.</li> <li>• No ground-based equipment operation.</li> <li>• Leave any trees damaged or felled from yarding activities.</li> </ul>
Inner RMA zone 25-100 ft.	<ul style="list-style-type: none"> <li>• Manage for mature forest condition.<sup>1</sup></li> <li>• No management activity where mature forest condition target already exists.</li> <li>• Actively manage where beneficial to achieve desired future condition.</li> <li>• Minimum 15-year interval between harvest entries, and minimum number of entries necessary to achieve the desired future condition.</li> <li>• Partial cutting will maintain a conifer density of at least SDI 25%, and will retain at least 50 TPA.</li> <li>• No more than 10% vegetative disturbance allowed from cable yarding.</li> <li>• Full suspension wherever possible, or one-end suspension on all cable-yarded material.</li> <li>• Ground-based equipment operation limited to area more than 50 ft. from aquatic zone and slopes less than 35%, and allowed on no more than 10% of area.</li> <li>• Leave any trees damaged or felled from yarding activities and additional felled, girdled or topped trees to contribute to down wood targets.<sup>2</sup></li> <li>• Retain all dead and down material that was present prior to the operation.</li> </ul>
Outer RMA zone 100-170 ft.	<ul style="list-style-type: none"> <li>• Manage to retain at least 10 conifer trees and snags per acre (15 trees per 1,000 ft. of RMA).<sup>3</sup></li> <li>• Retain all snags as safety permits.</li> </ul>

1. Desired mature forest condition consists of a stand dominated by large conifer trees, or where hardwood-dominated conditions are expected to be the natural plant community, a mature hardwood/shrub community. For conifer stands, this equates to a basal area of 220 square feet or more per acre, inclusive of all conifers over 11 inches DBH. At a mature age (80-100 years or greater), this equals 40-45 conifer trees 32 inches in DBH per acre.
2. Up to 10 trees per acre will be retained as felled, girdled, or topped trees during partial cutting, to reach a target of 600-900 cubic feet per acre of hard down wood.
3. All trees retained will be dominant or co-dominant conifer trees (if available). In order to balance the need for short-term and long-term recruitment of large wood to the aquatic zone, preference will be given to retaining trees on adjacent slopes, trees leaning toward the aquatic zone, and trees closest to the channel.

**Table J-2 continued. Management Standards for Type N Stream RMAs**

<b>Small Perennial Type N Streams (applied to at least 75% of reach)<sup>1</sup></b>	
Stream bank zone 0-25 ft.	<ul style="list-style-type: none"> <li>• No harvest.</li> <li>• No ground-based equipment operation.</li> </ul>
Inner RMA zone 25-100 ft.	<ul style="list-style-type: none"> <li>• Manage to retain at least 15-25 conifer trees and snags per acre (25-40 trees per 1,000 ft. of RMA).<sup>2,3</sup></li> <li>• Retain all other snags as safety permits.</li> <li>• Within 500 ft. of a confluence with a Type F stream, retain all hardwoods, non-merchantable trees, and other conifers as necessary, to achieve 80% shade over aquatic zone.</li> <li>• Retain all dead and down material that was present prior to the operation.</li> </ul>
Outer RMA zone 100-170 ft.	<ul style="list-style-type: none"> <li>• Manage to retain 0-10 conifer trees and snags per acre (0-15 trees per 1,000 ft. of RMA).<sup>2,3</sup></li> <li>• Retain all snags as safety permits.</li> </ul>

1. Prescription to be applied to at least 75% of perennial stream reach, including the first 500 ft. above the confluence with a Type F, and areas that meet the definition of a Special Emphasis Area (SEA) according to the definitions in the section following these tables.
2. All trees retained will be dominant or co-dominant conifer trees (if available). In order to balance the need for short-term and long-term recruitment of large wood to the aquatic zone, preference will be given to retaining trees on adjacent slopes, trees leaning toward the aquatic zone, and trees closest to the channel.
3. In meeting the tree retention target for the inner and outer zones, preference will be given to retaining trees within the inner zone. Where there are sufficient trees within the inner zone to meet the combined target for the two zones (40 trees per 1,000 ft.), then no additional leave trees are required in the outer zone.

**Table J-2 continued. Management Standards for Type N Stream RMAs**

<b>Small Seasonal Type N Streams: High Energy Reaches (applied to at least 75% of reach)<sup>1</sup></b>	
Stream bank zone 0-25 ft.	<ul style="list-style-type: none"> <li>• No harvest.</li> <li>• No ground-based equipment operation.</li> </ul>
Inner RMA zone 25-100 ft.	<ul style="list-style-type: none"> <li>• Manage to retain at least 15-25 conifer trees and snags per acre (25-40 trees per 1,000 ft. of RMA).<sup>2,3</sup></li> <li>• Retain all other snags as safety permits.</li> <li>• Retain all dead and down material that was present prior to the operation.</li> </ul>
Outer RMA zone 100-170 ft.	<ul style="list-style-type: none"> <li>• Manage to retain 0-10 conifer trees and snags per acre (0-15 trees per 1,000 ft. of RMA).<sup>2,3</sup></li> <li>• Retain all snags as safety permits.</li> </ul>
<b>Small Seasonal Type N Streams: Potential Debris Flow Track Reaches (applied to at least 75% of reach)<sup>1</sup></b>	
Stream bank zone 0-25 ft.	<ul style="list-style-type: none"> <li>• No harvest.</li> <li>• No ground-based equipment operation.</li> </ul>
Inner RMA zone 25-100 ft.	<ul style="list-style-type: none"> <li>• Manage to retain at least 10 conifer trees and snags per acre (15 trees per 1,000 ft. of RMA).<sup>2,4</sup></li> <li>• Retain all other snags as safety permits.</li> <li>• Retain all dead and down material that was present prior to the operation.</li> </ul>
Outer RMA zone 100-170 ft.	<ul style="list-style-type: none"> <li>• Retain trees and snags sufficient to meet landscape management strategy targets.</li> </ul>
<b>Other Small Seasonal Type N Streams (applied to at least 75% of reach)</b>	
Stream bank zone 0-25 ft.	<ul style="list-style-type: none"> <li>• Maintain integrity of stream channel.</li> <li>• No ground-based equipment operation.</li> </ul>
Inner RMA zone 25-100 ft.	<ul style="list-style-type: none"> <li>• Manage to retain at least 10 conifer trees and snags per acre where operationally feasible (16 trees per 1,000 ft. of RMA).<sup>2</sup></li> <li>• Retain all other snags as safety permits.</li> <li>• Retain all dead and down material that was present prior to the operation.</li> </ul>
Outer RMA zone 100-170 ft.	<ul style="list-style-type: none"> <li>• Retain trees and snags sufficient to meet landscape management strategy targets.</li> </ul>

1. Prescription to be applied to at least 75% of stream reach, including the first 500 ft. above the confluence with a Type F stream.
2. All trees retained will be dominant or co-dominant conifer trees (if available). In order to balance the need for short-term and long-term recruitment of large wood to the aquatic zone, preference will be given to retaining trees on adjacent slopes, trees leaning toward the aquatic zone, and trees closest to the channel.
3. In meeting the tree retention target for the inner and outer zones, preference will be given to retaining trees within the inner zone. Where there are sufficient trees within the inner zone to meet the combined target for the two zones (40 trees per 1,000 ft.), then no additional leave trees are required in the outer zone.

4. To maximize the influence of retained trees on debris flow processes, preference will be given to retaining these trees as close to the stream channel as operationally feasible, or on adjacent slope features that exhibit a high potential for failure and delivery to the stream.

## **Increasing Outer Zone Conifer Retention on Type F Streams**

On Type F streams, in situations where the number of conifers available for retention within the inner zone is not adequate to achieve the large wood delivery potential of a mature forest condition, additional conifers will be retained in the outer zone to provide additional large wood recruitment potential.

This additional outer zone target will apply when the number of conifers of suitable size (11 inches or greater DBH) in the inner zone is less than the mature forest condition target of 45 TPA (100 trees per 1,000 lineal feet of stream for a 100-foot inner zone).

The number of additional conifers to be retained in the outer zone will be equal to the deficit from the inner zone target, adjusted to account for the different widths of the zones. For example, if the inner zone has an average of 70 suitable conifers per 1,000 feet of stream, then the additional retention level for the outer zone would equal 30 times 0.7, or an additional 21 conifers per 1,000 feet of outer zone.

In no case shall the number of conifers required to be retained in the outer zone exceed the inner zone target for mature forest condition. This means no more than 70 conifers per 1,000 feet of outer zone or 45 TPA are required. In addition, no trees shall be required to be retained in the outer zone in locations where, due to topography, they would have no opportunity to reach the area within the channel migration zone and thus potentially function as large wood in the stream channel. All conifers retained under this strategy shall meet the conifer retention criteria as described in footnotes to Tables J-1 and J-2: dominant or co-dominant trees, with preference given to retaining trees on adjacent slopes, trees leaning toward the aquatic zone, and trees closest to the channel.

## **Perennial Type N Stream Special Emphasis Areas**

On small Type N streams, the required riparian management areas will be located to provide protection to the following special emphasis areas. These special emphasis areas may be especially important to certain species (such as amphibians), or to the functions and processes within a watershed.

### **Seeps and Springs in Inner RMA Zone, Connected to Aquatic Zone**

The 25-foot stream bank zone of the stream, which is the no-harvest zone, will be extended around the outer perimeter of side slope seeps and springs that are within 100 feet of the aquatic zone and connected to the channel via overland flow. The inner zone will follow that boundary.

## **Source Areas of Perennial Streams**

The 25-foot stream bank zone, which is the no-harvest zone, will be extended for a distance of 100 feet above the initiation point of perennial flow.

## **Stream-Associated Wetlands**

The 25-foot stream bank zone, which is the no-harvest zone, will be extended around the outer perimeter of the wetland area.

## **Inner Gorge Areas**

- A no-harvest zone will be extended to the top of the slope break that defines the inner gorge.
- If the slope break is less than 100 feet from the edge of the CMZ, then the applicable inner zone standard will be applied for the remaining distance (out to a maximum of 100 feet), and the applicable outer zone standard will be applied out to 170 feet.
- If the slope break is greater than 100 feet from the edge of the CMZ, then the outer zone standard will be applied from the slope break out to 170 feet.

## **Stream Junctions**

The 25-foot stream bank zone (no harvest) will be extended for a minimum of 100 feet upstream and downstream, on each stream, where two or more small Type N perennial streams intersect.

## **Significant Waterfalls**

- A significant waterfall is one that has an identifiable splash zone. The splash zone is the area immediately adjacent to the stream channel that is occupied by vegetation commonly associated with wet areas, i.e., mosses, maidenhair or licorice fern, and other hydric species.
- For these sites, the stream bank zone (no harvest) will be extended around the outer perimeter of the splash zone of the waterfall.

# **Landscape Green Tree Retention and RMA Conifer Retention Targets**

It is recognized that conifer trees retained on the landscape during regeneration harvests provide benefits to both upland and riparian species, as well as contributing to aquatic habitats. Although any given tree or group of trees retained may provide multiple benefits, it is assumed that it would be undesirable for all leave trees to be concentrated in riparian management areas, with few or none in upslope areas, or vice-versa. Therefore, the following standards and guidelines will be used in accounting for the required RMA and landscape-level live tree retention targets.

## **Management Standards**

- Conifers retained to meet the requirements in the inner zone of streams managed for mature forest condition (Type F, and large or medium Type N) will not be counted towards achieving the landscape-level live tree retention standard.
- Conifer trees retained to meet the requirements on all other RMA zones may be counted towards achieving the landscape-level leave tree retention standard.

## **Management Guidelines**

- On regeneration harvest units, leave trees should be arranged to meet the intent and functional objectives for both riparian and upslope habitat values.
- On average, at least 25 percent of the leave trees required to meet the landscape standard should be located in riparian areas that extend well into upslope areas, or in upslope areas that are outside of riparian areas.

## Other Aquatic Habitats

The northwest Oregon state forests contain other aquatic habitats besides streams, such as wetlands, lakes, ponds, bogs, seeps and springs. The management objectives for these waters are generally similar to the objectives for streams, but the specific prescriptions are sometimes different. The following strategies apply to these other aquatic habitats.

### Prescriptions

The prescriptions for other aquatic habitats are presented in the following two tables.

#### Key Terms

**Wetland** — An area that is inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal conditions does support, a prevalence of vegetation typically adapted for life in saturated soil conditions. The process used to determine the presence of wetlands will be consistent with the method described in the 1989 *Federal Manual for Identifying and Delineating Jurisdictional Wetlands* (USDI Fish and Wildlife Service et al. 1989).

**Bog** — A wetland that is characterized by the formation of peat soils and that supports specialized plant communities. A bog is a hydrologically closed system without flowing water. It is usually saturated, relatively acidic, and is dominated by ground mosses, especially sphagnum. Bogs are distinguished from other wetlands by the dominance of mosses and the presence of extensive peat deposits.

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**Table J-3. Management Prescriptions for Lakes, Ponds, and Wetlands**

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**Greater Than 1 Acre**

- Establish a 25-foot no harvest zone, starting from the high water line, or wetland boundary (whichever is greater).
- Establish a riparian management area (RMA) of 100 feet from the high water line, or wetland boundary (whichever is greater).
- Manage vegetation to achieve and maintain mature forest conditions.
- The site-specific prescription will classify the wetland.

**From 1/4 Acre to 1 Acre**

- Establish a 25-foot no harvest zone, starting from the high water line, or wetland boundary (whichever is greater).
- Establish a riparian management area (RMA) of 50 feet from the high water line, or wetland boundary (whichever is greater).
- Within the RMA, harvest activities will retain at least 50% of the existing live tree basal area, or 110 square feet of basal area per acre (whichever is greater). Retained trees will generally be representative of the existing diameter classes and species distribution, with a preference for retaining trees greater than 20 inches DBH.
- If the waterway is inhabited by fish, or is identified as an important area for temperature-sensitive amphibian species, at least 80% shade will be maintained over the aquatic area.
- The site-specific prescription will classify the wetland.

**Less Than 1/4 Acre**

- Establish an RMA of 50 feet for waters containing fish (Type F), or 25 feet for non-fish-bearing (Type N) waters. These areas will be measured from the high water line, or wetland boundary (whichever is greater).
- For Type F waters, harvest within the RMA will retain at least 50% of the existing live tree basal area, or 110 square feet of basal area per acre (whichever is greater). Retained trees will generally be representative of the existing diameter classes and species distribution, with a preference for retaining trees greater than 20 inches DBH.
- For Type N waters, hardwood trees and brush will be retained to protect the hydrologic functions and wildlife habitat values of the site.
- If the waterway is inhabited by fish, or is identified as an important area for temperature-sensitive amphibian species, at least 80% shade will be maintained over the aquatic area.

**Stream-Associated Wetlands**

- Stream-associated wetlands are considered to be components of the aquatic habitat of streams, and will be managed according to the objectives and prescriptions specified for the associated stream.

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**Table J-4. Management Prescriptions for  
Estuaries, Bogs, Seeps, and Springs**

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**Estuaries**

- Establish a 25-foot no harvest zone, starting from the high water line or estuarine wetland boundary (whichever is greater).
- Establish a riparian management area (RMA) of 200 feet from the high water line, or estuarine wetland boundary (whichever is greater).
- Manage vegetation within the RMA to achieve and maintain mature forest conditions.

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**Bogs**

- Establish a 25-foot no harvest zone, starting from the high water line or wetland boundary (whichever is greater).
- Establish an RMA of 100 feet from the high water line or wetland boundary (whichever is greater).
- Manage vegetation within the RMA to achieve and maintain mature forest conditions.

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**Seeps and Springs**

Where possible, these aquatic areas should be incorporated into the RMAs of adjacent streams, and vegetation retention provided according to the stream prescription. In practice, this may simply require adjusting the boundary of a stream's RMA to fully encompass the spring or seep.

Other management considerations for some of these areas were described earlier in the section titled "Perennial Type N Stream Special Emphasis Areas."

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