

INTERIOR ALASKA

Riparian Management Zones

General Recommendations

Multifunctional riparian management zones (RMZ) have gained wide acceptance within the scientific and regulatory communities as primary tools for protecting water quality, maintaining stream channel and bank stability, maintaining fish and wildlife habitat, providing flood water protection, and providing other benefits to people and the environment. RMZs are exceptionally rich in biodiversity and provide a connective bridge between aquatic and upland habitats. Protectively managing these relatively narrow strips of land adjacent to water bodies provides significant benefits for the maintenance of public resources. Monetary values published by the National Wildlife Federation in the mid-1970s provide an estimate of between \$50,000 to \$80,000 per wetland acre and include the often hidden “free services” wetlands provide including flood prevention, erosion and sediment control, purification of ground and surface water, as well as the production of commercially and recreationally important species of fish and waterfowl (Sullivan, 1976).

The primary purpose of a RMZ is to protect public waters from human land use impacts. Excessive overland sediment, nutrient and chemical inflow and stream bank erosion can significantly degrade adjacent public waters, including larger water bodies located at a distance downstream. Leaf litter and other organic matter from riparian forests, including terrestrial invertebrates that drop into the water, are an important source of food and energy to stream systems (Wegner, 1999). Removal of riparian vegetation can cause a fundamental shift in the source and seasonality of energy input to the aquatic system. When riparian vegetative canopy removal is significant, heterotrophic systems (where production is based on carbon inputs from leaves and other vegetation) will be converted to autotrophic systems (where production is based on algae) (Allan, 1995). This causes a shift in the peak organic input from fall to mid-summer (Schlosser and Karr, 1981) and can adversely affect fish winter survival. Removal of the riparian vegetative community significantly reduces the amount and type of terrestrial insects that fall into the water. Many species of fish rely almost exclusively on terrestrial insects for their diet. The importance of terrestrial organisms as a food source is most important in smaller headwater streams that have lower algal production (Vannote et al., 1980).

The secondary purpose of a RMZ is to maintain diverse riparian communities that are critically important for the maintenance of many wildlife and bird species. Recognizing that maintenance of riparian habitats for wildlife and birds is more of a public rather than a private land use obligation, the RMZ guidelines place considerably greater importance on maintaining a larger RMZ on public land than on private land.

As a general policy, RMZs should be incorporated in all authorizations for activities on private, state, and federal lands. Activities specifically excluded from these general RMZ recommendations include grand fathered activities and timber harvest activities regulated under the Forest Practices Act (AS 41.17). Variances for water dependent activities, transportation and utility corridors, and other activities will be considered on a case-by-case basis.

General Policies

RMZs should be determined on a site-specific basis considering sources of possible water pollution and the management objectives for the area. Factors to be considered include, but are not limited to, water quality, importance of the area for fish, wildlife and bird habitat, wetland size and value, and bank stability. However, in general, RMZ widths should not be less than the widths recommended below unless a site-specific determination is made by the resource agencies that public resource values can be protected with a smaller RMZ. Wider RMZs may be appropriate if the potential source of water pollution is large (e.g., feedlot, tank farm, oil and gas development).

Recommendations for RMZs within private lands were developed in recognition of the private landowners authority and control over their land. The RMZ guidelines for private lands are primarily designed to prevent activities from adversely impacting public values on adjacent public lands and waters. Specific considerations include erosion control, contaminant interception, nutrient filter, channel morphology, fish habitat, and other factors necessary to comply with Section 404 of the federal Clean Water Act.

Conversely, under the public trust doctrine, the guidelines for RMZs on public lands consider a much broader range of public values, including, but not limited to, public access, stream bank and bed stability, aquatic and terrestrial habitats, water quality, floodwater storage, erosion control, and visual aesthetics.

The general RMZ width recommendations mitigate the majority of land use impacts to riparian and aquatic habitats. However, to provide habitats for all fish, wildlife, and bird species, some RMZs at least 100-m (328') wide should be maintained at the watershed level. Normally, these should be provided in public lands that are reserved for these purposes. Specific activities that are especially damaging should be subject to additional setbacks or restrictions. These include animal waste lagoons, animal waste spray fields, hazardous and municipal waste disposal facilities, oil and gas development, and other potential sources of severe contamination.

Specific attention should be directed at managing pollution on-site and minimizing the extent of bypasses or incursions into the RMZ for activities excluded under these general recommendations. Controlling pollution and surface runoff on-site may do more to improve stream water quality and habitat than additional increases in the width of the RMZ.

The width and uses allowed within a RMZ may vary between water bodies based on the management intent for the area, specific public resource values, and the type of land use activity proposed for the area. However, to provide a reasonable degree of consistency, the following recommended RMZ widths and management guidelines should be considered the default unless over-ridden by a detailed, site-specific analysis. A site-specific analysis should address the following factors:

- Primary land use
- Sediment removal from runoff
- Stream bank stabilization

- Nutrient uptake and removal (phosphorus, nitrogen, and other nutrients that can cause eutrophication of the water body)
- Uptake and removal of other chemicals (e.g., pesticides, fertilizer) that can pollute aquatic ecosystems
- Floodwater storage
- Aquatic life habitat
- Riparian wildlife and bird habitat
- Riparian movement corridors for wildlife
- Large woody debris and organic litter input into aquatic systems
- Public access, recreation, and subsistence use activities along the water body (public lands)

Headwater and Low-Value Resident Fish Water Bodies	Recommended RMZ
Private Land	8-m (26') primary; 8-m (26') secondary
Public Land WITHOUT significant wildlife/bird habitat values of regional or statewide importance	10-m (33') primary; 10-m (33') secondary
Public Land WITH significant wildlife/bird habitat values of regional or statewide importance	25-m (82') primary; 15-m (50') secondary

Non-Glacial Low-Value Resident and Anadromous Fish Water Bodies	Recommended RMZ
Private Land	10-m (33') primary; 10-m (33') secondary
Public Land WITHOUT significant wildlife/bird habitat values of regional or statewide importance	15-m (50') primary; 15-m (50') secondary
Public Land WITH significant wildlife/bird habitat values of regional or statewide importance)	25-m (82') primary; 20-m (66') secondary

Non-Glacial High-Value Resident and Anadromous Fish Water Bodies	Recommended RMZ
Private Land	15-m (50') primary; 15-m (50') secondary
Public Land WITHOUT significant wildlife/bird habitat values of regional or statewide importance	20-m (66') primary; 20-m (66') secondary
Public Land WITH significant wildlife/bird habitat values of regional or statewide importance	30-m (100') primary; 30-m (100') secondary

Glacial High-Value Resident and Anadromous Fish Water Bodies	Recommended RMZ
Private Land	10-m (33') primary; 10-m (33') secondary
Public Land WITHOUT significant wildlife/bird habitat values of regional or statewide importance	15-m (50') primary; 15-m (50') secondary
Public Land WITH significant wildlife/bird habitat values of regional or statewide importance	25-m (82') primary; 20-m (66') secondary

Wetlands	Recommended RMZ*
Class I Wetlands – (a) > 40.5 hectares (100 acres) OR (b) all wetlands with a locatable outlet	
Private:	18-m (60') primary; 12-m (40') secondary
Public:	30-m (100') primary; no secondary required
Class II Wetlands - between 16 and 40.5 hectares (40 to 100 acres) with no locatable outlet	
Private:	10-m (33') primary; 8-m (26') secondary
Public:	19-m (62') primary; no secondary required
Class III Wetlands – Lacustrine or palustrine emergent wetlands less than 16 hectares (40 acres) with no locatable outlet	
Private:	15-m (50') primary; no secondary required
Public:	15-m (50') primary; no secondary required
* <i>Fill or structures may be placed within the RMZ and/or adjacent wetlands if specifically authorized under Section 404 of the Clean Water Act.</i>	

Calculation of RMZ Widths

The recommended RMZ widths are measured horizontally landward from the ordinary high water (OHW) line of the adjacent water body. The width of the RMZ is measured from the bank rim if the stream bank is geologically unstable, exceeds 3-m (10 feet) in height, or slopes more than 30 percent.

RMZ Adjustments for Slope, Wetlands, and Impervious Surfaces

Steep slopes – The RMZ width is increased by 0.6-m (2 feet) for every 1% increase in adjacent bank slope.

Adjacent wetlands – Adjacent wetlands are excluded from RMZ width calculations. For example, a site that normally would have a 20-m (66 feet) RMZ includes a 15 –m (50 feet) wide area of riparian wetlands, the total RMZ width should be increased from the original 15-m (50 feet) to 35-m (115 feet).

Impervious surfaces – Impervious surfaces are not included in calculating the width of the RMZ. If an 8-m (26 feet) wide impervious surface (paved road) is located within the RMZ, the width of the RMZ is increased by 8-m (26 feet).

Management Guidelines

Primary RMZ

Primary RMZs should be managed to (1) maintain stream bank stability, (2) provide large organic debris input into stream channel, (3) control sediment, chemical and nutrient runoff, (4) provide overhanging bank vegetation for fish habitat, and (5) provide riparian upland habitat for wildlife. All major sources of contamination should be excluded from the primary RMZ. This includes construction resulting in major land clearing, impervious surfaces, roads, septic tank drain fields, agricultural fields, waste disposal sites, livestock, and dog lots. Application of fertilizer and pesticides should be prohibited, except as may be necessary for restoration of natural vegetation within the primary RMZ.

Minor exceptions for water dependent structures may be allowed if approved by all applicable state, federal, and local government agencies. Other sources of contamination including septic drain fields, waste disposal sites, dog lots, and application of fertilizer and pesticides (except as necessary for RMZ vegetation restoration) should be excluded from the primary RMZ. Water dependent and other minor development activities may be allowed within a RMZ provided they minimize adverse impacts to water quality and fish and wildlife habitat AND are approved by all state, federal and local regulatory agencies. Such activities may include transportation and utility corridors, water intake facilities, hydro projects, boat launches, docks, piers, stairways, culverts and bridges, erosion control, bank stabilization, public structures whose purpose is to provide access to or across the water body, subsistence activities, and activities involving the study, protection, or enhancement of fish or wildlife habitat.

Minor vegetative management (trimming, pruning or removal of hazardous trees) may be allowed within the primary riparian management zone. Further clearing of natural vegetation may be allowed to establish a view corridor and path to the water body provided the cleared area does not exceed 8-m (26 feet) in width along the water body and vegetative cover (natural or planted) is established and maintained. Except for water dependent and other activities specifically authorized within the RMZ, all other structures should not be located within the primary RMZ.

Secondary RMZ

Secondary RMZs should be managed to control sediment, chemical, and nutrient runoff. A maximum of 50 percent of the natural vegetation may be removed within the secondary RMZ for buildings, driveways, and landscaping provided that cleared areas not occupied by a structure, road, or driveway are maintained with a vegetative cover (natural or planted).

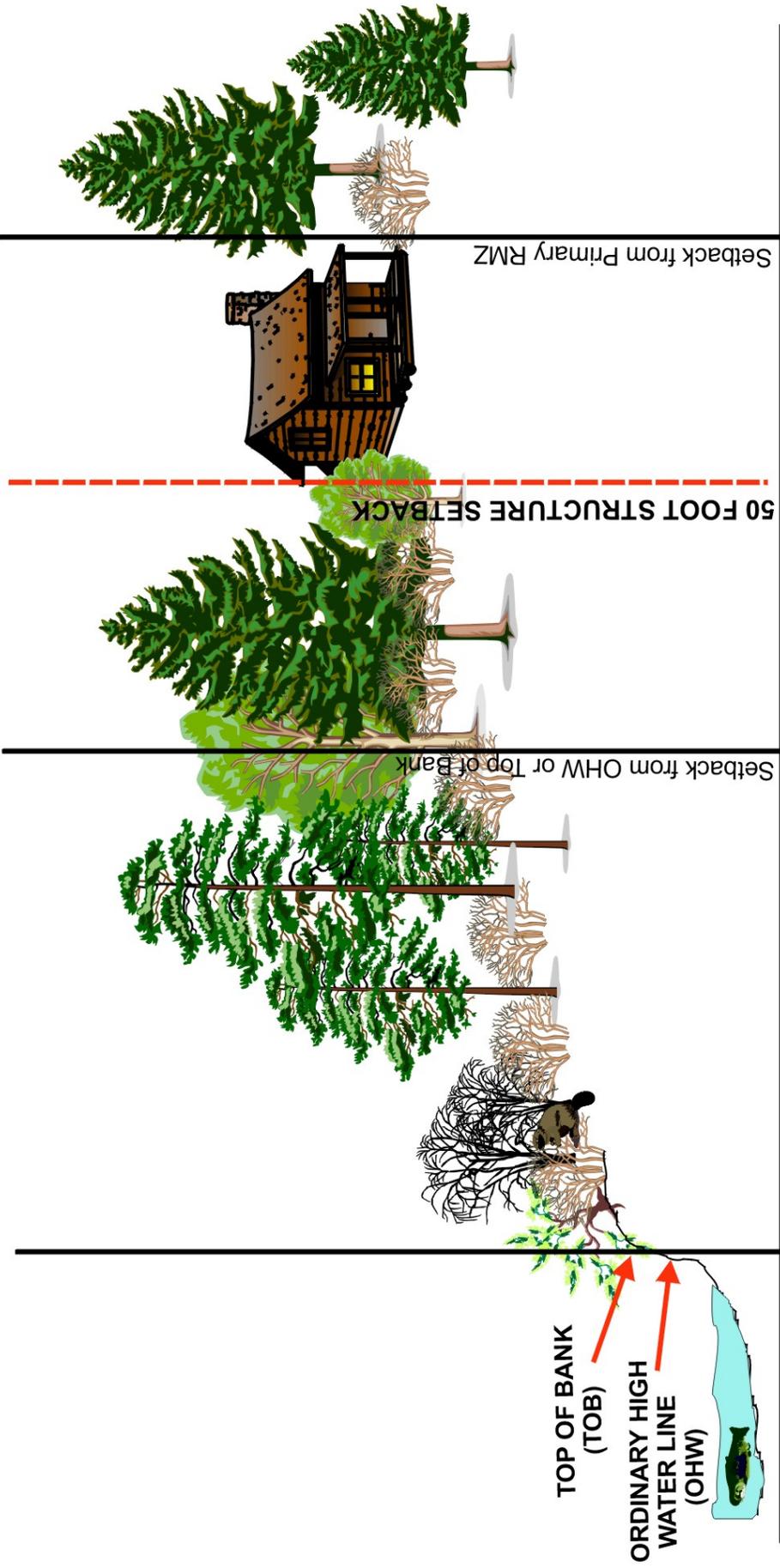
Building and Structure Setbacks

All permanent buildings and structures, except for water-dependent and other structures specifically authorized within the primary RMZ, shall be set back a minimum distance of 15-m (50') from the ordinary high water line of rivers, lakes, streams, sloughs, lacustrine wetlands, and palustrine emergent wetlands.

Literature Cited

- Allan, J.D. 1995. *Stream Ecology: Structure and Function of Running Waters*. London, UK: Chapman and Hall.
- Schlosser, I.J. and J.R. Karr. 1981. Water Quality in Agricultural Watersheds: Impact of Riparian Vegetation During Base Flow. *Water Resources Bulletin* 17(2):233-240.
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- Vannote R.L., G.W. Minshall, K.W. Cummins, J.R. Sedell, and C.E. Cushing. 1980. The River Continuum Concept. *Canadian Journal of Fisheries and Aquatic Science* 37:130-137.
- Wegner, S. 1999. A Review of the Scientific Literature on Riparian Buffer Width, Extent, and Vegetation. *Inst. Of Ecology, Univ. of Georgia, Athens, GA*.

A Riparian Buffer consisting of a Primary and a Secondary Riparian Management Zone (RMZ). Some restrictions on land clearing and vegetation removal apply. Dog lots and waste disposal are prohibited in both zones.



PRIMARY RMZ

Extends inland from OHW or TOB. Damaged, diseased, or fallen trees may be removed. Clearing for a view corridor/path is limited to 26' wide - vegetative ground cover shall be maintained, shrubs may be trimmed to 3' in height and trees limbed (or removed at base). Pathways shall not exceed 6' in width. Bank stabilization projects must be reviewed and approved by state and federal agencies.

SECONDARY RMZ

Extends inland from the primary riparian zone. No structure before 50'. A maximum of 50% of natural vegetation may be cleared for landscaping, buildings, and driveway. Bulldozers and/or other heavy equipment may be used inland from the 50' structure setback zone. All other land clearing within this zone will be done by hand. All exposed surfaces will be seeded/planted and maintained to prevent soil erosion.

EXAMPLE

A Riparian Buffer consisting of a Primary and a Secondary Riparian Management Zone

