

**Riparian Forest Buffer (Acre) 391**

vertical structure/density and connectivity to accomplish the intended purpose(s).

The minimum width for all purposes shall be at least 35 feet measured horizontally on a line perpendicular to the water body beginning at the bank-full elevation, or the top of the bank.

RFBs may be established within existing forested areas. Assess species and stocking density to determine if the intended purpose(s) will be served. If additional stocking is required, select species adapted to the site that will not compromise the function and purpose(s).

If the existing forest cover width allows, establish the RFB as follows:

**DEFINITION**

An area of predominantly trees and/or shrubs located adjacent to and up-gradient from watercourses or water bodies.

**PURPOSES**

- Create shade to lower or maintain water temperatures to improve habitat for aquatic organisms.
- Create or improve riparian habitat and provide a source of detritus and large woody debris.
- Reduce excess amounts of sediment, organic material, nutrients and pesticides in surface runoff and reduce excess nutrients and other chemicals in shallow ground water flow.
- Reduce pesticide drift entering the water body.
- Restore riparian plant communities.
- Increase carbon storage in plant biomass and soils.

<b>Table 1. Forest Buffer Widths Adjusted for Slope</b>	
Slope of Land Above Water Body	Minimum Width* of Riparian Forest Buffer
0-10 %	100 feet
10-20%	115 feet
20-30%	135 feet
30-40%	155 feet
40 +	175 feet

\*For streams, listed widths are for each side of stream

**CONDITIONS WHERE PRACTICE APPLIES**

Riparian forest buffers are applied on areas adjacent to permanent or intermittent streams, lakes, ponds, and wetlands. They are not applied to stabilize stream banks or shorelines.

If the existing forest cover is not wide enough to meet the widths in Table 1, establish the full existing width of the forest cover to a RFB. If the existing forest cover is less than 35 feet wide, plant trees and shrubs to increase the width to a minimum of 35 feet. Consider additional planting to meet the widths in Table 1.

**CRITERIA**

**General Criteria Applicable to All Purposes**

Comply with all federal, state, and local laws and regulations.

Where RFBs are established with tree/shrub planting, use only native species and viable, high-quality and adapted plant materials. Prepare the site and plant at a time and manner to ensure survival and growth of selected species for achieving the intended purpose(s). Refer to Michigan NRCS Tree/Shrub Establishment (612) for spacing requirements, and additional information. Also refer the Conservation Tree/Shrub Suitability Guide in Section II of the Field Office Technical Guide to determine appropriate species to plant.

Position and design the riparian forest buffer (RFB) appropriately to achieve sufficient width, length,

Use additional conservation practices, e.g., Tree/Shrub Site Preparation (490), Herbaceous Weed Control (315), Cover Crop (340), as needed to ensure the best chance of tree/shrub establishment.

Favor native tree and shrub species that have multiple values such as those suited for timber, biomass, nuts, fruit, browse, nesting, aesthetics and tolerance to locally used herbicides.

Periodic removal of some forest products such as high value trees, medicinal herbs, nuts, and fruits is permitted, provided the intended purpose is not compromised by the loss of vegetation or harvesting disturbance. Do not remove timber from RFBs with slopes greater than 50%.

Plan any tree harvesting or cutting to leave at least 60 sq. ft. of residual basal area. Do not cut any trees growing along the stream bank.

Control excessive sheet, rill and concentrated flow erosion within the riparian forest buffer and in the areas immediately adjacent to and up-gradient from the buffer site.

Control or exclude livestock as necessary to achieve the intended purpose. Refer to the Michigan NRCS Prescribed Grazing (528) and/or Access Control (472) Conservation Practice Standards, as applicable.

Control or eliminate harmful plant and animal pests present on the site as necessary to achieve and maintain the intended purpose. If pesticides are used, refer to the Michigan NRCS Pest Management (595) Conservation Practice Standard.

Use all fertilizers, pesticides, and other chemicals in accordance with labeling and only if it will not compromise the intended purpose(s).

**Additional Criteria to Reduce Excess Amounts of Sediment, Organic Material, Nutrients and Pesticides in Surface Runoff and Reduce Excess Nutrients and Other Chemicals in Shallow Ground Water Flow**

Establish a filter strip directly adjacent to and upslope from the RFB, to provide additional filtration. Refer to the Michigan NRCS Filter Strip (393) Conservation Practice Standard. Additionally, extend the width of the RFB in high nutrient, sediment, and animal waste application areas, where the contributing area is not adequately treated or where an additional level of protection is needed.

Assess the severity of bank erosion and its influence on existing or potential riparian trees and shrubs. Watershed-level treatment or bank stability activities may be needed before establishing a riparian forest

buffer. Refer to the Michigan NRCS Streambank and Shoreline Protection (580) Conservation Practice Standard, if needed.

Direct drainage (subsurface tiles, etc.) and concentrated flow through the RFB provide a direct conduit of sediment, organic material, nutrients, etc. Use additional conservation measures such as to treat these areas. Refer to the Michigan NRCS Filter Strip (393) Conservation Practice Standard, if needed.

**Additional Criteria to Create or Improve Riparian Habitat and Provide a Source of Detritus and Large Woody Debris**

The minimum width shall be at least 50 feet measured horizontally on a line perpendicular to the water body beginning at the bank-full elevation, or the top of the bank.

Use the NRCS-Michigan Wildlife Habitat Evaluation or species-specific Habitat Suitability Index Models to evaluate the site. See Michigan Biology Technical Note #12.

Match RFB widths to the requirements of the fish and wildlife species and associated communities of concern, as described in Table 2. Contact the NRCS State Biologist for appropriate widths for other species, if unknown.

<b>Table 2 – Required Total* Riparian Forest Buffer Width for Various Wildlife Species</b>	
<b>Species</b>	<b>Desired Width (Ft.)</b>
Bald eagle, cavity nesting ducks, heron, sandhill crane, neotropical migrants	600
Pileated woodpecker, kingfisher	450
Beaver, mink, salmonids	300
Deer	200
Muskrat	165
Frog, salamander, turtle	100

\* For buffers along streams, width should include RFBs on both sides of the water course, if possible.

Establish plant communities that address the target aquatic and terrestrial wildlife needs and have multiple values such as pollinator need, habitat, nutrient uptake and shading.

Select species, corridor configuration, and management to enhance habitats for threatened,

endangered, and other species of concern, where applicable.

Create or maintain 4 to 7 snags (standing dead trees) per acre, with at least 1 snag per acre greater than 12” in diameter at breast height (measured 4.5 ft from the ground), if possible.

#### **Additional Criteria for Increasing Carbon Storage in Biomass and Soils**

Maximize the width and length of the RFB.

Select plants that have higher rates of carbon sequestration in soils and plant biomass and are adapted to the site to assure strong health and vigor. Plant a minimum of 681 trees per acre (8 feet x 8 feet or equivalent).

#### **CONSIDERATIONS**

Design RFBs to meet the Riparian Management Zone (RMZs) guidelines in “Sustainable Soil and Water Quality Practices on Forest Land” (MI DNR and DEQ, 2009).

Avoid tree and shrub species that may be alternate hosts to undesirable pests.

Consider species diversity to avoid loss of function due to species-specific pests.

Use plants from multiple sources to increase genetic diversity.

Consider allelopathic impacts of plants.

Plan the location, layout and density of the buffer to complement natural features, and mimic natural riparian forests.

For sites where continued function of drains is desired, woody root penetration may eventually plug the underground structure. In these cases, consider a setback of woody vegetation planted over the drain maintained in herbaceous cover or using rigid, non-perforated pipe to minimize woody root penetration.

Maximize widths, lengths, and connectivity of riparian forest buffers.

Address riparian forest buffer restoration on a watershed basis to reduce forest fragmentation and provide corridors for wildlife by maintaining continuous streamside vegetation.

The species and plant communities that attain biomass more quickly will sequester carbon faster. The rate of carbon sequestration increases as riparian plants mature and soil organic matter increases.

Species that resprout are generally preferred when establishing new rows nearest to watercourses or waterbodies subject to flooding or ice damage.

Establishment of riparian forest buffers is not advised in areas of extremely high runoff or severe shoreline or streambank erosion unless Michigan NRCS Conservation Practice Standard Streambank and Shoreline Protection (580) can be successfully implemented. In such cases, install these measures prior to the establishment of the riparian forest buffer.

#### **PLANS AND SPECIFICATIONS**

Specifications for applying this practice shall be prepared for each site and recorded using approved specification sheets, job sheets (See Riparian Forest Buffer (391) Conservation Design Sheet, narrative statements in the conservation plan, or other acceptable documentation.

Specifications will include, but are not limited to, the following items, if applicable:

- Purpose of treatment
- Width and length of the RFB
- Map indicating location of treatment
- Species to be planted
- Number of plants required
- Plant spacing
- Site preparation and planting techniques
- Timing of planting and other activities

#### **OPERATION AND MAINTENANCE**

Inspect the RFB periodically and protect from adverse impacts such as excessive vehicular and pedestrian traffic, pest infestations, concentrated flows, pesticides, livestock or wildlife damage and fire.

Replace dead planted trees or shrubs to maintain at least 80% survival with plants evenly distributed over the entire planted area.

Control undesirable vegetative competition until the buffer is, or will progress to, a fully functional condition.

Ensure that any manipulation of species composition, stand structure and stocking by cutting or killing selected trees and understory vegetation will sustain the intended purpose(s). Refer to the Michigan NRCS Forest Stand Improvement (666) Conservation Practice Standard.

Control or exclusion of livestock and harmful wildlife shall continue. Refer to the Michigan NRCS Prescribed Grazing (528) and/or Access Control (472) Conservation Practice Standards, as applicable.

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