

**NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE STANDARD**

RIPARIAN FOREST BUFFER

(Ac.)

CODE 391

DEFINITION

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

PURPOSE

- 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.
- Mitigate flooding damage by trapping large debris and water-borne sediments, slowing flood waters and lowering flood peaks.
- Provide a harvestable crop of timber, fiber, wildlife forage, fruit or other crops consistent with other intended purposes.
- Create riparian habitat and corridors for wildlife.
- Provide room for water courses to establish geomorphic stability.

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. It should not be applied to small cold water trout streams.

The riparian forest buffer will be most effective when used as a component of a total resource management system including nutrient management, pest management, and erosion runoff and sediment control practices.

CRITERIA

General Criteria Applicable to All Purposes

The riparian forest buffer shall be positioned appropriately and designed to achieve sufficient width, length, vertical structure/density and connectivity to accomplish the intended purpose(s).

It must be wide enough to achieve the purpose and minimally 40 feet measured horizontally on a line perpendicular to the water body beginning at the normal water line, bank-full elevation, or the top of the bank as determined locally.

Dominant vegetation will consist of existing, naturally regenerated, or seeded/planted trees and shrubs suited to the soil and hydrology of the site and the intended purpose(s). Use locally grown native species. Plantings will consist of two or more species with individual plants suited to the seasonal variation of the site's moisture status. No single species will

make up more than 50% of the total number of species planted.

Overland flow through the riparian area will be maintained as sheet flow.

For sites to be regenerated or planted, excessive sheet-rill and concentrated-flow erosion will be controlled.

Excessive sheet-rill and concentrated-flow erosion will be controlled in the areas immediately adjacent and up-gradient of the buffer site.

Use tree and shrub species that are native and non-invasive. Substitution with improved and locally accepted cultivars or purpose-specific species is allowed. For plantings and seeding, only viable, high-quality and adapted plant materials will be used.

Favor 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.

Necessary site preparation and planting shall be done at a time and manner to insure survival and growth of selected species for achieving the intended purpose(s).

Livestock shall be controlled or excluded as necessary to achieve the intended purpose. Refer to the standards Prescribed Grazing (528), and/or Use Exclusion (472), as applicable.

Harmful plant and animal pests present on the site will be controlled or eliminated as necessary to achieve and maintain the intended purpose. If pesticides are used, refer to the standard Pest Management, 595.

Refer to Tree/Shrub Establishment (612) for planting methods.

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

The width will be extended 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.

Concentrated flow erosion or mass soil movement shall be controlled in the up-gradient area adjacent to the riparian forest buffer. An herbaceous zone, immediately adjacent to the riparian forest buffer, may be designed and established in accordance with the criteria in Filter Strip (393).

Existing, functional underground drains through the riparian area will pass pollutants directly to the outlet. To filter such pollutants, drains can be plugged, removed or replaced with perforated pipe/end plugs to allow passage and filtration of drain water through the riparian forest root zone. Caution is advised that saturated conditions in the riparian and adjacent areas may limit existing land use and management.

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

The width will be extended to meet the minimum habitat requirements of the wildlife or aquatic species of concern.

Existing functional underground drains shall be replaced with non-perforated pipe under the buffer area to alleviate root intrusion and to sustain the drains functionality. Alternatively, a regulating valve or structure may be installed on the drain to control drain outflow.

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

Additional Criteria to Mitigate Flooding Damage by Trapping Large Debris and Water-borne Sediments, Slowing Flood Waters and Flattening Flood Peaks.

For the Missouri and Mississippi Rivers, the width of the buffer strip will be 300 feet.

Additional Criteria for Increasing Carbon Storage in Biomass and Soils

Maximize width and length of the riparian forest buffer.

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 the appropriate stocking rate for the site.

Additional Criteria for Non-cropland Areas that Contain Remnants of Native Prairie Vegetation

Riparian forest buffers that are to be established on non-cropland areas that contain remnants of native prairie vegetation will use woody vegetation at low density.

These areas will be identified by NRCS in consultation with Iowa Department of Natural Resources (DNR) Forester and Wildlife Biologist.

Low density woody vegetation is an established density of 50 - 100 woody plants per acre. Only native woody vegetation will be used on these sites. (Refer to Tables 1-3 for native woody plants).

Native woody forbs or shrubs shall be used where site conditions allow. Native woody vegetation may consist of native woody forbs (such as leadplant and prairie rose), native shrubs, or trees.

Natural regeneration may be used on sites that are determined to have a seed source adequate to establish a minimum of 50 woody plants per acre within two years.

Caution will be used when planting woody vegetation. Avoid planting directly into the native prairie remnants. Leave at least 10 feet between woody plantings and native prairie remnants.

Areas that have been identified by NRCS as having remnant native prairie areas shall be managed to encourage growth of the native vegetation. Management may include mowing (not shorter than 8 inches), prescribed burning (plan required), or chemical treatments.

CONSIDERATIONS

Tree and shrub species, which may be alternate hosts to undesirable pests, should be avoided. Species diversity should be considered to avoid loss of function due to species-specific pests.

Allelopathic impacts of plants should be considered.

The location, layout and density of the buffer should 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, a setback of woody vegetation planted over the drain maintained in herbaceous cover or using rigid, non-perforated pipe will minimize woody root penetration.

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

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

Joining new buffers with existing buffers increases the continuity of cover.

PLANS AND SPECIFICATIONS

Specifications for applying this practice shall be prepared for each site and recorded using approved specification sheets, job sheets, technical notes, and narrative statements in the conservation plan, or other acceptable documentation.

For species selection—refer to:

<http://www.ia.nrcs.usda.gov/plants.html> and click on "Iowa Woodland Suitability Recommendations" or refer to "Woodland Suitability Guide at:

<http://www.iowadnr.com/forestry/soils.htm>

OPERATION AND MAINTENANCE

The riparian forest buffer will be inspected periodically and protected from adverse impacts such as excessive vehicular and pedestrian traffic, pest infestations, concentrated flows, pesticides, livestock or wildlife damage and fire.

Replacement of dead trees or shrubs and control of undesirable vegetative competition will be continued until the buffer is, or will progress to, a fully functional condition.

Any manipulation of species composition, stand structure and stocking by cutting or killing selected trees and understory vegetation shall sustain the intended purpose(s). Refer to the standard Forest Stand Improvement (666).

Control or exclusion of livestock and harmful wildlife shall continue. Refer to the standards Prescribed Grazing (528), and/or Use Exclusion (472), as applicable.

Fertilizers, pesticides and other chemicals used to maintain buffer function shall not impact water quality

Refer to Prescribed Forestry (409) and Forest Stand Improvement (666) for maintenance and management of the forest buffer.

If harvest in an active flood plain is to be considered, consult with a DNR Wildlife Biologist or Forester.

REFERENCES

U.S. Department of Agriculture, Forest Service, Northeastern Area State and Private Forestry, 1991. Riparian Forest Buffers—Function and Design for Protection and Enhancement of Water Resources. NA-PR-07-91. Prepared by: Monte E. Seehorn, Atlanta, GA.

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Kovacic, D.A., L.L. Osborne, and B.C. Dickson. 1991. "Effectiveness of Riparian

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