NATURAL RESOURCES CONSERVATION SERVICE
VIRGINIA 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.

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.
- Increase carbon storage in plant biomass and soils.

CONDITIONS WHERE PRACTICE APPLIES

Riparian forest buffers are installed in areas adjacent to permanent or intermittent streams, lakes, ponds, wetland, sinkholes, and other areas of groundwater recharge that are capable of supporting woody vegetation. They are not applied to stabilize stream banks or shorelines.

CRITERIA

General Criteria Applicable to All Purposes

Position and design the riparian forest buffer appropriately to achieve sufficient width, length, vertical structure/density and connectivity to accomplish the intended purpose(s).

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).

The vegetation will extend a minimum width to achieve the purpose(s). Measurement shall begin at and perpendicular to the normal water line, bank-full elevation, or the top of the bank as determined locally.

Maintain overland flow through the riparian area 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. Use only viable, high-quality and adapted plant materials. Plant local or regionally adapted species when available.

Favor native, non-invasive 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.

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).

Specific pesticide recommendations will be obtained from personnel who are licensed by the Virginia Department of Agricultural and Consumer Services in one of the forest pest management categories in accordance with Virginia's Pesticide Laws and Regulations. If chemical herbicides or pesticides are used, follow all instructions for the particular chemical as outlined in the Virginia Pest Management Guide (2009 edition and subsequent revisions) as maintained by the Virginia Cooperative Extension Service. The specific pesticide container label addressing instructions and safety precautions shall be strictly followed as it applies to handling, applying in proximity to water resources, and storage.

Volunteer species that exist onsite within the seed-bank will establish themselves. The establishment of these species is encouraged to promote a diverse and fully functional buffer.

Exclude livestock as necessary to achieve the intended purpose. Refer to the VA Practice Standard *Prescribed Grazing, Code 528* and/or VA Practice Standard *Access Control, Code 472*, as applicable.

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 minimum width is 35 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.

Extend the buffer width 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.

Existing, functional underground drains through the riparian area may pass pollutants directly to the drain 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.

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 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.

CONSIDERATIONS

Avoid tree and shrub species which may be alternate hosts to undesirable pests. Consider species diversity to avoid function deficiencies due to species-specific pests.

Maximize widths, lengths, and connectivity of riparian forest buffers for increased wildlife value, usage as migration corridors, and aquatic habitat.

Consider allelopathic impacts that some species exhibit.

Locate, layout, and stock the buffer in a manner that complements natural features and mimics natural riparian forests.

For sites where continued function of drains is desired, woody root penetration may eventually plug the underground structure. In these cases, woody vegetation should not be planted over the drain, but the area should be maintained in herbaceous cover. Use non-perforated pipe to minimize woody root penetration into subsurface drain pipe and establish herbaceous cover only in an appropriately sized setback over the drain pipe.

Conduct necessary site preparation and planting operations at a time and in a manner to insure survival and growth of selected species for achieving the intended purpose(s).

PLANS AND SPECIFICATIONS

Prepare and record specifications for applying this practice for each site using approved specification sheets, job sheets, technical notes and narrative statements in the conservation plan, or other acceptable documentation. Prepare site specific maps of the area with the planting area marked clearly denoting acreage, species, stocking rate, and planting dates.

Check Data:

Record soil type, species, seedling size, acres, stocking rate, planting date, and type of site prep used. Record length and type of tree shelter, if used.

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, invasive plant species infestations, concentrated flows, pesticides, livestock or wildlife damage and fire.

Replace dead trees or shrubs and control the undesirable vegetative competition until the buffer is fully functional.

Where tree shelters are used, maintain tree protection twice per year by straightening leaning shelters, replacing broken stakes, and removing bird nets when the tree is near the top of the shelter. If the shelter does not have a perforated line and is not photodegradable, the shelter must be cut off when the tree reaches 2.5 to 3 inches diameter. Remove competing vegetation and wasp nests inside the shelter. Check for fungus growing on the bark inside the shelter, and if found, remove the shelter.

Control and manage competing vegetation around planted trees to allow the planted trees to grow and become established. Maintain vegetation control within 4 feet of planted hardwoods for a minimum of 3 years.

Manipulate species composition, stand structure and stocking by cutting or killing selected trees and understory vegetation only to sustain the intended purpose(s). Refer to VA Practice Standard *Forest Stand Improvement, Code 666.*

Control or exclude livestock and harmful wildlife by appropriate means. Refer to the VA Practice *Standards Prescribed Grazing, Code 528, and/or Access Control, Code 472,* as applicable.

Use fertilizers, pesticides and other chemicals to maintain buffer function appropriately so as not to impact water quality.

Maintain overland flow through the riparian area as sheet flow.

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.

Control harmful plant and animal pests present on the site as necessary to achieve and maintain the intended purpose.

REFERENCES

USDA, Forest Service, 1991, Riparian Forest Buffers – Functional Design for Protection and Enhancement of Water Resources, NA-PR-07-91, prepared by David Welsh.

USDA, NRCS, 1996, NRCS/RCA Issue Brief 11 Riparian Areas – Environmental Uniqueness, Functions, and Values.

USDA, NRCS, 2000. Conservation Buffers to Reduce Pesticide Losses, NRCS, Fort Worth, Texas.

Tjaden, Robert L. and Glenda M. Weber, Fact Sheet #724, Introduction to the Riparian Forest Buffer, Cooperative Extension Service, University of Maryland.

Tjaden, Robert L. and Glenda M. Weber, Fact Sheet #733, Riparian Buffer Systems, Cooperative Extension Service, University of Maryland.

USDA, et. al., Stream Corridor Restoration – Principles, Processes and Practices.

USDA, Palone, R. S. and A. H. Todd (editors), 1997, Chesapeake Bay Riparian Handbook: A Guide for Establishing and Maintaining Riparian Forest Buffers, USDA Forest Service, NA-TP-02-97, Radnor, PA.

Virginia Cooperative Extension Service, “2009 Pest Management Guide” and subsequent revisions available at: http://www.ext.vt.edu/pubs/pmg/