NRCS Natural Resources Conservation Service

Riparian Forest Buffer

Conservation Practice Job Sheet *391*

Definition

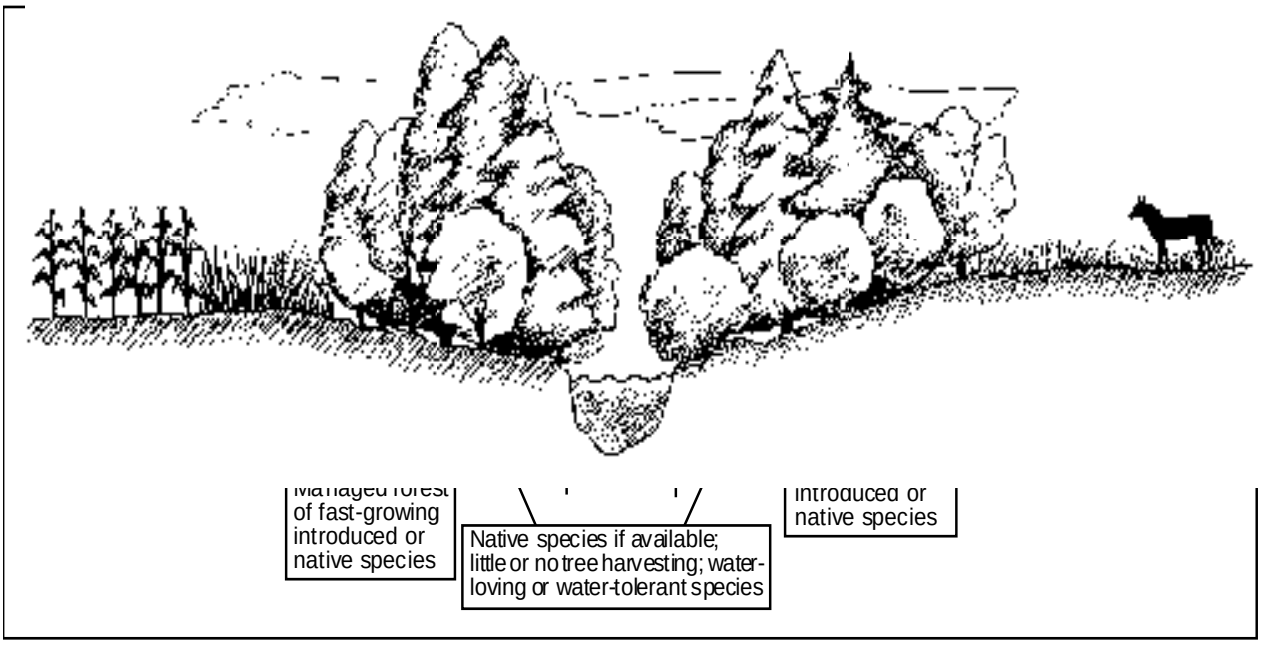
A riparian forest buffer is an area of trees and shrubs located adjacent to streams, lakes, ponds, or wetlands.

Purpose

Riparian forest buffers of sufficient width intercept sediment, nutrients, pesticides, and other materials in surface runoff and reduce nutrients and other pollutants in shallow subsurface water flow. Woody vegetation in buffers provides food and cover for wildlife, helps lower water temperatures by shading the stream or waterbody, and slows out-of-bank flood flows. In addition, the vegetation closest to the stream or waterbody provides litter fall and large wood important to fish and other aquatic organisms as a nutrient source and structural components to increase channel roughness and habitat complexity. Also, the woody roots increase the resistance of streambanks and shorelines to erosion caused by high water flows or waves. Some tree and shrub species in a riparian forest buffer can be managed for timber, wood fiber, and horticultural products.

Where used

Buffers are located along or around permanent or intermittent streams, lakes, ponds, wetlands, or seeps. Many of these areas feature year-round or seasonal moisture, which allows woody species to establish quickly. A new riparian forest buffer can rapidly benefit a variety of settings, such as cropland, rangeland, forest land, and urban areas.



A riparian forest buffer includes a zone 1, the area closest to the stream or waterbody, and a zone 2, the area adjacent to and up gradient of zone 1. Trees and shrubs in zone 1 provide important wildlife habitat, litter fall for aquatic organisms, large wood that can fall into the stream or waterbody, and shading to lower water temperature. This zone helps stabilize streambanks and shorelines. Trees and shrubs in zone 2 (along with zone 1) intercept sediment, nutrients, pesticides, and other pollutants in surface and subsurface water flows. Zone 2 can be managed to provide timber, wood fiber, and horticultural products. A third zone, zone 3, is established if periodic and excessive water flows, erosion, and sediment from upslope fields or tracts are anticipated. Zone 3 generally consists of herbaceous plants or grass and a diversion or terrace, if needed. This zone provides a “first line of defense” to assure proper functioning of zones 1 and 2.

Resource management system

Riparian forest buffers are normally established concurrently with other practices as part of a resource management system for a conservation management unit. For example, adjoining streambanks or shorelines must be stabilized before or in conjunction with the establishment of the buffer (streambank and shoreline protection). To maintain proper functioning of a planting, excessive water flows and erosion must be controlled upslope of the riparian forest buffer (filter strip, diversion, critical area planting, residue management). New plantings must be protected from grazing during establishment (prescribed grazing, use exclusion).

Wildlife

Connecting a riparian forest buffer with existing perennial vegetation, such as woodlots and woody draws (tree/shrub establishment) or other woody habitat (windbreak/shelterbelt establishment), benefits wildlife, including fish and other aquatic organisms. Select tree and shrub species and a planting pattern that benefit the wildlife species of interest and enhance local landscape aesthetics.

Operation and maintenance

Replace dead and dying woody species in newly established plantings. Trees and shrubs in a riparian forest buffer can eventually become crowded, slowing their growth and the growth, survival, and composition of understory species. As the buffer matures, periodic harvesting of some of the overstory trees and shrubs becomes an important activity for maintaining plant health and buffer function. Some of the older trees that are dead or dying within the buffer area can serve as nesting cavities for terrestrial organisms as well as a source of large wood for aquatic systems.

Specifications

Site-specific requirements are listed on the specifications sheet. Additional provisions are entered on the job sketch sheet. Specifications are prepared in accordance with the NRCS Field Office Technical Guide. See practice standard Riparian Forest Buffer, code 391.

Riparian Forest Buffer – Job Sheet

Landowner_____ Field number_____

Purpose (check all that apply)	
☐ Create shade to lower water temperature/improve aquatic habitat	☐ Provide a harvestable crop of timber, fiber, forage, fruit, or other tree-related crops consistent with other purposes
☐ Provide detritus/large woody debris for aquatic/terrestrial organisms	☐ Provide protection against scour erosion within the floodplain
☐ Create wildlife habitat and establish wildlife corridors	☐ Restore natural riparian plant communities
☐ Reduce excess sediment, organic material, nutrients, pesticides in surface runoff and excess nutrients/chemicals in shallow groundwater flow	☐ Moderate winter temperatures to reduce freezing of aquatic over-wintering habitats
	☐ Increase carbon storage

Layout		
Water body/course type and name, other:		
Minimum buffer zone widths (ft) – specify left and right of stream [facing upstream/downstream (circle appropriate one)] for a two-side buffer; use left only for water bodies, such as lakes and ponds; include herbaceous species in zone 3 notes or refer to other jobs sheets.		
Zone 1	**Zone 2**	**Zone3**
Left: Right:	Left Right:	Left: Right:
Notes:	Notes:	Notes (or refer to other job sheets):
Buffer zone length (ft):		
Additional location and layout requirements:		

Woody Plant Materials Information				
Species/cultivars:	Plants/acre:	Kind of stock[1]:	Planting dates:	Avg. Spacing[2]:
Zone # 1				
1				
2				
3				
4				
Zone # 2				
1				
2				
3				
4				

[1]BAreroot, COntainer, CUtting, Seed; include size, caliper, height, and age as applicable. [2]Spacing between plants to achieve plants/acre.

Temporary Storage Instructions

Planting stock that is dormant may be stored temporarily in a cooler or protected area. For stock that is expected to begin growth before planting, dig a V-shaped trench (heeling-in-bed) sufficiently deep and bury seedlings so that all roots are covered by soil. Pack the soil firmly and water thoroughly. Additional requirements:

Site Preparation

Remove debris and control competing vegetation to allow enough spots or sites for planting and planting equipment. Additional requirements:

Planting Methods

For container and bareroot stock, plant stock to a depth even with the root collar in holes deep and wide enough to fully extend the roots. Pack the soil firmly around each plant. Cuttings are inserted in moist soil with at least 2 to 3 buds showing above ground. Additional requirements:

Operation and Maintenance

The buffer must be inspected periodically and protected from damage so proper function is maintained. Replace dead or dying tree/shrub stock and continue control of competing vegetation to allow proper establishment. Periodic harvesting of trees and shrubs in zones 1 and 2 may be necessary to maintain the health and vigor of mature stands. Keep large dead and dying trees for cavity nesting birds and a source of large wood in aquatic habitats. Additional requirements:

Riparian Forest Buffer – Job Sheet

If needed, an aerial view or a side view of the practice can be shown below. Other relevant information, complementary practices and measures, and additional specifications may be included.

Scale 1"=_____ ft. (NA indicates sketch not to scale: grid size=1/2" by 1/2")

Additional Specifications and Notes:

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