NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE SPECIFICATION GUIDE SHEET

RIPARIAN FOREST BUFFER

(ACRE)

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.

DOCUMENTATION

All categories require the following design information (a MFS approved Woods WISE program "Project Plan" may be substituted in most cases).

1. Landowner and Design Preparer name and address
2. Property Location, including town and county, and NRCS Field Office
3. Practice name, code, justification, extent, estimated cost, and time schedule.
4. Description of specific work to be performed and its location and size, as well as written instructions for contractor and /or owner.
5. Description of layout with all boundaries will be clearly marked in long-lasting paint.
6. Maps of property and practice locations, including a lat/long for boundary corners and practices.
7. Specifications for the protection of other natural resources including but not limited to water, soil, and wildlife and non-target plants.
8. The design shall also identify where and if recommended treatments also necessitate application for permits or variances from local, state or federal regulations.
9. The expected composition, stocking, growth and quality of the future or residual stand, and its susceptibility to further insect/disease will be described and regeneration needs will be addressed, if applicable.
10. If chemical are used, WIN-PST program will be used to evaluate potential risks to humans and/or fish, as appropriate, for each pesticide to be used. The minimum level of mitigation required for each resource concern is based on the final risk ratings in the "WIN-PST (refer to IPM code 595)
11. All deviation from the specification guide must have written justification and be mutually agreed upon by TSP Forester and NRCS Field Office.

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.

EXISTING PERMANENT RIPARIAN FOREST MANAGEMENT

All riparian area boundaries are to be clearly marked in long-lasting paint. Riparian areas must include all portions of the waterbody on the property.

Minimum widths shall be used in accordance with all federal, state, and local laws and regulations, but not less than 15 feet on one side.

Riparian area widths will be measured from the normal high water mark, or the edge of the non-forested wetland. Braided or multiple channels will be treated as a single channel, with riparian width measured from the normal high water mark of the outermost channel on each side.

Areas containing rare, threatened, or endangered animals, plants, or natural communities identified by Maine Natural Areas Program and/or the Department of Inland Fisheries and Wildlife will be managed to protect those features.

Maintenance will be based on subsequent management to protect the identified features/riparian values. All management activities in designated riparian areas for the life of the practice will:

a. promote riparian wildlife habitat features

b. protect vernal pool wildlife habitat

c. be based on silvicultural prescriptions developed and implemented by a Licensed Forester

d. promote or maintain multi-aged forest with a more or less continuous canopy

e. maintain or create den or nest trees, snags, and coarse woody debris.

f. prevent ground disturbance within 75 feet of the normal high water mark.

g. mark any trees to be removed.

h. exceed regulatory requirements for protection of water bodies.

PLANTED RIPARIAN BUFFERS

This practice includes the establishment, through planting, of riparian forest buffers adjacent to streams, lakes, ponds, or nonforested wetlands. It applies in areas previously devoted to other land uses, or of forested areas severely degraded by natural or artificial causes beyond the control of the landowner.

Purchase and installation of tree and shrub seedlings, appropriate to the site, and mixtures of two or more tree species and two or more shrub species are required.

Established riparian forest buffers must be no less than 35 feet wide for water quality purposes, and will meet or exceed widths needed to satisfy NRCS quality criteria for fish and wildlife using Maine wildlife habitat evaluation procedures (WHEPs) or other State Office approved habitat assessment procedure. Sites must be reasonably protected from destructive grazing.

The following specifications apply:

1. Species selection must be appropriate to the site (soil, aspect, etc.) and the objectives of the practice. Native species of an appropriate provenance will be used when ever possible.

2. Species selection should also account for present and expected insect and disease problems in the immediate area. At least 4 species, two trees and two shrub species, will be planted in mixture.

3. Planting stock must be either bare root, containerized, potted or ball-and-burlap stock, less than a 1-inch caliper, or live cuttings of appropriate species. All stock must be of good quality and properly handled to help ensure survival. Planting stock will be cared for and handled as described in Standard and Specification 612, Tree/shrub Establishment. Use younger, smaller stock and plant more. Larger stock may be used in areas where maintenance of the planting is assured.

4. Existing or expected competition from natural vegetation must be assessed in the Design Specifications. If competition from non-woody, non-native, or off-site species is determined to be too heavy for acceptable seedling survival, use mulch mats, weed barriers, and/ or hardwood tree shelters. Fabric mulch may be used for weed control and moisture conservation for new plantings on all sites, particularly those with pronounced growing season moisture deficits or invasive, weedy species. Refer to Mulching, 484, for installation procedures.

5. Soils throughout the treated area must be identified. Areas that are too wet, where ledge outcrops occur, or where soils are too shallow for tree survival should be marked off in the field and their acreage determined.

6. Initial plant-to-plant densities for trees and shrubs will depend on their potential height at 20 years of age. Heights may be estimated based on: 1) performance of the individual species (or comparable species) in nearby areas on similar sites, or 2) Table 1-Tree and Shrub Species for Riparian Areas, specifications for tree heights 20 years after planting.

7. Measures to prevent browsing of hardwoods must be identified in the Design Specifications and implemented.

8. Planting sites shall be properly prepared based on the soil type and vegetative conditions listed in Tree/Shrub Site Preparation, Code 490. Leave a minimum of 3-foot untreated strip at the edge of the bank or shoreline. Avoid sites that have had recent application of pesticides harmful to woody species to be planted. If pesticides are used, apply only when needed and handle and dispose of properly and within federal, state and local regulations. Follow label directions and heed all precautions listed on the container.

9. Installation of planted seedlings must be done to maximize survival, e.g. with proper vertical placement of roots and soil contact with the roots.

10. When establishing a planted buffer, a minimum of two (2) rows of trees and one (1) row of shrubs should be established alongside the water body for maximum shade, stabilization and nutrient uptake within the desired buffer width. At least two species of trees and two of shrubs shall be planted in order to ensure a better survival rate. The remaining area of the designated riparian zone should be planted or meet natural regeneration requirements. Plantings can be intermixed with open areas treated for natural regeneration and specific wildlife needs. These openings should not exceed 4,356 square feet (1/10 acre), nor exceed 25% of the remaining planned riparian zone.

11. Plant by May 30. Design Specifications must include recommendations for maintaining or supplementing competition control measures post planting.

12. Additional measures to stabilize and protect shorelines may be needed. Where appropriate, additional resource professionals and/or other agency staff shall be consulted.

PLANT TO PLANT SPACING

Plant Types/Heights:	Plants per Acre	in feet:
Shrubs less than 10 feet in height	4500 to 1200	3 to 6
Shrubs and trees from 10 to 25 feet in height	1500 to 450	5 to 10
Trees greater than 25 feet in height	1200 to 200	6 to 15

NATURALLY REGENERATING OR DIRECT SEEDED RIPARIAN BUFFERS

Establishment Densities

A naturally regenerated riparian buffer is considered initially established when tree and shrub densities have reached the recommended stocking rates for planted buffers. A three- (3) growing season period is a reasonable amount of time in which to determine if sufficient natural regeneration will be established.

Trees and shrubs are considered established when they have begun to dominate herbaceous plants and undesired shrubs that are competing with it for nutrients, water and sunlight.

All areas immediately adjacent to the watercourse should have trees and or shrubs growing near it. Open areas within the area designed as a buffer should not exceed 1/10th acre in size nor exceed more than 25% of the total designated buffer areas.

BUFFER WIDTHS

It is best to base buffer widths on a large array of concerns, including social and economic needs of the landowner as well as other non-water quality related concerns.

The following table shows the range of widths recommended for different buffer purposes.

Range of Minimum Widths for Meeting Specific Buffer Purposes

Concern	Range of Widths (ft)	Concern	Range of Widths (ft)
Wildlife[1]	35 - 1320	Water Temperature[2]	5 – 75
Flood Control[2]	100 - 200	Streambank Stabilization[2]	15 – 60
Sediment Control[2]	50 – 200	Nutrient Removal[2]	50 – 200

1 – Maine Audubon. 1996. Conserving wildlife in Maine's shoreline habitats. Falmouth, ME. 8pp
2 – Palone, R. S. and A. H. Todd (Editors). 1997. Chesapeake Bay Riparian Handbook: a Guide for Establishing and Maintaining Riparian Buffers. USDA Forest Service, Northeastern Area State & Private Forestry. Publication NA-TP-02-97. Radnor, PA.

PLANT LIST

The plant list provided in the section I of the eFOTG General Reference folder; Conservation Tree and Shrub Database has listed woody plant species (trees and shrubs) commonly associated with and suited to riparian areas. In most instances selection of tree and shrub species to be used can be determined by evaluating existing areas that have some of the same characteristics of the site being reestablished. The best possible situation is to restore the natural plant communities.

REFERENCES

1. 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: David J. Welsch, Radnor, PA.
2. U.S. Department of Agriculture, Forest Service, Southern Region, 1992. Stream Habitat Improvement Handbook. Tech. Publ. R8-TP 16. Prepared by: Monte E. Seehorn, Atlanta, GA.
3. U.S. Environmental Protection Agency for the Chesapeake Bay Program, 1995. Water Quality Functions of Riparian Forest Buffer Systems in the Chesapeake Bay Watershed. Technology Transfer Report. EPA 903-R-95-004 CBP/TRS 134/95. Prepared by the Nutrient subcommittee of the Chesapeake Bay Program.
4. Pelletier, S.K. 1999. Special Habitats and Ecosystems: Riparian and Stream Ecosystems. Pages 47-55 in Catherine A. Elliott (ed.) Biodiversity in the Forests of Maine: Guidelines for Land Management. University of Maine. Maine Forest Biodiversity Project, Univ. Maine Coop. Ext., Univ. Maine, Orono. Bull. 7147.
5. Palone, R. S. and A. H. Todd (Editors). 1997. Chesapeake Bay Riparian Handbook: a Guide for Establishing and Maintaining Riparian Buffers. USDA Forest Service, Northeastern Area State & Private Forestry. Publication NA-TP-02-97. Radnor, PA.