NATURAL RESOURCES CONSERVATION SERVICE
ENGINEERING STANDARD

RIPARIAN FOREST BUFFER

(Acre)

CODE 391

DEFINITION

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

PURPOSES

- Create shade to low water temperatures to improve habitat for fish and other aquatic organisms.
- Provide a source of detritus and large woody debris for fish and other aquatic organisms and riparian habitat and corridors for wildlife.
- 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 forest riparian buffer will be most effective when used as a component of a total resource management system including nutrient management; pest management, erosion, runoff and sediment control practices as well as non-riparian wildlife habitat management.

CONDITIONS WHERE PRACTICE APPLIES

On areas adjacent to permanent or intermittent streams, lakes, ponds, wetlands and areas with ground water recharge.

CRITERIA

General Criteria Applicable to All Purposes Named Above.

The location, layout and density of the riparian forest buffer will accomplish the intended purpose and function. The buffer will consist of a zone (identified as zone 1) that begins at the normal water line, or at the top of the bank, and extends a minimum distance of 15 feet, measured horizontally on a line perpendicular to the water body.

Dominant vegetation will consist of existing or planted trees and shrubs suited to the site and the intended purpose. Occasional removal of some tree and shrub products such as high value trees 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 ensure survival and growth of selected species. Only viable, high growth, and adapted planting stock will be used. Site preparation shall be sufficient for establishment and growth of selected species and is done in a manner that does not compromise the intended purpose.

Livestock shall be controlled or excluded as necessary to achieve and maintain the intended purpose.

Harmful pests present on the site will be controlled or eliminated as necessary to achieve and maintain the intended purpose.

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.

An additional strip or area of land, zone 2, will begin at the edge and up-gradient of zone 1 and extend a minimum distance of 25 feet, measured horizontally on a line perpendicular to the water body. The minimum combined width of zones 1 and 2 will be 100 feet or 30 percent of the geomorphic flood plain whichever is less, but not less than 35 feet. The geomorphic flood plain is defined as that area consisting of soils formed in alluvial deposits.

Criteria for zone 1 shall apply to zone 2 except that removal of tree and shrub products such as timber, nuts and fruit is permitted on a periodic and regular basis provided the intended purpose is not compromised by loss of vegetation or harvesting disturbance.

Concentrated flow erosion or mass soil movement shall be controlled in the up-gradient area immediately adjacent to zone 2 prior to establishment of the riparian forest buffer. This area is delineated and identified as zone 3.

Additional Criteria to Create Shade to Lower Water Temperatures to Improve Habitat for Fish and Other Aquatic Organisms

A buffer for lowering warm-season water temperatures shall consist of at least zone 1 for watercourse reaches or water bodies less than or equal to 30 feet in width or water bodies greater than 30 feet wide but less than 1 acre in size. Buffers for wider watercourses or larger water bodies may have only site-specific value; their overall effectiveness will depend on their extent within the watershed. Buffers shall be established or maintained on south and west sides of watercourses or bodies insofar as practical. The buffer canopy shall be established to achieve at least 50% crown cover with average canopy heights equal to or greater than the width of the water course or 30 feet for water bodies. Place drooping or wide-crowned species nearest the water.

Maximum Buffer Width

Although wider buffers may provide increased effectiveness, at some distance their value to the stream or water body is minimal. For streams and rivers, the maximum width would be the full width of the geomorphic flood plain, as defined above, or 300 feet, whichever is less. For soils not formed in alluvial deposits, the maximum width of the combined zones 1, 2, and 3 shall not exceed 10 times the width of the stream (as measured at the ordinary high water mark) plus 50 feet or 300 feet, whichever is less. For all other water bodies, the maximum combined width of zones 1, 2, and 3 shall not exceed 300 feet.

CONSIDERATIONS

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

Joining of existing and new buffers increases their effectiveness as corridors and in moderating stream temperatures. Efforts should be made to include the entire reach within a landowner's control in the forest buffer and to plan buffers along multi-owner reaches. For streams and rivers, buffers established on both sides will enhance multiple values.

Where ephemeral, concentrated flow erosion and sedimentation is a concern in zone 3, consider the application of a vegetated strip consisting of grasses and fords. When concentrated flow erosion and sedimentation cannot be controlled vegetatively, consider structural or mechanical treatments.

Favor tree and shrub species that are native and have multiple values such as those suited for timber, biomes, nuts, fruit, and browse; nesting, aesthetics and tolerance to locally used herbicides. For detritus and large woody debris, consider species that will produce stems and limbs of sufficient size to provide a source of woody debris for in-stream habitat.

Avoid tree and shrub species, which may be alternate hosts to undesirable pests. Species diversity should be considered to avoid loss of function due to species-specific pests. Woody phreatophytes and hydrophytes that deplete ground water should be used with caution in water-deficit areas.

The location, layout and density of the buffer should compliment natural features. Avoid layouts and locations that would concentrate flood flows or return flows.

Consider the type of human use (rural, suburban, urban, recreation, natural area, etc.) and the aesthetic, social and safety aspects of the area to determine the vegetation selection, arrangement and management.

PLANS AND SPECIFICATIONS

Specifications for this practice shall be prepared for each site. Specifications shall be recorded using approved specifications sheets, job sheets, narrative statements in the conservation plan, or other acceptable documentation. Requirements for operation and maintenance of the practice shall be incorporated into site specifications.

OPERATION AND MAINTENANCE

The following actions shall be carried out to ensure that this practice functions as intended throughout its expected life. These actions include normal repetitive activities in the application and use of the practice (operation), and repair and upkeep of the practice (maintenance).

The riparian forest buffer will be inspected periodically and protected to maintain the intended purpose from adverse impacts such as excessive vehicular and pedestrian traffic, pest infestations, pesticide use on adjacent lands, livestock 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.

As applicable, control of concentrated flow erosion or mass soil movement shall be continued in zone 3 to maintain buffer function. Any removals of tree and shrub products shall be conducted in a manner that maintains the intended purpose.

Any use of fertilizers, pesticides and other chemicals to ensure buffer function shall not compromise the intended purpose.

Large, stable debris should be retained as much as possible. If debris dams or logs create dangerous hydraulic conditions, they may be removed; however, retain useful, stable portions which provide habitat and detritus storage.