

NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE STANDARD

RIPARIAN FOREST BUFFER (ACRE)

CODE 391

DEFINITION

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

Conservation practices needed to stabilize eroding stream channels must be designed during the riparian forest buffer planning stages. Some bank shaping, bank protection, or grade control may be required to have adequate and sustaining connectivity between the channel and the flood plain.

PURPOSE

- Create shade to lower water temperatures to improve habitat for aquatic organisms.
- Provide a source of detritus and large woody debris for aquatic and terrestrial organisms.
- Create wildlife habitat and establish wildlife corridors.
- 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.
- Provide a harvestable crop of timber, fiber, forage, fruit, or other crops consistent with other intended purposes.
- Provide protection against scour erosion within the floodplain.
- Restore natural riparian plant communities.
- Moderate winter temperatures to reduce freezing of aquatic over-wintering habitats.
- To increase carbon storage.

CRITERIA

General Criteria Applicable To All Purposes

The location, layout, and density of the riparian forest buffer will accomplish the intended purpose and function. **They will mimic the stocking, distribution and densities of historic native plant communities as much as possible.** See ILLUSTRATION 1.

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. **Supplemental moisture will be applied when necessary to assure adequate establishment. Ensure that the Zone 1 soil surface is protected from water erosion during spring runoff. Refer to General Specifications for site preparation methods, and grasses for ground cover.**

Dominant vegetation will consist of existing, naturally regenerated, or planted trees and shrubs suited to the site and the intended purpose. **Emphasis will be on natural regeneration of woody and herbaceous plants. Provide supplemental planting where native re-establishment will be slow, i.e., more than five years. An adequate on-site or adjacent seed or root stock source must be present when using natural regeneration to establish a buffer.**

Plantings will contain at least two species with preference to locally native plants. The reference, *Classification and Management of Montana's Riparian and Wetland Sites* by Paul Hansen et.al, is a good tool for identifying local riparian plant communities; their species composition and canopy cover. Knowing the riparian habitat type will aid in

CONDITIONS WHERE PRACTICE APPLIES

On areas adjacent to permanent or intermittent streams, lakes, ponds, wetlands, and areas with ground water recharge that are capable of supporting woody vegetation.

NRCS, MT
August 2002

Conservation practice standards are reviewed periodically and updated if needed. To obtain the current version of this standard contact the Natural Resources Conservation Service.

NOTE: This type of font (AaBbCcDdEe 123..) indicates NRCS National Standards.
This type of font (AaBbCcDdEe 123..) indicates Montana Supplement.

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knowing what vegetation should recover naturally or should be planted.

Plant types and species shall be selected based on their characteristics related to site conditions and the intended buffer function. Select species from the Plant List, TABLE 1, located in General Specifications, or other reliable sources. See General Specifications for minimum plant spacings.

All buffers will consist of a Zone 1 that begins at the normal water line, or at the top of the **bankfull discharge edge of the active channel**, and extends a minimum distance of 15 feet, measured horizontally on a line perpendicular to the water body. **Zone 1 is the bankfull width beginning from the bankfull edge of the active channel.** For example, if the bankfull width of a stream is 23 feet wide. Then the width of Zone 1 is 23 feet beginning at the top of the bankfull edge. Old channels and depressions are not considered part of Zone 1 even though they may be below the bankfull discharge elevation.

Occasional removal of some tree and shrub products such as high value trees is permitted in Zone 1 provided the intended purpose is not compromised by the loss of vegetation or harvesting disturbance. **All activity is done in accordance with the Montana Streamside Management Zone (SMZ) law.**

Necessary site preparation and planting shall be done at a time and manner to insure survival and growth of selected species. **Refer to General Specifications for care, handling, and planting requirements for woody planting stock.**

Only viable, high-quality and adapted planting stock will be used.

The method of planting shall achieve proper depths and placement of planting stock roots, and not impair the intended purpose and function of the buffer.

Livestock shall be controlled or excluded as necessary to achieve and maintain the intended purpose. **Livestock stream crossings and watering facilities shall be located and sized to minimize impacts to the buffer . On established buffers within grazed areas, set utilization rates of key browse species to maintain its intended function. Impaired function by livestock overuse (trampling, compaction, or over-utilization of woody plants, grasses, and sedges) shall require immediate removal of livestock from the riparian area.**

Harmful pests present on the site will be controlled, or eliminated as necessary to achieve and maintain the intended purpose. **Deer or rodent damage will be minimized, especially during establishment.**

For optimal carbon storage, select plant species that are adapted to the site to assure strong health and vigor and plant the full stocking rate for the site.

Comply with applicable federal, state and local laws and regulations during the installation, operation (including harvesting activities) and maintenance of this practice.

Riparian forest buffers will be planned as part of a system, which may include practices for pest, nutrient and waste management, erosion control, and others as needed.

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 up-gradient edge of Zone 1 and extend a minimum distance of 20 feet, measured horizontally on a line perpendicular to the water body. **The upper boundary of Zone 2 is the elevation corresponding to two times the maximum bankfull depth.** 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.

Zone 1 and Zone 2 contain woody vegetation.

FIGURE 1 illustrates examples of zones 1 and 2 widths for water bodies.

Criteria for Zone 1 shall apply to Zone 2 except that removal of products such as timber, fiber, nuts, fruit, and forbs is permitted and encouraged on a periodic and regular basis provided the intended purpose is not compromised by loss of vegetation or harvesting disturbance. **All activity is done in accordance with the SMZ Law.**

Zone 2 will be expanded 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 desired.

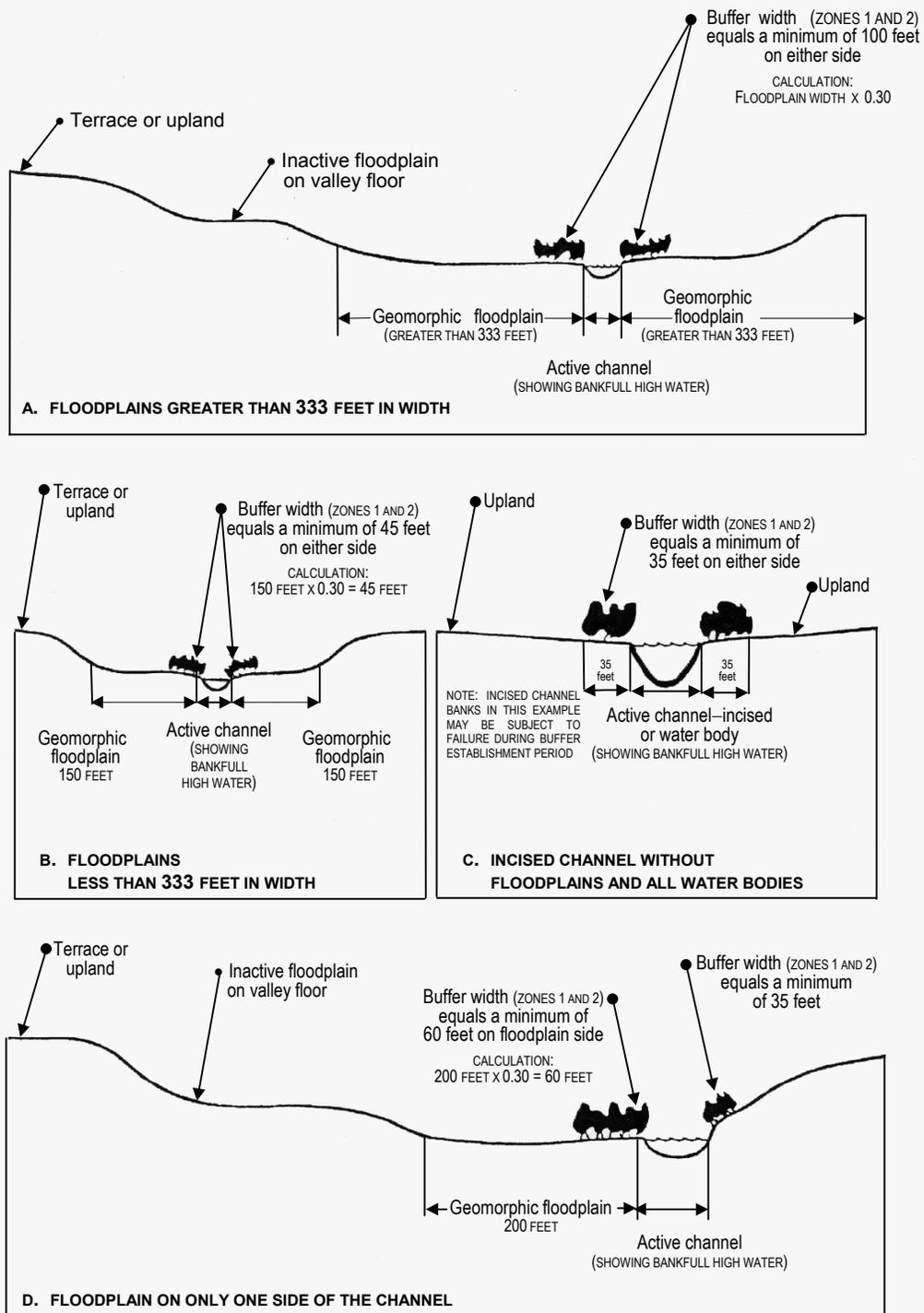


FIGURE 1. EXAMPLES OF RIPARIAN FOREST BUFFER WIDTHS FOR WATER COURSES AND WATER BODIES

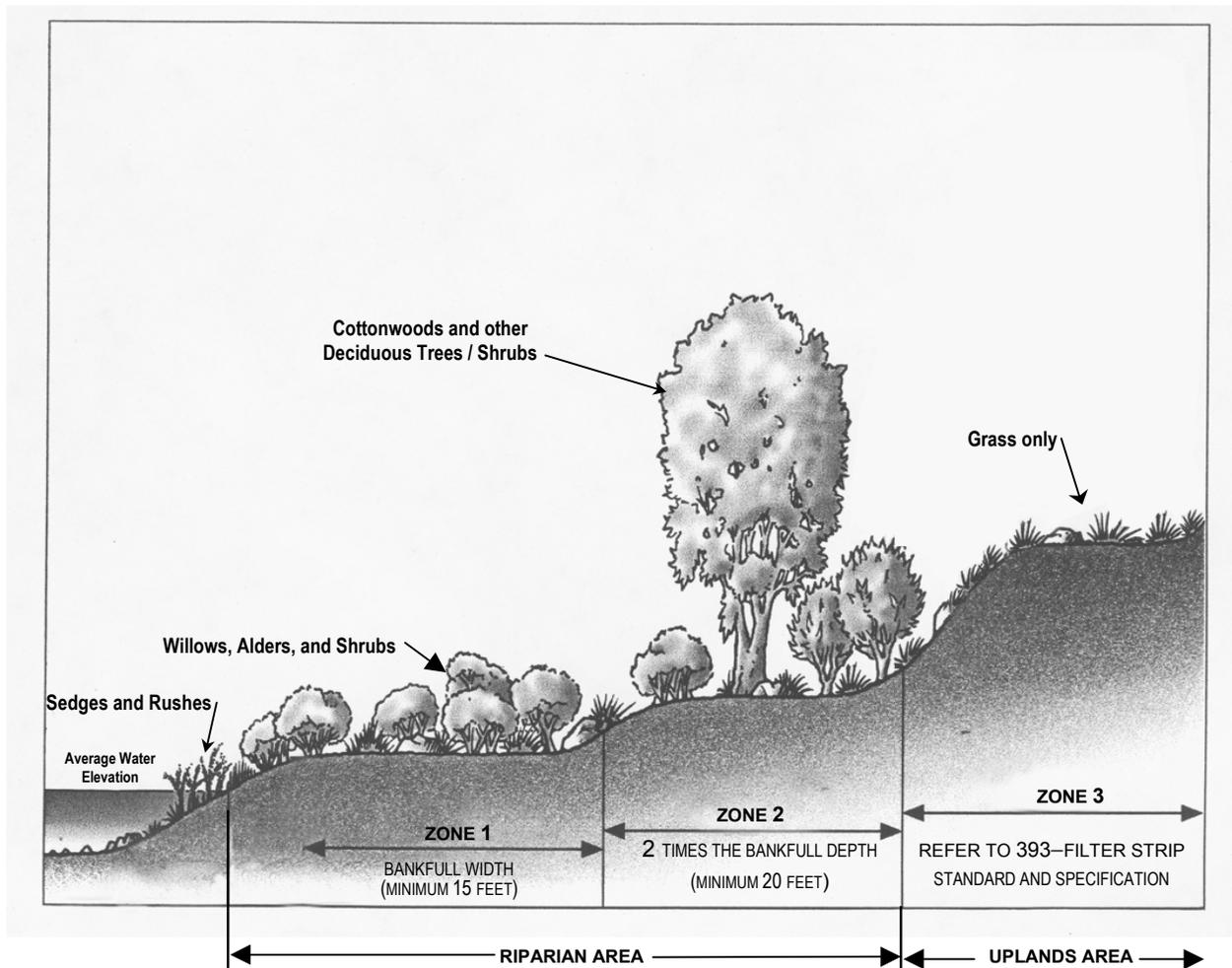


ILLUSTRATION 1. Zone Lay Out.

A Zone 3 shall be added to the riparian buffer prior to planting Zones 1 and 2 when adjacent to cropland or other sparsely vegetated or highly erosive areas to filter sediment, address concentrated flow erosion, and maintain sheet flow. (See FIGURE 2) FOTG, Section IV-Practice Standards and Specifications, 393-Filter Strip shall be used to design Zone 3.

Additional criteria to provide habitat for aquatic organisms and terrestrial wildlife

Width of Zone 1 and/or Zone 2 will be expanded to meet the minimum requirements of the wildlife or aquatic species and associated communities of concern.

Establish plant communities that address the target wildlife needs and existing resources in the watershed.

To create shade to lower or maintain water temperatures for improvement of habitat for fish and other aquatic organisms, the buffer canopy shall achieve at least 50 percent crown cover with average canopy heights equal to or greater than the width of the watercourse at low flow (30 feet for water bodies.) (See FIGURE 3) Use species listed in the Plant List, TABLE 1, General Specifications, with sufficient height, crown width, and shade value. Place drooping or wide-crowned trees and shrubs nearest the watercourse or body.

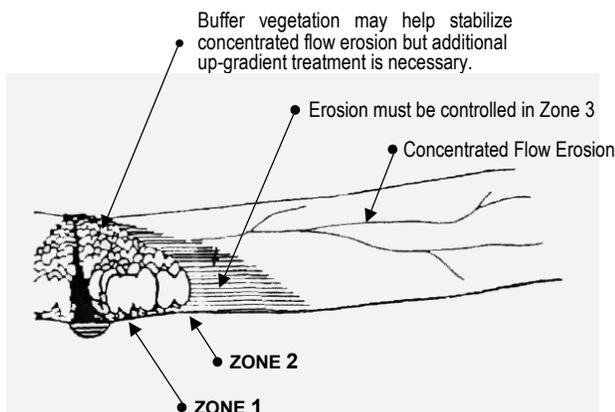


FIGURE 2. CONTROL OF CONCENTRATED FLOW EROSION

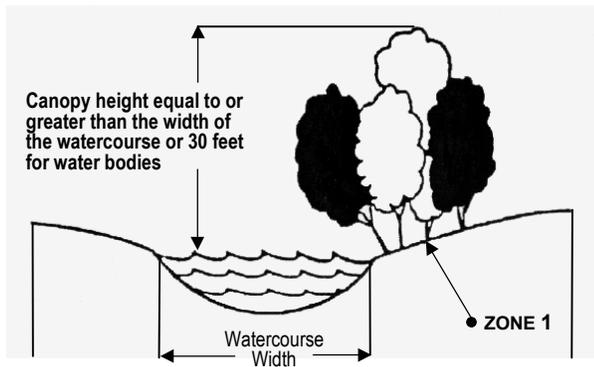


FIGURE 3. CANOPY HEIGHT FOR WATER TEMPERATURE CONTROL

To provide an eventual source of large woody debris for in-stream habitat for fish and other aquatic organisms, establish, and/or manage species capable of producing stems and limbs of sufficient size within Zone 1 as a minimum, preferably both Zones 1 and 2.

CONSIDERATIONS

The severity of bank erosion, concentrated flow erosion or mass soil movement and its influence on existing or potential riparian trees and shrubs should be assessed. Large trees (>30 feet) are not recommended adjacent to streams due to the tendency to topple into the channel and diverting flow and causing bank erosion. Watershed-level or contributing area treatment or bank stability activities may be needed before establishing a riparian forest buffer.

When concentrated flow erosion and sedimentation cannot be controlled vegetatively, consider structural or mechanical treatments.

Consider establishing buffers on both sides of watercourses. This will provide more streambank protection, wildlife cover, less nutrient runoff, and other values. Complex ownership patterns of riparian areas may require group planning for proper buffer design, function and management.

Favor tree and shrub species that are native, or otherwise suited to the site, non-invasive, or have multiple values such as those suited for timber, biomass, nuts, fruit, browse, nesting, aesthetics, and tolerance to locally used herbicides.

Consider species that resprout when establishing new rows nearest to watercourses or bodies. For detritus and large woody debris, use species that will meet the specific requirements of fish and other aquatic organisms for food, habitat, migration, and spawning.

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.

Contact your local or state biologist when designing, locating, and connecting buffers for indicator and/or target species of wildlife, fish, and other aquatic organisms to help meet the needs of that species.

Plants that deplete ground water should be used with caution in water-deficit areas.

Herbaceous plants might be considered adjacent to stream channel for ground cover and soil stabilization depending on site conditions.

Allelopathic impacts of plants should be considered.

The location, layout and density of the buffer should complement natural features, and mimic natural riparian forests. Avoid layouts and locations that would concentrate flood flows or return flows. Low, flexible-stemmed shrubs will minimize obstruction of local flood flows. Avoid using large/tall trees when establishing buffers in locations prone to windthrow.

Consider the positive and negative impacts beaver, muskrat, deer, rabbits, and other local species may have on the successful management of the riparian and stream systems. Temporary and local population control methods of these kinds of local species should be used cautiously and within state and local regulations.

Consider the type of human use (rural, suburban, urban) and the aesthetic, social, and safety aspects of the area to determine the vegetation selection, arrangement, and management. For example, avoid using shrubs/trees that block views, and prune low branches along recreation trails.

Special planting techniques should be considered (i.e., root wads, pole plantings, clump planting, and dormant cutting) when this practice is being installed in the geomorphic flood plain. Consider propagation by soil salvage when encouraging suckers, root stem, and clump plantings and follow Field Office Technical Guide, Section IV—Practice Standards and Specifications, 322—Channel Vegetation.

To improve aesthetics, select species that may have seasonal foliage color, showy flowers, fruit, foliage texture, a particular form, and/or a unique branching habit.

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On most sites, protection from grazing and other impacts will be necessary to allow for adequate recovery and establishment.

Consider the use of fabric squares, weed barrier, and chemical/mechanical methods to control competing vegetation while seedlings are getting established.

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. **Requirements for operation and maintenance of the practice shall be incorporated into site specification(s).**

OPERATION AND MAINTENANCE

The following actions shall be carried out to insure 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), repair and upkeep of the practice (maintenance).**

The riparian forest buffer will be inspected periodically and protected from adverse impacts such as excessive vehicular and pedestrian traffic, pest infestations, 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. **Replant if there is less than 75 percent survival after the second year or riparian function is not achieved.**

To maintain buffer function control concentrated flow erosion and sediment deposition by an adjacent filter strip (ZONE 3).

Any removals of tree and shrub products shall be conducted in a manner that maintains the intended purpose.

For purpose of moderating water temperatures and providing detritus and large woody debris, riparian forest buffer management must maintain a minimum of 50 percent canopy cover.

Manage the dominant canopy to maintain maximum vigor of overstory and understory species.

For providing habitat and corridors for wildlife, manage the buffer to favor food, shelter, and nesting cover that would satisfy the habitat requirements of the indicator or target wildlife. *Refer to Habitat Evaluation Procedures* by the U.S. Fish and Wildlife Service or *Montana's Biology Technical Note 1 – Wildlife Habitat Appraisal Guide* by the Natural Resources Conservation Service for the particular species.

Any use of fertilizers, **mechanical treatments, prescribed burning**, pesticides, and other chemicals for purposes of assuring buffer function, shall not compromise the intended purpose. **Follow all pesticide labels.**

Biological control of undesirable plant species and pests (i.e., using predator or parasitic species, or grazing of domestic animals) shall be implemented where available and feasible.