

NATURAL RESOURCES CONSERVATION SERVICE  
MONTANA CONSERVATION PRACTICE STANDARD

## 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.

*Intermittent:* Flows only during wet periods (30-90% of the time) and flows in a continuous well-defined channel.

*Perennial:* Flows more than 90% of the time and in a well-defined channel.

#### 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 groundwater flow.
- Reduce pesticide drift entering the water body.
- Restore riparian plant communities.
- Increase carbon storage in plant biomass and soils.
- Produce woody energy biomass.

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.

#### CRITERIA

##### General Criteria Applicable to All Purposes

The riparian forest buffer shall be positioned appropriately and designed to achieve sufficient width, length, vertical structure/density and connectivity to accomplish the intended purpose(s). **They will mimic the stocking, distribution, and densities of historic native plant communities as much as possible.**

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). **Refer to Field Office Technical Guide (FOTG), Section IV, Riparian Forest Buffer (Code 391) practice specification for site preparation, care, handling and planting requirements for woody planting stock.**

**Supplemental moisture will be applied when necessary to assure adequate establishment. Protect soil surface from water erosion during spring runoff.**

#### 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.

##### Stream Classification:

*Ephemeral:* Flows only during storms and does not have a well-defined channel. Common names include drainageways, swale, gullies, etc.

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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.

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). **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 onsite or adjacent seed or root stock source must be present when using natural regeneration to establish a buffer.**

Use tree and shrub species that are native and non-invasive. Substitution with improved and locally-accepted cultivars or purpose-specific species is allowed. For plantings and seeding, only viable, high-quality and adapted woody plant materials will be used.

Favor tree and shrub species that have multiple values such as those suited for timber, nuts, fruit, florals, browse, nesting, energy biomass and aesthetics.

**Plantings will contain at least two locally native plant species. 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 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. Plant spacing guidelines are located in the Field Office Technical Guide (FOTG), Section IV, Riparian Forest Buffer (Code 391) practice specification.**

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.

**Plant trees/shrubs at the proper depth and ensure the stock roots are properly placed.**

Overland flow through the riparian area will be maintained 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.

Periodic removal of some forest products such as high value trees, medicinal herbs, nuts, fruits and energy biomass is permitted 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.**

Livestock shall be controlled or excluded as necessary to achieve 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. Refer to the Field Office Technical Guide (FOTG), Section IV, Practice standards Prescribed Grazing (Code 528), and/or Access Control (Code 472), as applicable.**

Harmful plant and animal pests present on the site will be controlled or eliminated as necessary to achieve and maintain the intended purpose. **Wildlife or rodent damage will be minimized, especially during establishment.** If pesticides are used, refer to the Field Office Technical Guide (FOTG), Section IV, practice standard Integrated Pest Management (Code 595).

**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 Groundwater Flow**

The minimum width shall be at least 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.

The width will be extended 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 will pass pollutants directly to the outlet. To filter such pollutants, drains can be plugged, removed or replaced with perforated pipe/end plugs or water control structures (see Structure for Water Control (Code 587) 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**

The width will be extended to meet the minimum habitat requirements of the wildlife or aquatic species of concern.

Establish plant communities that address the target aquatic and terrestrial wildlife and pollinator needs and have multiple values such as habitat, nutrient uptake and shading. The establishment of diverse native woody and herbaceous species will enhance wildlife and pollinator values.

**To create shade to lower or maintain water temperatures for improvement of habitat for fish and other aquatic organisms, use species with high or medium shade value. Select species from the Plant List, TABLE 1, located in the Field Office Technical Guide (FOTG), Section IV, Specifications for Riparian Forest Buffer (Code 391). Place drooping or wide-crowned trees and shrubs nearest to the watercourse or body.**

**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 nearest to the watercourse or body.**

**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.

**Additional Criteria for Producing Woody Energy Biomass**

On sites that are to be established, select species that will meet the plant characteristics necessary for biomass production and the other identified purpose(s).

Intensity and frequency of energy biomass removals will be managed to prevent long-term negative impacts on the buffer.

The harvesting of energy biomass shall be accomplished in a manner that will not compromise the other intended purpose(s) and functions.

**CONSIDERATIONS**

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 wind-throw.**

Maximize widths, lengths, and connectivity of riparian forest buffers.

**Contact a biologist when designing, locating, and connecting buffers for indicator and/or target species of fish or wildlife, to help meet the needs of that species.**

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.

Using seed and/or seedlings collected or propagated from multiple sources can increase genetic diversity.

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

Allelopathic impacts of plants should be considered.

Consider the impacts of beaver, muskrat, deer, rabbits, and other local species may have on the successful management of the riparian and stream system. Temporary population control methods for those species maybe needed.

The species and plant communities that attain biomass more quickly will sequester carbon faster. The rate of carbon sequestration is enhanced as riparian plants mature and soil organic matter increases. Harvesting energy biomass may result in a short-term reduction in carbon sequestration.

Special planting techniques should be considered (i.e., block planting and dormant cutting) when this practice is being installed.

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

For sites where continued function of drains is desired, woody root penetration may eventually plug the underground structure. In these cases, a setback of woody vegetation planted over the drain maintained in herbaceous cover or using rigid, non-perforated pipe will minimize woody root penetration.

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.

## 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.

As a minimum, the Riparian Forest Buffer practice will have the following components in its plan and specification:

- A narrative that describes the producer's goals and objectives. Identify why the practice is needed and feasible.
- An environmental assessment of the planned practice that includes the potential impacts on soil, water, animals, plants, air, and humans.

- An alternative narrative that identifies and describes several methods that could be used to address the resource issue. Also identifying the producer-selected method.
- The Montana Riparian Forest Buffer practice job sheet and specification.
- Plan map and soil map of site with location of practice on the map.
- Operations and maintenance instructions.

## 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, concentrated flows, 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. As part of maintenance, replant if there is less than 75% survival after the second year or riparian function is not achieved.

Any manipulation of species composition, stand structure and stocking by cutting or killing selected trees and understory vegetation shall sustain the intended purpose(s). Refer to the **Field Office Technical Guide (FOTG), Section IV, practice standard Forest Stand Improvement (Code 666)**.

Control or exclusion of livestock and harmful wildlife shall continue. Refer to the **Field Office Technical Guide (FOTG), Section IV, practice standards Prescribed Grazing, (Code 528), and/or Access Control, (Code 472), as applicable**.

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.

Fertilizers, **mechanical treatments, prescribed burning**, pesticides and other chemicals used to maintain buffer function shall not impact water quality. **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.**

## REFERENCES

Bentrup, Gary. 2008. Conservation buffers: design guidelines for buffers, corridors, and greenways. Gen. Tech. Rep. SRS-109. Asheville, NC: Department of Agriculture, Forest Service, Southern Research Station.