

**NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE STANDARD**

RIPARIAN FOREST BUFFER

(Ac.)

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.

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.

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).

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).

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.

Overland flow through the riparian area will be maintained as sheet flow.

Excessive sheet-rill and concentrated-flow erosion will be controlled on-site, and in the areas immediately adjacent and up-gradient of the buffer site.

Use tree and shrub species that are native and non-invasive. Species selection should be based on specific restoration purpose as recommended by state-approved references (eVegGuide). For plantings and seeding, only viable, high-quality and adapted 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, biomass, ethno-ecological uses, and aesthetics.

Periodic removal of some forest products such as high value trees, medicinal herbs, nuts, and fruits 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 for achieving the intended purpose(s). Refer to Tree/Shrub Site Preparation (490) and Tree and Shrub Planting (612).

Herbaceous vegetation will be selected which does not aggressively compete with trees and shrubs but provides erosion protection and filtration.

Livestock shall be controlled or excluded as necessary to achieve the intended purpose. Refer to the standards Prescribed Grazing (529) and/or Access Control (472) as applicable.

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 plant and animal pests present on the site will be controlled or eliminated as necessary to achieve and maintain the intended purpose. Refer to the Herbaceous Weed Control (314) and Integrated Pest Management (595).

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

For all lands, 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. Refer to CA Forest Practice Rules for buffer widths and protections for forest land.

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 - 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.

Minimum 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.

Existing trees and snags that have fallen into the water may be retained if they present no significant threat downstream.

The Wildlife Habitat Assessment Guide (WHAG) will be utilized for assessing existing habitat, and guiding prescriptions for wildlife.

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.

CONSIDERATIONS

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.

Trees should be selected that have a mature canopy height greater than the active channel width. For narrow buffers, select trees that have a broad crown. For vegetation along the waters' edge, select tree and shrub species that at maturity will have limbs that will overhang the water.

A drainage class assessment and depth to groundwater should determine suitability for plant selection to ensure success. Plant species adjacent to the active channel should be able to have their roots reach the water table during the growing season

Consider selecting species with tolerance to herbicide leakage from adjoining fields. Allelopathic impacts of plants should be considered. Woody plants that are known to deplete groundwater should be used with caution in water-deficit areas.

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.

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.

Avoid layouts and locations that concentrate flood flows or return flows. Low, flexible-stemmed shrubs will minimize obstruction of local flood flows.

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.

Concentrated flow or mass soil movement should be controlled in the up-gradient area immediately adjacent to the planned buffer and address incoming eroding drainages or stream channels using conservation practices such as Grade Stabilization (410) or Streambank Stabilization (580) as applicable.

A Filter Strip (393) should be added to the riparian buffer when adjacent to cropland or a cleared food safety buffer, sparsely vegetated or highly erosive areas to filter sediment, address concentrated flow erosion, and maintain sheet flow.

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.

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 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.

Large trees that are dead or dying should be left as snags provided they do not present a threat to life or property and do not harbor detrimental pests.

Where possible, consider wildlife travel corridors composed of woody vegetation between the water course or water body and wetlands, ponds, seasonal wet area and sediment basins.

The joining of existing and new riparian buffers increases the continuity of cover and will further moderate water temperatures.

Shade along south and west sides of water bodies will provide more temperature protection than shading the north and east sides. Tall shading trees on the outer edges of the buffer can be upland species, especially in the arid areas and/or where water is scarce. Cliffs and steep hills can also provide topographic shading.

A mix of woody species with growth forms that vary from short and drooping to tall erect and wide-crowned will assist in moderating temperature.

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.

Plans must recognize the complexity of riparian systems and comply with applicable federal, state and local laws and regulations during the installation, operation (including harvesting activities) and maintenance of this practice

OPERATION AND 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.

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 standard Forest Stand Improvement (666).

Control or exclusion of livestock and harmful wildlife shall continue. Refer to the standards

Prescribed Grazing (528) and/or Access Control (472) as applicable.

Fertilizers, pesticides and other chemicals used to maintain buffer function shall not impact water quality.

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.

CA Forest Practice Rules (FPR); Title 14 CCR Chapter 4, article 6, section 916.5. State of California,
http://www.fire.ca.gov/resource_mgt/resource_mgt_forestpractice.php

Griggs, F. Thomas 2009 California Riparian Habitat Restoration Handbook. River Partners
http://www.conservation.ca.gov/dlrp/watershed_portal/InformationResources/Documents/Restoration_Handbook_Final_Dec09.pdf.

Webinar Series on the Ecology and Active Management of Riparian Vegetation in Forested Landscapes
May 1-May 29, 2013
ARS/UCCE
http://ucanr.edu/sites/forestry/Webinars/Riparian_ecology/