



# Riparian Zones

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## Definition:

Riparian buffer zones are vegetated areas along both sides of water bodies that generally consist of trees, shrubs and grasses and are transitional boundaries between land and water environments. Riparian zones act as buffers to protect surface waters from contamination and are habitats for a large variety of animals and birds.

## Purpose:

Riparian zones aid in the protection of stream-banks and shorelines and flood attenuation. They reduce sedimentation of water bodies by reducing the erosive potential of stream-banks. These areas also aid in improved aesthetic environment; water quality improvement, including soluble contaminant flow retardation; and dispersion of concentrated flow, thereby minimizing gully erosion. The plants provide aeration and reduce pollutants by plant uptake. Vegetation in conservation buffers recycles entrapped nutrients in the harvested material, provides permanent habitat for many types of fauna and offers shade, thereby reducing stream temperature. Riparian zones can provide a great amount of biodiversity to the landscape. Even the detritus (i.e., leaves) that accumulates can provide a

food source for plants and animals.

## How Does This Practice Work?

Sedimentation can severely interfere with aquatic life. Due to the entrapment by sediment and the establishment of vegetation, phosphorus can be sorbed to the sediment that is deposited and remain on the field landscape, enabling plant uptake in the root zone. Conservation buffers, such as riparian zones, can improve infiltration and percolation, thus reducing runoff amounts and minimizing the amount of phosphorus transported to nearby surface waters.

## Where This Practice Applies and Its Limitations:

Riparian areas can be established near shorelines or stream banks. The regional topography, rainfall intensity and duration, runoff, climate and soil type affect the riparian zone. They can be constructed in places that need to reduce downstream flooding, to improve water quality and to enhance wildlife habitat. Deep-rooted native plants, such as trees, grasses, bushes and vines, should be able to grow along the banks. These zones run parallel to streams and are dependent upon periodic flooding.

Limitations of riparian zones include decreased drainage capacity; the presence of wildlife that can damage crops; noxious weed control; difficulty in operating farm equipment through the area; inability to use land for grazing; and the variability of nutrient removal and sediment trapping, due to the uncertainty of runoff rate and frequency.

## Effectiveness:

The effectiveness of riparian zones can be altered by disturbances to the natural drainage or habitat. Soil compaction, increased sedimentation rates, changes in the amount of solar radiation and stream channel alteration can affect the balance of the system. The removal of vegetation and



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boulders for stream channelization, damming and dredging can also severely degrade the habitat, thereby impacting the usefulness of riparian buffers.

Riparian zones are impacted by the soil characteristics, land slope/topography impacting drainage into them, the established vegetation, area for establishment and maintenance. The ecological benefits of riparian zones include plant roots stabilizing the soil by increasing soil aggregation; plant shoots protecting soil from absorbing forces of wind, water and rain-drop impact; vegetation providing shade, which impacts soil moisture content, acts as a noise filter and allows for the recycling of nutrients. Because the effectiveness of riparian zones is dependent on several factors, results vary as to how functional they are regarding water quality protection.

### **Cost of Establishing and Putting the Practice in Place:**

The establishment and construction costs depend on equipment and labor, grading, seed and fertilizer selected, noxious weed control and the vegetation selected for planting. Factors to consider before installing riparian zones include:

- 1) types and concentrations of pollutants for which they are being designed
- 2) soil characteristics, such as clay content, organic material and infiltration rate
- 3) size of contributing area
- 4) previous or existing vegetation
- 5) steepness of slope/irregularity of topography
- 6) dimensions of the watershed that will be draining into the riparian zone
- 7) types of vegetation adaptable to the area
- 8) climatic conditions at planting times
- 9) possible combinations of conservation practices upslope

of the riparian zone to reduce erosion and chemical loss

Riparian zones are recommended to be at least 50 to 100 feet with expansion necessary where there are high sediment loads or steep slopes. The buffer should expand approximately 5 feet for every 1 percent increase in slope. Narrow riparian zones are practical where soils are flat and sandy. The U.S. Forest Service in the Northeast region recommends a width of 75 ft. on both sides of a stream-based system when plans included using the riparian zone for improved water quality purposes.

The landowner/farmer may be eligible for CRP and WRP assistance as well as both technical and financial assistance from federal, state and local levels, such as the U.S. Fish and Wildlife Service.

### **Operation and Maintenance:**

The operation and maintenance of riparian zones is primarily determined by the land's slope and erosive potential. Making sure the vegetation receives sufficient moisture and nutrients is important to ensure the survival of the riparian zone. Contract life for riparian forest buffers should be 10-15 years.

Management practices that protect the source and reduce the transport of phosphorus from the landscape should be the first choice of nutrient management. Phosphorus can be managed using best management practices considering the method of application, timing and location applied. The Environmental Protection Agency recommends that total phosphorus (inorganic and organic) remain at concentrations less than 0.1 mg L<sup>-1</sup> in rivers; this is half of the amount of phosphorus usually found in soil.

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### **For Further Information:**

Contact your local conservation district, USDA-NRCS or Cooperative Extension Service office.