

Riparian Buffers

Defining Riparian

The term **riparian** is not a complicated scientific word. Riparian is taken from the Latin word **rip** meaning bank (of a stream). The first scientific use of the word may have been in 1758 when the naturalist Linnaeus named the common bank swallow *Riparia riparia*.

A **riparian area**, as defined by the USDA/Natural Resources Conservation Service, is an area of trees and/or shrubs located adjacent to and up-gradient from water bodies. There are three specific zones associated with the definition.

Zone 1 is identified as that area beginning at the normal water line, or at the top of the bank, and extending up-gradient a minimum distance of 15 feet. These areas are made up of trees and shrubs.

An additional strip or area of land, zone 2, begins at the edge and up-gradient of zone 1. The minimum distance of zone 2 is twenty feet of up-gradient width. Both zone 1 and 2 are measured horizontally on a line perpendicular to the water body. Fifty percent of the area should be in trees and the remainder in shrubs and grassy plant materials. Light maintenance (cutting and thinning of mature trees and protecting the zone by allowing regeneration of woody materials) is required in zone 2 in order to maintain a vegetative state and to absorb nutrients as they flow into the zone.

Zone 3, a grass buffer zone, is set at a width of 20 feet. Zone 3 starts at the outer most edge of zone 2. This zone can be maintained by rotationally grazing or by mowing.

Other definitions are not as specific and do not convey definitive boundaries. Often it is possible to distinguish riparian areas by vegetation, soils and topography. In addition a riparian area can be characterized by laterally flowing water that rises and falls at least once within a growing season and maintains a high degree of connectivity with the land and activities occurring on the land.

Purpose of Riparian Areas

The primary riparian effect on the watershed is to reduce non-point source pollution from agricultural and other human activities that occur up-gradient from the riparian area. Nutrients and chemicals filtering into streamside areas can help control pollution runoff. Riparian zone factors that affect nutrient output include physical, vegetative, and soil processes.

Physical factors include sedimentation in the riparian zone, streambank stabilization, and water temperature reduction by canopy shading of the stream channel. Sediment deposition is a natural process that takes place during periodic flooding in the riparian zone. Accelerated upland erosion can increase sediment deposition in streamside areas because of downslope movement of dislodged soil material. Such deposition has changed the soils, drainage, and vegetation associated with bottom lands. The riparian area may fill with sediment. However the eventual release of the sediment would be slow and gradual and the damage to the stream habitat would be minimal.

Near-stream vegetation is essential for both stabilizing streambanks and regulating water temperatures. Streambank stabilization is important because much of a stream's

sediment load, particularly during high flows, can be the result of bank erosion. Levels of suspended solids increase quickly during storm events when riparian vegetation is absent. By contrast, more stable channel sections with well-developed riparian vegetation show a slower increase in suspended solids.

Streamside vegetation can regulate temperature in running water, most importantly by reducing maximum summer temperatures. Lower temperatures increase the streams ability to absorb and conserve oxygen. An adequate stream oxygen level insures stream health and fish survival.

The most important role of vegetation is uptake and long-term storage of nutrients in woody plant materials. Woody riparian vegetation, especially woody shrubs and trees, can remove nutrients from surface and subsurface flow. This is most apparent when the region has relatively permeable soils overlying relatively impermeable rock or clay. The nutrients move by way of subsurface flow to the root areas of the woody materials. Woody plant roots take the nutrient content up into the plant, and produce new plant materials. The plant nutrients are then isolated from the riparian zone. As the plant materials are harvested from the riparian, the nutrients are removed from the area.

Soil processes within a riparian zone are quite complex. They can be made up of high organic matter, sand, silt and clay. These soil mosaics provide exchange sites for upland runoff nutrients. A major nutrient-filtering pathway in riparian ecosystems is the gaseous loss of nitrogen via microbial denitrification.

Prepared by: Terry Hutchens, Area Extension Agent for Water Quality. Updated by Amanda Abnee Gumbert, Extension Water Quality Liaison, February 2008.

Plant materials

Dominant vegetation will consist of existing or planted trees and shrubs suited to the site and the intended purpose. Native species can be used within the riparian zone if they are tolerant of riparian conditions and soil variations. The planting of two or more species will insure acceptable stands of hardwoods and shrubby type materials within the riparian zone.

The riparian area presence is vital to the health and productivity of the plant, animal and human community. Riparian areas are a recommended best management practice in the Kentucky Agriculture Water Quality Plan. This best management practice could be applied in silviculture and livestock production operations. Riparian areas are designated as BMP # 3 in the silviculture and livestock sections of the State Plan. The state plan recommends operations that have areas of timber production or livestock pastures directly adjacent to streams, rivers, wetlands or other bodies of water to manage and protect riparian areas. Riparian management is also recommended for operations that allow livestock access to forested areas in streamside corridors or around lakes and ponds.

For more information about the use of riparian areas or about the Kentucky Agriculture Water Quality Plan, please contact your local County Extension Office or conservation district office.