

## Riparian Zones – Working for You and for Water Quality

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Credit for photo and figure also to Katie Giacalone.

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Riparian zones are recognized as unique and valuable features in the landscape; they are an *ecotone*, a boundary between ecosystems with a more rich diversity than the two systems they connect – the utilized landscape and a waterbody (stream, lake and river). Riparian buffers may be as simple as no-mow zones where grass is allowed to grow taller than the surrounding landscape or designed with diverse, purposeful vegetation. Riparian buffers serve many functions, a few of which are the following:

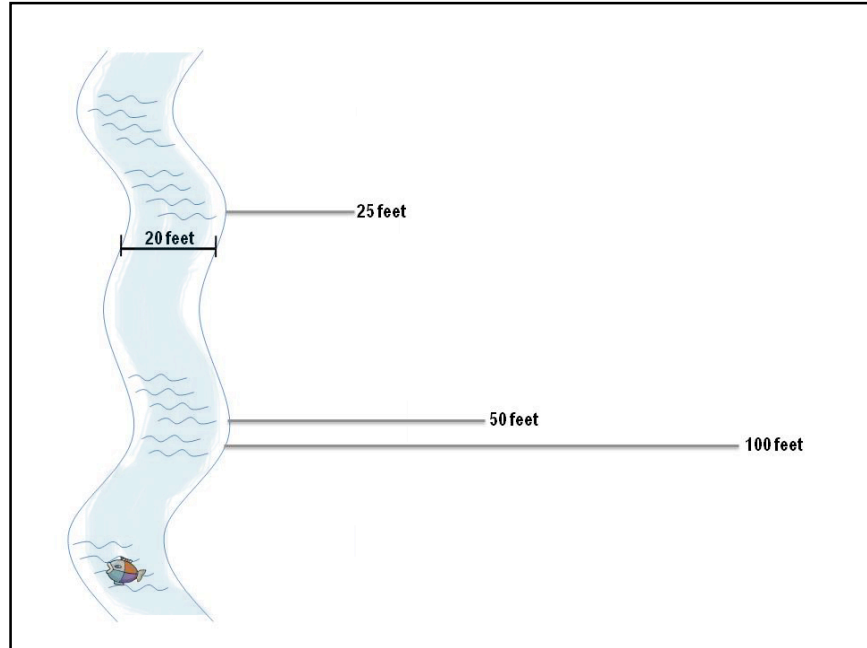
- Trap sediment that runs off the land from fields, roads, parking lots and the landscape, in general;
- Due to their sediment-trapping capabilities, buffers may extend the lifetime of downstream drinking water reservoirs and lakes;
- Remove pollutants such as nutrients and metals carried in runoff on the surface and in the subsurface;
- Temporarily slow or store runoff, lessening the chance of downstream flooding problems during storms;
- May improve the natural look and health of a stream corridor, which in turn, can improve property value.

Riparian forest buffers include the following additional benefits:

- Strengthen stream banks and protect banks from erosion and people from loss of property due to erosion;
- Provide shade for the adjacent waterway which regulates temperature and provides habitat for fish and other aquatic life;
- Provide habitat for deer, other wildlife and birds;

Research has been conducted across the globe on how effective riparian buffers are and what characteristics of a buffer play a role in their ability to remove pollutants from runoff. Some consensus regarding these questions has been achieved. Research has shown that *wider buffers provide greater sediment removal*. Long-term research suggests that buffers with a width of 100 feet (measured from edge of bank on one side of the stream) will trap sediments under almost all circumstances, but that buffers on steep slopes should be even wider. It has also been found that wider buffers will maintain their sediment removal capacity and phosphorus control for a longer period of time – there's just more space to trap and store sediment and the nutrients attached to sediment! For an urban riparian forest buffer, the Natural Resources Conservation Service recommends that buffers be 100 feet wide on each side of the stream, which is 3 to 5 mature trees wide for water quality protection and flood storage.

If the goal of a buffer is nitrogen removal, research has demonstrated greater than 50 feet of buffer will lead to effective nitrogen removal. More importantly, if wetlands exist within the buffer zone, their upkeep and protection will be critical to even greater nitrogen removal. In terms of vegetation, many studies agree that a mix of vegetation – herbaceous plants, shrubs and trees – are best for water quality treatment. However, starting off with a simple no-mow zones may be a necessary and important first step towards water quality protection.



In South Carolina, open areas and streams are valued by many for their hunting and fishing recreational opportunities. Research suggests that buffer widths of 35 to 100 feet are critical to protect instream aquatic habitat (this includes fish and the critters that live in the stream and provide food for fish). It is also supported that buffers with the goal of protecting aquatic habitat should be forested to allow large woody debris to enter the stream and provide habitat and protection for fish and other organisms. For the protection and maintenance of diverse wildlife, a 300 foot buffer has been found to be effective.

In order for buffers to fully achieve their purpose and function, there are guidelines that should be considered. First, livestock should be prevented from entering the riparian zone. Second, the buffer zone should not be allowed to become channeled, and stormwater should not bypass the buffer zone via piping since that takes out any possibility of treatment. Trees and shrubs should also not be removed from the first 15 feet of buffer zone as this is likely to lead to bank loss and erosion. Minimizing disturbance of soil and vegetation in this adjacent region is an important maintenance consideration for the protection of water quality.



Buffer widths may be specific to the slope and land use, though most ordinances and regulations require a standard width of buffer zone maintained on all waterbodies, independent of site specifics. If considering a riparian buffer on your property, remember that wider is better. For a community considering buffer ordinances, the most important question is *“What are the goals that this*

*buffer should achieve in terms of habitat, water quality and flood control?"* From this standpoint, a community will be able to gather information on what are the best widths, plants, and recommendations for the end goal to be met.

Additional resources and information are being updated on the Carolina Clear website for your further review at [www.clemson.edu/carolinaclear](http://www.clemson.edu/carolinaclear).