



SWATARA CREEK FORESTED RIPARIAN BUFFER PROJECT

A cooperative project between the Dauphin County Conservation District and the Manada Conservancy.

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Riparian Buffers

Riparian, or streamside, buffers are designed to maintain or restore streamside land in its natural vegetated state, in order to take advantage of the benefits that a forest's biological processes can provide to aquatic ecosystems. They are forested strips of land along a stream that "buffer," or protect, the stream from the impact of human activities. Preventing harmful pollutants from entering the stream benefits the entire aquatic ecosystem, as well as people who use the stream for swimming, fishing, boating, and as a source of drinking water. Trees and shrubs along the stream are more beneficial than a grass-lined streambank.

Benefits of Buffers

Riparian buffers have numerous water quality and stream protection benefits. They include: 1) Protecting streams from contaminants carried in runoff, such as fertilizers, pesticides, sediment, grease, oil and chemicals; 2) Helping to alleviate localized flooding by decreasing the amount of runoff entering local streams immediately after a storm; 3) Helping to reduce streambank erosion by roots holding the soil in place, minimizing the erosive force of the stream; 4) Helping to recharge the groundwater supply by providing infiltration; 5) Protecting the habitat by providing a shade canopy that protects the stream from the sun's heat, which keeps the water temperature cool during the summer; 6) Supplying food, shelter, and breeding habitat for fish and other organisms through leaves and woody debris that fall into the stream; 7) Providing habitat for terrestrial species; and 8) Improving streamside aesthetics and promoting recreational uses.

Unsuitable Uses and Activities

In order to preserve the buffer's effectiveness and stream health, certain land uses and activities are not suitable within a designated buffer zone. The threat to water quality posed by the land use or activity is included in parentheses. They include: construction related to development, plowing fields and grading the streambank (sediment, nutrients); Impervious surfaces (chemicals); Application of fertilizers, pesticides and manure (nutrients, bacteria); Livestock grazing (bacteria/pathogens, sediments); Septic tank drain fields (bacteria/pathogens, nutrients); Waste disposal sites (chemicals, bacteria/pathogens); Logging roads (sediment); and Mining (sediment).

Buffer Design

A review of available sources indicates that there are a wide variety of buffer designs in use. Buffers can be found from a few feet to several hundred feet. Some designs incorporate width modifications for site conditions such as slope, upslope drainage area and soil infiltration capacity. Some designs are developed not only for water quality but for wildlife habitat and corridors. The Pennsylvania Department of Environmental Protection is also considering a buffer requirement for permitting purposes related to development. To be effective, a buffer must have sufficient width to allow filtration and infiltration processes to occur. It is also critical that water flow into and across the buffer as sheet flow rather than concentrated flow. Concentrated flows will likely cause erosion and will also reduce the buffers filtering and storage capacity. Two common designs are the forested buffer and the three zone buffer. In the forested buffer, the entire width is planted to or preserved as undisturbed forest. This is the design used for this project. The second common design is the three zone design. See Figure 1. In this design, the interior zone closest to the stream, zone 1, is undisturbed forest. It protects the stream bank and

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THE STREAMSIDE FOREST BUFFER

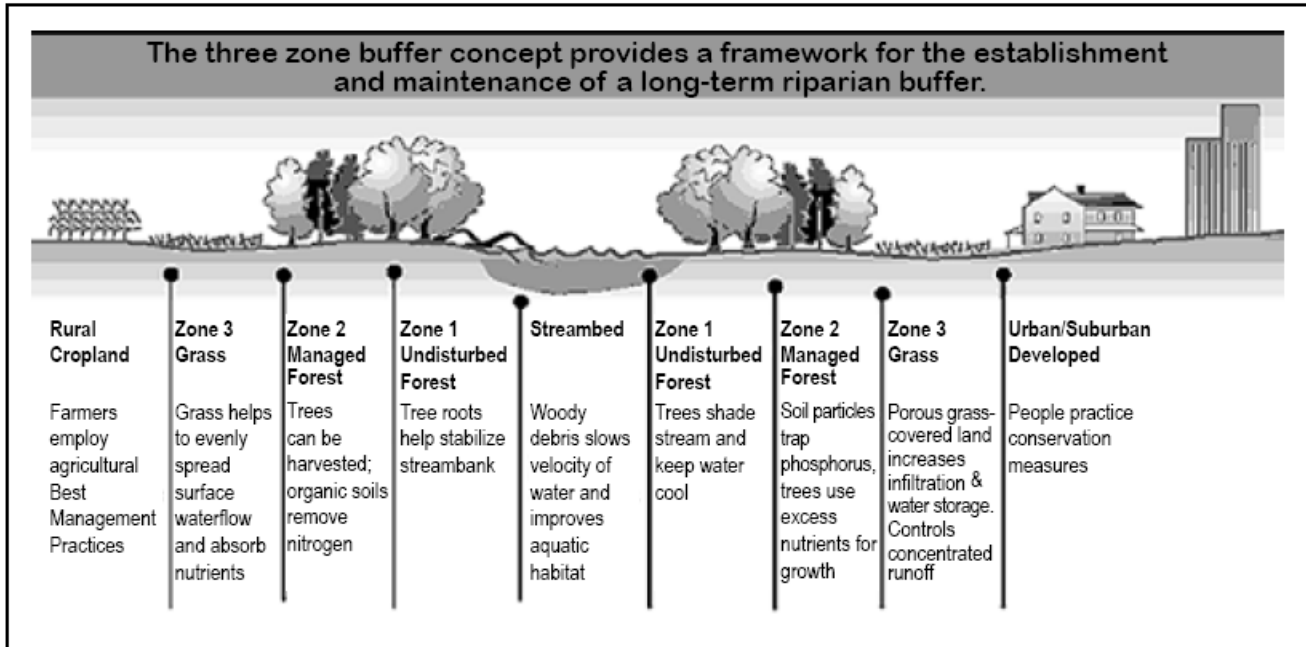


Figure 1. Diagram of Buffer Zones and Land Uses Recommended for Each Zone
Courtesy of the University of Maryland

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stream side environment. The middle zone, zone 2, is upland from zone 1 and is maintained as trees and shrubs. This areas suitable for light uses such as footpaths. With the exception of periodic removal of trees, this zone should remain undisturbed. Periodic harvesting of trees fosters nutrient removal as the new trees remove nutrients while growing. The outside zone, zone 3, is maintained as ground cover or grass. This zone should be shaped to convert flow to sheet flow into zone 2. The vegetation also helps filter sediment. The widths of the three zones vary by source of design. There are many guidance publications available from resource agencies and online related to buffers. Buffer design should be considered carefully and include consideration of the objectives of the buffer, available resources for protecting an existing buffer or installing a new buffer and any maintenance requirements

Buffer Management

Once a buffer is established, maintenance is key to its success. The following tips will help ensure that a buffer system functions effectively over the long term: 1) Designate a buffer manager who will perform buffer inspections and maintenance; 2) Conduct annual buffer inspections assessing streambank erosion and human and livestock damage; 3) Plant additional trees, shrubs and ground cover, if necessary, to compensate for excessive losses; 4) Inspect the buffer for gully formation after severe storms; 5) Remove piles of debris completely blocking streamflow; 6) Control weeds for two or three growing seasons; and 7) Remove invasive plant species.

Swatara Creek Buffer

The Swatara Creek Forested Riparian Buffer Education and Demonstration Project is a partnership between the Dauphin County Conservation District and the Manada Conservancy initiated in 2008. Working together the project partners established a 100 foot wide forested riparian buffer along approximately 528 linear feet of Swatara Creek located on Manada Conservancy land in South Hanover Township, PA. Designed specifically for this site, the buffer consists of native species of trees, shrubs and wild flowers and followed established federal and state standards. The combination of tree species, shrubs, and riparian plants were specifically selected to maximize the buffer's diversity, rapid establishment, aesthetics, and wildlife benefits. The buffer provides numerous water resource benefits and serves as an education and demonstration site.