Medical and Environmental Management Division

Environmental Bulletin

National Aeronautics and Space Administration

October 2023

The Buffer Zone

How Do Riparian Buffer Zones Impact Our Waterways?

Streams, rivers, bays, and other waterways act as more than water conveyances– they also transport sediment that erodes from the surrounding embankments. Vegetation can help stabilize these borders and reduce the amount of sediment that erodes away. These areas are called riparian buffer zones and are a key factor in maintaining the health of waterways. A riparian/forested buffer refers to the lands and plants bordering rivers, streams, bays, and other waterways whose primary function is to physically protect and separate a water body or wetland from future development, disturbance, or encroachment. With proper design, a buffer can provide a wide array of stormwater management advantages and improve the integrity of stream ecosystems and habitats.

Wetlands and riparian areas typically occur as natural buffers between uplands and adjacent water bodies. They act as natural filters of nonpoint source pollutants to include sediment, nutrients, pathogens, and metals. It is important to preserve and restore riparian buffers as these areas play a significant role in managing adverse water quality impacts and have the potential to decrease the need for costly stormwater and flood protection facilities.

What Types of Buffers Exist?

There are three types of buffers:

- *Water pollution setbacks* — areas separating potential pollution hazards from targeted waterways. Engineered buffer setbacks reduce the potential for pollution.
- *Vegetated buffers*—natural areas that divide land uses or provide landscape relief.
- *Engineered buffers*—areas with specific designs to treat stormwater before it enters streams, lakes, or wetlands.

The most common type of riparian buffer is the vegetated buffer. This type of buffer can be made up of a variety of vegetation such as trees, shrubs, grasses, or other perennial plants. The type of vegetation plays a role in the structure of the buffer zone and the amount of sediment that

is preserved. A diversified vegetative area increases the variety of habitats available, attracting different species to the area. Trees and shrubs possess larger, more robust root systems that are capable of retaining more sediment than buffers comprised largely of grasses.

Scientific research documents that riparian buffers, *particularly forested buffers and those along headwater streams*, deliver tremendous economic, ecological and other benefits. Among these benefits, riparian buffers:

- protect the quality of the water we drink;
- intercept non-point source pollutants carried by surface water runoff and remove the excess nitrogen, phosphorus, pesticides, animal waste and other substances that can pollute water bodies;
- stabilize stream banks and minimize erosion;
- decrease the frequency and intensity of flooding and low stream flows;
- prevent sedimentation of waterways;
- through shading, reduce swings in stream temperatures and prevent elevated temperatures harmful to aquatic life;
- provide food and habitat for wildlife of the land, water and air and allow for wildlife movement within natural corridors;
- replenish groundwater and protect associated wetlands and
- provide space for recreation.

How is Maryland Taking Part?

Maryland Department of Natural Resources Forest Service provides staff support for *Maryland Stream ReLeaf*, a statewide initiative supporting riparian forest buffers. *Stream ReLeaf* coordinates the efforts of a wide variety of state, local, federal, and nonprofit agencies and groups, working together to expand or maintain streamside and shoreline forests. *Stream ReLeaf* began in 1996, carrying out the State's commitment to the Chesapeake Bay *Riparian Forest Buffer (RFB) Initiative*. Mature buffers have been found to reduce nitrogen by 60 to 90+ percent, a major step towards the goal of reducing nutrients to the Chesapeake Bay by 40%. The *RFB Initiative* was developed to increase the rate at which forest buffers were established and conserved throughout the Chesapeake Bay Watershed, and was adopted by Maryland, Virginia, and Pennsylvania.

Conserving Our Riparian Buffers

Riparian buffers provide multiple benefits for both humans and the environment. Protecting these resources is essential to creating a healthier watershed and providing space for human recreation. Managing buffers focuses on minimizing degradation, erosion, and damage to the

buffer area. Replacing damaged structures and/or replanting eroded areas ensures the buffer is functioning as intended. The type of vegetation populating the buffer should also be managed. It is important to remove invasive or damaging species of plants from the affected areas to protect the health of the ecosystem within the buffer. Maintaining these practices ensures the health of the riparian buffer zone and in turn, our local waterways.

Riparian buffers are at risk of decline due to several factors including building practices in urban areas, aesthetics for parks, and grazing practices in rural areas. It is important to look for ways to help preserve buffers in your local community. The simplest way to improve conditions can start in the yard. Consider planting woody and native plants if your property borders a stream or body of water. Avoid mowing the stream edge and leave around 15 feet of vegetation from the edge of the water. These practices can improve the health of the stream and encourage native wildlife to return.

Involvement can also begin at the local government or county level. Alert representatives to areas where streams are lacking healthy buffers, especially open grassy areas that do not have pavement or sidewalks around them, as these are great candidates for restoration. You can also contact local non-profits that focus on environmental restoration. The state or county also has allocated stormwater funds that area meant to repair impaired buffers. Contacting the correct representative can be beneficial to repairing and restoring riparian buffers in your local community.

Visit the following websites for more information on Riparian Buffer Zones:
The Science Behind the Need for Riparian Buffer Protection : ConservationTools
https://dnr.maryland.gov/forests/Pages/programapps/ripfbi.aspx
https://www.fs.usda.gov/nac/practices/riparian-forest-buffers.php
https://www.epa.gov/system/files/documents/2021-11/bmp-riparian-forested-buffer.pdf

Check out the some of our past environmental bulletins on this and similar topics:
https://code200-external.gsfc.nasa.gov/250/environmental/environmental-bulletins.