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Chesapeake Bay Program

FACT SHEET

Riparian Forest Buffers in the Chesapeake Bay Watershed

Background

When colonists first arrived on the shores of the Chesapeake Bay, over 95% of the landscape was forested. Captain John Smith wrote in 1608, "the country is overgrown with trees...and affords no grass but that which grows in the marshes." This vast forest was an important regulator of the Bay's environment - a "living filter" that protected the land, filtered pollutants and sediment from rainfall, regulated stream and air temperatures, controlled runoff, and provided wildlife habitat.

The last 300 years have brought dramatic changes to the Bay's forests. Agricultural expansion, deforestation, and the growth of cities removed almost 70% of the watershed's forests by the mid-1800's. These changes in land use resulted in a fragmented forest landscape that adversely impacted the Bay and its streams and rivers, as well as its wildlife and fish. While many forests have returned or have been replanted, less than 60% of the Bay's original forested areas remain. *With over 13 million people living in the Bay's* watershed, urban growth now results in the permanent loss of almost 100 acres of forests every day.

What is a riparian area?

Riparian refers to the area of land adjacent to a body of water, stream, river, marsh, or shoreline. Riparian areas form the transition between the aquatic and the terrestrial environment.

Linking the landscape to the Bay, close to 100,000 miles of interconnected streams, rivers, wetlands and their riparian areas serve as a "circulatory system" for the Chesapeake Bay. Forests are the natural riparian vegetation in the Bay region. Although they comprise only about 5-10% of the land in the watershed, riparian areas play an extremely important role in maintaining the health of the Bay. However, 50% or more of these streamside and shoreline forests are now disturbed or degraded, and more continue to be lost. Protecting and replanting riparian forests is one of the goals of the Bay restoration effort.

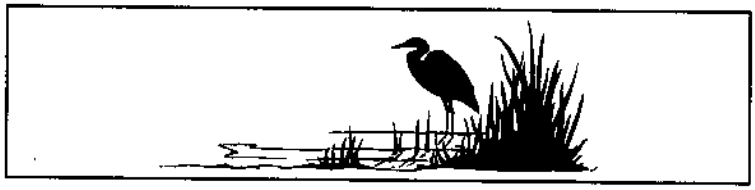
Functions and Values

Riparian forests are integral to the health of the Bay and its rivers for many reasons. Their position in the landscape makes these forests excellent buffers between upland areas and waters that eventually enter the Bay. Studies have shown dramatic reductions of 30 to 98% in nutrients (nitrogen and phosphorus), sediment, pesticides, and other pollutants in surface and groundwater after passing through a riparian forest. In addition, trees provide deep root systems which hold soil in place, thereby stabilizing streambanks and reducing erosion.

Cool stream temperatures maintained by riparian vegetation are essential to the health of aquatic species. Shading moderates water temperatures and protects against rapid fluctuations that can harm stream health and reduce fish spawning and survival. Elevated temperatures also accelerate algae growth and reduce dissolved oxygen, further degrading water quality. In a small stream, temperatures may rise 1.5 degrees in just 100 feet of exposure without trees.

Riparian forests offer a tremendous diversity of habitat. The layers of habitat provided by trees, shrubs, and grasses and the transition of habitats from aquatic to upland make these areas critical in the life stages of over one-half of all native Bay species. Forest corridors provide crucial migratory habitat for neotropical songbirds, some of which are now threatened due to loss of habitat. Also, many ecologically important species such as herons, wood ducks, black ducks, as well as amphibians, turtles, foxes and eagles utilize the riparian forest.

Riparian forests also offer many benefits to migratory fish. Forested streams and rivers provide suitable spawning habitat for shad, herring, alewife, perch, and striped bass. The decline of these species is partly due to destruction of habitat, which for some, like shad and herring, extends well into small streams. Trees and woody debris provide valuable cover for crabs, small fish and other aquatic organisms along the Bay's shoreline as well. Degradation of any portion of a stream can have profound effects on living resources downstream. While the overall impact of these riparian forest corridors may be greatest in headwaters and smaller order streams, there is a clear linkage all the way to the Bay.



The Benefits of Riparian Forests

1. Filtering Runoff

Rain that runs off the land can be slowed and infiltrated in the forest, settling out sediment, nutrients and pesticides before they reach streams. Infiltration rates 10-15 times higher than grass turf and 40 times higher than a plowed field are common in forested areas.

2. Nutrient Uptake

Fertilizers and other pollutants that orginate on the land are taken up by tree roots. Nutrients are stored in leaves, limbs and roots instead of reaching the stream. Through a process called "denitrification," bacteria in the forest floor convert harmful nitrate to nitrogen gas, which is released into the air.

3. Canopy and Shade

The leaf canopy provides shade that keeps the water cool, retaining more dissolved oxygen, and encourages the growth of diatoms, nutritious algae and aquatic insects. The canopy improves air quality by filtering dust from wind erosion, construction or farm machinery.

4. Leaf Food

Leaves fall into a stream and are trapped on woody debris (fallen trees and limbs) and rocks where they provide food and habitat for small bottom-dwelling creatures (i.e crustaceans, amphibians, insects and small fish), organisms that are critical to the aquatic food chain.

5. Stream and Habitat

Streams that travel through woodlands provide more habitat for fish and wildlife. Woody debris serves as cover for fish while stabilizing stream bottoms, thereby preserving habitat over time.

The Forest Buffer Concept

The concept behind a riparian buffer is to put the natural benefits and functions of riparian areas to work in non-point pollution control. When considering the range of benefits provided and potential effectiveness, forests are the most effective type of riparian buffer available. These linear strips of forest serve as a stream's last line of defense against the activities we undertake in managing the land, such as agriculture, grazing, and urban development. Unlike most best management practices, the high value of forests to wildlife and fish helps these buffers accomplish habitat benefits at the same time they improve water quality.

Definition of a Riparian Forest Buffer:

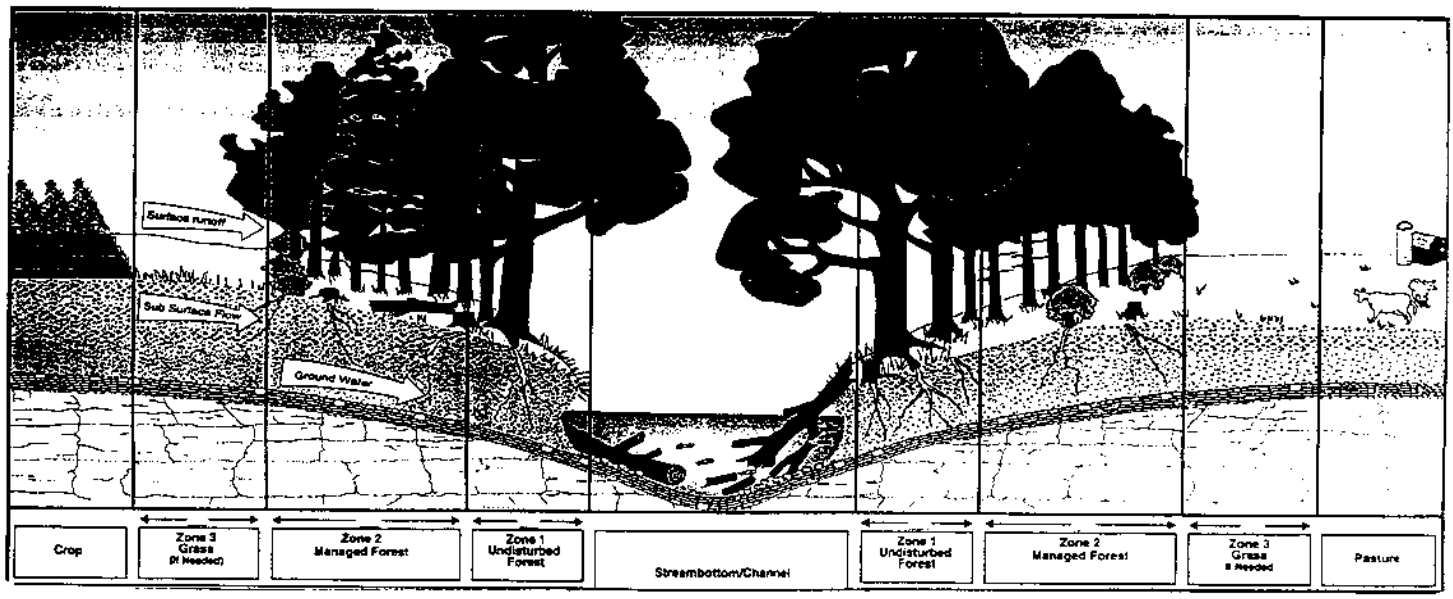
An area of trees, usually accompanied by shrubs and other vegetation, that is adjacent to a body of water which is managed to maintain the integrity of stream channels and shorelines, to reduce the impact of upland sources of pollution by trapping, filtering, and converting sediments, nutrients, and other chemicals, and to supply food, cover, and thermal protection to fish and other wildlife.

Riparian buffers will vary in character, effectiveness and size based on the environmental setting, proposed management, level of protection desired and landowner objectives. A three-zone buffer concept has been proposed to assist technical professionals and landowners with the planning and design of riparian forest buffers. The width of each zone is determined by site conditions and landowner objectives.

ZONE 1 - The mature forest along the edge of the water maintains habitat, food, and water temperature and helps stabilize streambanks, reduce flood impact and remove nutrients.

ZONE 2 - This zone contains a managed forest. The primary function of Zone 2 is to remove sediment, nutrients and other pollutants from surface and groundwater. It also provides wildlife habitat and accommodates other desired buffer objectives, including economic benefits to the landowner from management of the forest resource.

ZONE 3 - Zone 3 may contain grass filter strips, level spreaders or other features useful in slowing runoff, infiltrating water and helping to filter sediment and its associated chemicals.



Chesapeake Bay Riparian Forest Buffer Initiative

There are a number of existing federal, state and local programs that can help protect and restore riparian forest buffers. These programs include the use of tools such as agricultural and wetland reserve programs, cost-share practices, conservation easements, zoning and stormwater provisions, and tax incentives. The Chesapeake Bay Program has recognized the need for better coordination among these programs and, in October 1996, adopted a comprehensive policy calling for more aggressive action in conserving and restoring forests along the Bay's tributaries and shorelines. The Chesapeake Bay Program adopted three goals and five specific policy recommendations:

Goals:

✧ *To assure, to the extent feasible, that all streams and shorelines will be protected by a forested or other riparian buffer.*

✧ *To conserve existing forests along all streams and shorelines.*

✧ *To increase the use of all riparian buffers and restore riparian forests on 2,010 miles of stream and shoreline in the watershed by 2010, targeting efforts where they will be of greatest value to water quality and living resources.*

Policy recommendations:

✧ *Establish mechanisms to streamline, enhance, and coordinate existing programs related to buffers and riparian system conservation.*

✧ *Build partnerships with the private sector to help support the promotion and implementation of riparian forest buffer retention and restoration activities.*

✧ *Develop and promote an adequate array of incentives for landowners and developers to encourage voluntary riparian buffer retention and restoration.*

✧ *Increase the level of scientific and technical knowledge of the function and management of riparian forest and other buffers, as well as their economic, social, ecological, and water quality values.*

✧ *Encourage Bay signatories to implement education and outreach programs about the benefits of riparian forest buffers and other stream protection measures.*

Each of the states and the federal government will develop an implementation strategy for the riparian forest buffer initiative by June 30, 1998. Working together, efforts by landowners, communities, citizens and federal, state and local government to conserve and restore riparian forest buffers in the Bay watershed will help to improve the health of our streams and rivers as well as the Chesapeake Bay itself.

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