Waterways and wetlands are more than just water and soil. They include

Riparian Zones and Buffers

ri·par·i·an (rə-**pair**-ē-ən) *adj.*

written by Jeff Beane

WHAT ARE THEY?

Under natural conditions, all waterways, from tiny streams to major rivers, have strips of trees, shrubs, grasses and other vegetation growing along their **floodplains.** These vegetated areas, known as **riparian** zones, serve as natural **buffers**, protecting both the streams and the **terrestrial** habitat surrounding them.

JODY DUGGINS

WHY ARE THEY IMPORTANT?

Filters – Riparian zones serve as natural filters, protecting streams from **sedimentation** and **nonpoint source pollution**. The roots of trees and other vegetation, and the leaf litter they produce, trap soil sediment before it can enter the stream and suffocate fish, mollusks or other aquatic life. Harmful substances such as pesticides or heavy nutrient loads from fertilizers are also trapped, broken down and used by plants or other organisms before they can poison the stream.

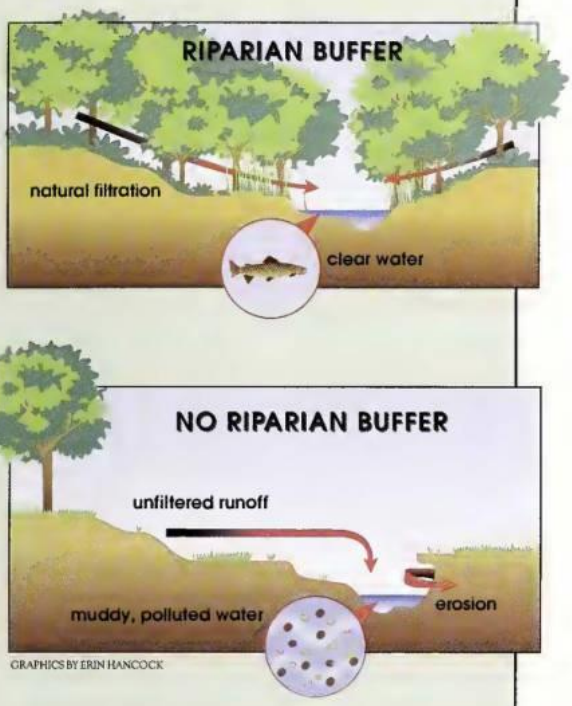
Stabilizers – The root systems of plants growing in riparian areas help strengthen and stabilize stream banks. The vegetation also helps modify the stream's channel and control the rate that water flows through it. This helps prevent **soil erosion**, improving not only water quality, but also the quality (and economic value) of the surrounding land.

Flood Control and Water Storage – Riparian buffers are like sponges. The plants and their root systems hold and soak up water during heavy rains. This increases the soil's water-holding capacity. The stored water is released slowly rather than rushing directly into the stream, thus helping to conserve **groundwater** and prevent flooding.

Coolers – The shade created by tree and shrub canopies along streams can significantly lower water temperature. Cooler water has more oxygen, vital for coldwater species such as trout. Canopy cover also reduces the amount of light reaching the water, thus helping to prevent excessive growth of algae.

Wildlife Habitat – Riparian zones support a high diversity of wildlife and serve as vital **corridors** and migration routes for many species. Some species, such as mink, kingfishers and cricket frogs, may spend most or all of their lives in riparian areas. Insects and fruit that fall from trees along streams provide food for fish and other wildlife. Leaves, wood and other plant debris that falls into streams or along stream banks provide essential cover for many animals.

Bonus Benefits – In addition to all their practical values, riparian areas provide humans with other benefits. They offer excellent opportunities for recreational activities such as fishing, hunting, canoeing, hiking, wildlife watching and picnicking. The beauty, serenity and diversity of life in riparian areas and other greenways may be more important to our mental health and well-being than we realize.



Healthy Waters, Healthy Wildlife

Rivers and streams are cleaner when grass, trees and other plants grow along the banks (upper right). After a rainstorm, water flows across the ground. Known as "runoff," this water picks up pollutants such as motor oil, fertilizer, even dirt. As the runoff flows toward ditches, streams and ponds, the riparian plants slow the runoff, then filter out the pollutants. Buffers also prevent erosion of the banks. The cleaner water benefits all wildlife, especially the species that live in or beside it—birds, invertebrates, amphibians, fish and mammals.

river otter

sunfish

salamander

KEN TAYLOR

Streams without a riparian buffer are frequently muddy and polluted.

What Does It Mean?

floodplains: the low-lying areas stretching along rivers or streams where annual or periodic flooding occurs

riparian: along, adjacent to, or associated with a river or stream

buffers: things that serve to protect or stabilize, as the protective strips of vegetation bordering wetlands

terrestrial: on or associated with land

sedimentation: the depositing of soil or other matter into a stream by water or wind

nonpoint source pollution: potentially harmful substances such as fertilizers, pesticides, herbicides or sediment, which enter streams in runoff from many different sources that are difficult to pinpoint, rather than from a single, identifiable source

soil erosion: loss or wearing away of soil, usually due to water or wind

groundwater: water stored underground in soil or porous rock layers

corridors: connectors; areas that animals can use to travel safely from one patch of habitat to another

ephemeral: temporary; holding water only part of the time

Carolina bays: oval-shaped depressions of controversial origin, found mostly in the Coastal Plain of the Carolinas

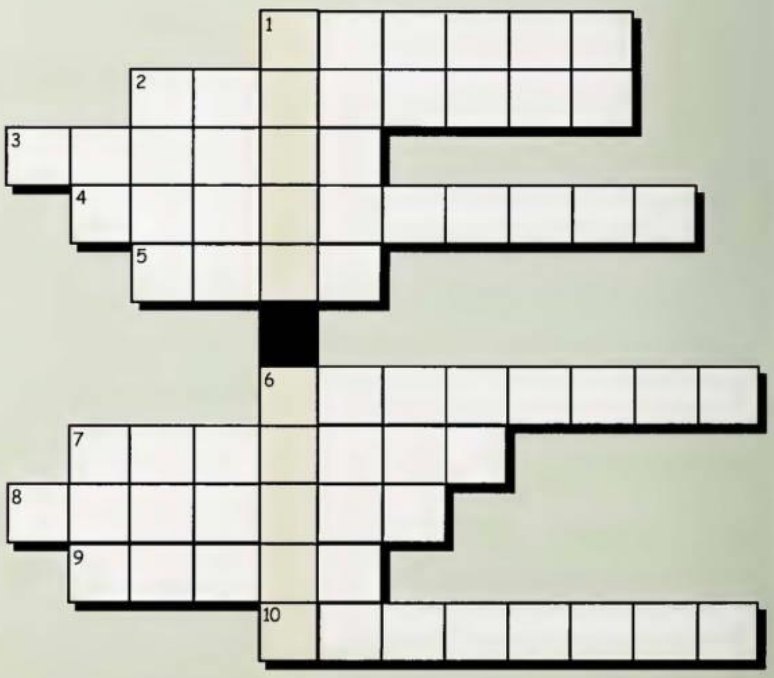
OTHER WETLAND BUFFERS

Swamps, marshes and landlocked bodies of water such as ponds and lakes, also have buffer zones that are vital to their health. Protective buffers around **ephemeral** wetlands such as woodland pools and **Carolina bays** can be especially important. The actual buffers for these sites may extend much farther than they appear to. Many animals—including spotted and tiger salamanders, wood and gopher frogs, and mud and chicken turtles—use wetlands only for breeding, or otherwise live in them only part of the year, spending the rest of their time in upland habitats, sometimes as far as a mile away. Protecting a temporary wetland while failing to protect an adequate terrestrial buffer will also fail to protect many of the creatures that live there..

The Streamside Scrambler

Unscramble the words below and write them in the grid to spell out the mystery word.

1. AYPOCN
2. FIDWLIEL
3. RFEBFU
4. DNAMLSRAEA
5. OEZN
6. TLSENWDA
7. UCATQIA
8. BTAIHTA
9. TEOTR
10. AIPRNIRA



ANSWERS: 1. CANOPY 2. WILDLIFE 3. BUFFER 4. SALAMANDER 5. ZONE 6. WETLANDS 7. AQUATIC 8. HABITAT 9. OTTER 10. RIPARIAN

Get Outside

Identify the riparian zone of a river or stream. How far does it reach? What kinds of plants grow there? Are they different from those found farther away from the water? What wildlife species do you think might use the riparian area or live there permanently? Is the water level high or low? Can you see where the high-water mark might be during a flood? Does the water look clear or cloudy? Can you see signs of soil erosion along the stream's banks? Do you think this is a healthy river or stream system?

Take a close look at a pond, lake or woodland pool. Does it have a buffer zone around it? Can you see evidence of soil erosion or sedimentation? Would you expect to find more kinds of animals living in and around a pond surrounded by woodland, or one surrounded by a pasture or golf course?

The North Carolina Museum of Natural Sciences in Raleigh and the North American streamside exhibit of the North Carolina Zoological Park in Asheboro have exhibits that can help you learn about the importance of riparian areas and the creatures that depend upon them.

Read and Find Out

- "Discover North Carolina's River Basins" (special publication available from the Office of Environmental Education, N.C. Department of Environment and Natural Resources)

In *Wildlife in North Carolina:*

- "Rivers of North Carolina" special issue, November 1999 (entire issue)
- "Water Pressures" by Brad Deen and Chris Powell, March 2002
- "The Unbroken Cycle of Water" by Lawrence S. Earley, June 1986

Riparian buffers aren't the only water filter in nature. Mussels, which feed by filtering water, remove silt, bacteria and other impurities.

It's Sedimentary!

Items needed:

plastic drink bottle; drinking straw; cottonballs; pebbles; coarse sand; fine sand; wood charcoal; clear cup or glass; mixing container

Cut the bottom off a plastic drink bottle. Turn it upside down. Cut a piece of a straw about 2 inches long. Put the straw through the cotton wool and plug the cap opening. (Use two cottonballs if necessary.) Layer with clean pebbles, coarse sand, fine sand and a wood charcoal paste. Mix up some muddy water and pour into the filter. Catch the water in a clear glass as it drips out to see the difference in the water's color. Try to improve the clarity of the water by adding alternate layers of sand and wood charcoal.