



## Functions & Benefits of Riparian Forest Buffers

**I**N RECENT YEARS, scientists in the Chesapeake Bay region and elsewhere have documented how riparian forest buffers can help to restore the Bay. Their research also provides a broader understanding of the features that make a forest buffer most effective.

Riparian forest buffers offer enormous benefits to life on the land and in the water. These streamside systems:

- Filter pollution
- Sustain aquatic habitat
- Stabilize floodplains
- Transform and store nutrients
- Provide shade
- Provide wildlife habitat

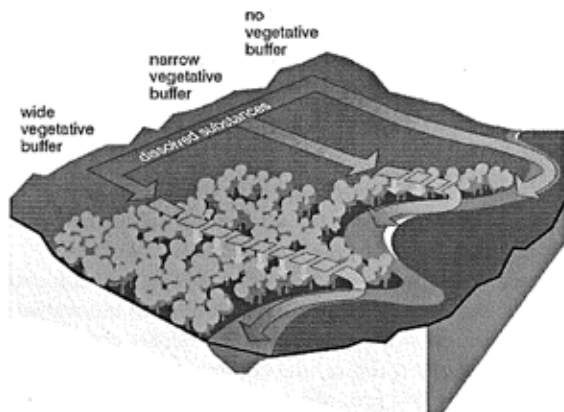
There are few restoration initiatives that address both water quality and habitat needs so directly.



Photo: Mike Land, National Park Service

### Filter Pollution

Riparian forest buffers capture and filter rain water and sediment that wash off the land. The roughness of the vegetation and the forest floor slows runoff and allows it to infiltrate into the soil, filtering sediment from the water before it reaches local



Riparian forest buffers filter out pollutants before they reach the stream. The wider the buffer, the more effectively it reduces pollution.

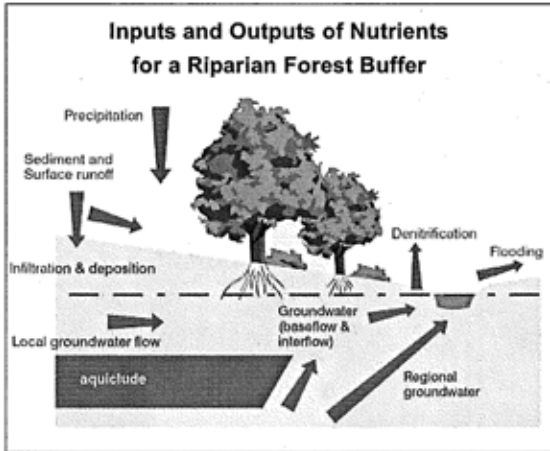
streams and rivers. Serving as a last “line of defense,” buffers remove pollutants such as nitrogen in the water and phosphorus bound to soil particles.

In fact, riparian forests can reduce nutrient and sediment inputs to a water body by 30 to 90 percent. The capacity of forests to absorb and store runoff can be 10 to 15 times higher than grass and four times higher than a plowed field. The wider the buffer, the more effectively it reduces pollution.

### Transform & Store Nutrients

Fertilizers and other pollutants travel to a stream through surface and ground water. Riparian forests act like pumps—taking up water and nutrients through their root system, storing them in the biomass of the tree, and releasing moisture into the air.

Streamside forests are also very effective in capturing and transforming nitrogen and other pollutants into less harmful forms, mostly due to the high level of chemical and biological activity in the wet, organic, carbon-rich soil. Through a process called “denitrification,” soil bacteria convert nitrate to a harmless nitrogen gas which is released into the atmosphere instead of polluting local streams.



Riparian forest buffers filter, transform, and store nutrients, while stabilizing floodplains.

### Stabilize Floodplains

Healthy, wooded riparian vegetation helps stabilize streambanks and reduce erosion. The root system holds soil together, while both the stems and roots help protect banks by deflecting and reducing streamflow velocity during floods. Floodplain forests can lessen effects of flooding downstream.

### Provide Shade

Riparian forests benefit fish and other organisms by improving the quality of nearby waters through shading. In summer, the leaf canopy helps maintain cooler, more even temperatures, especially on small streams. Cooler water reduces stress on fish and other creatures and holds more oxygen, encouraging the

growth of diatoms, beneficial algae, and aquatic insects. A few degrees can have a major effect on water quality and the survival of aquatic organisms.

### Sustain Aquatic Habitat

Leaves fall into buffered streams and are trapped by woody debris and rocks. They provide food and habitat for insects, amphibians, crustaceans, and small fish which in turn form the food chain for fresh water streams.

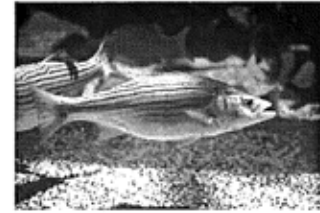
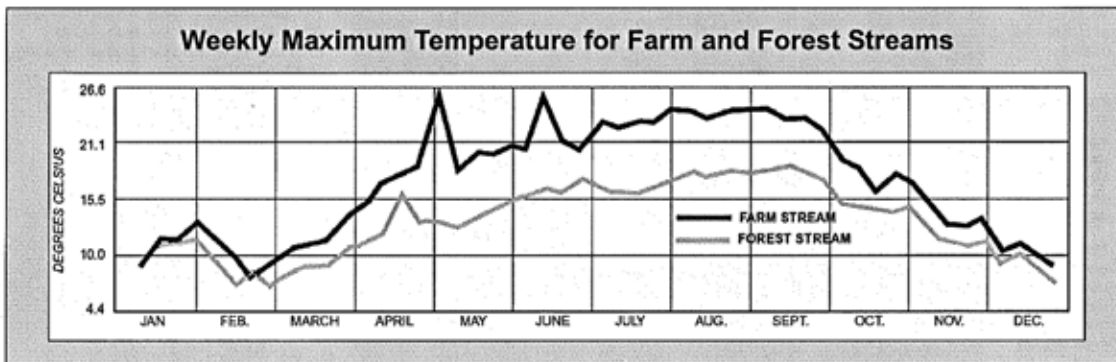


Photo: Chesapeake Bay Program

Leaf detritus supplies up to 75 percent of the organic food base in shaded streams. Woody debris also creates habitat structure and cover for fish and their food supply. When trees are removed from a stream, a wide range of species that depend on them are lost as well. Fish do “grow on trees.”

### Provide Wildlife Habitat

More than half of all species on earth rely on the interwoven layers of habitat provided in riparian areas and the availability of food, water, and diversity of shelter all within a small area. The zone of transition from streamside to upland is home to a multitude of important plant and animal species. In addition to permanent habitat, continuous stretches of riparian forest also serve as valuable corridors for migrating wildlife. These multiple benefits are especially enhanced when the forest is composed of native trees with a diversity of age and species.



Shade provided by riparian forest buffers reduces stream temperatures and enhances aquatic habitat.