

Benefits from Riparian Forests

A healthy riparian forest provides many tangible benefits. Like an SMZ it also acts as a filter strip to keep sediment, nutrients, and other pollutants out of the waterways. It does this by intercepting surface runoff and even ground water before it reaches a stream, causing it to deposit its sediments, nutrients, and other pollutants so they can be absorbed by the soil or broken down through the action of plants and microbes. Many plants can absorb harmful chemicals; ferns for example, have been shown to take up arsenic. A healthy and diverse riparian forest floor protects water quality. The size of an adequate filter strip will vary with soil type, slope, and vegetative diversity, but the 35-foot strip called for in Alabama's Best Management Practices

for Forestry will usually suffice for this purpose.

A healthy riparian forest provides stream bank stabilization. This is important in controlling what happens to the stream channel itself and in protecting the associated aquatic ecosystem from becoming degraded. Bank erosion, when severe enough, can cause changes in channel velocity and increase sedimentation, disrupting the life cycles of aquatic plants and animals. The riparian forest also provides shade to protect aquatic ecosystems from severe temperature fluctuations that can cause serious problems for these systems, especially in nutrient recycling. It also provides the organic matter that fuels the biological process to power these systems, as well as adds structure to the habitat of both aquatic and terrestrial species.

But it is in protecting and creating diverse wildlife habitats that gives the riparian forest concept the edge over SMZs. A 35-foot SMZ filter strip is hardly adequate to promote very much habitat diversity. This is true even when horizontal and vertical structure is incorporated into the SMZ, which is not a part of the guidelines as outlined in the BMP manual. SMZs may, however, be adequate to provide the habitat needs for certain small amphibians or insects and can provide needed shade for maintaining temperature control in the adjacent aquatic ecosystems. But for anything more than this, wider and more diverse riparian forests are needed. Many riparian forest guidelines call for minimum widths of 50 feet, but advocate widths up to 150+ feet for maximum habitat diversity.

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Mussels, Alabama's Endangered Species

By **Bob Keefe**, Retired Forester, Cullman

Of the 122 endangered species listed for Alabama, most are aquatic species and most of these are freshwater mussels. To most of us, freshwater mussels are not the attention grabbers that the more flashy endangered species are, such as the red cockaded woodpecker. In fact, mussels are so innocuous that probably few Alabamians have even seen them or know much about them. North Alabamians may know that they were an important part of the diet of Native Americans and that there is a small pearl industry in the Tennessee River based on freshwater mussels, but few realize that they have a very unique life cycle.

Mussels are common in Alabama and exist in perennial streams over most of the state. They live on stream bottoms, and for the greatest part of their lives are fairly immobile. Because of this they are very sensitive to stream pollution, especially sediment. In fact, the presence of mussels can be a good indicator of the health of a stream. Currently over 20 species of mussels all over the state are listed as endangered, an indicator of present and future water quality problems.

Although mussels seem drab in comparison to most aquatic animals, their reproductive life cycle is actually pretty unique. They have a very unusual way to keep from overpopulating their beds and dispersing their offspring. The female mussel broods its young in their gill chambers. The mussel larvae, called *glochidia*, are then released into the water where they must attach themselves to the gills of fish. Here they live as parasites for 14 to 28 days until they develop into a juvenile mussel, often in a location distant from the parent mussel.

The female mussels have developed a series of strategies to visually attract or lure fish within range. In this manner they are enabled to expel the parasitic larvae directly into the fish's mouth where they attach themselves to the gills as they pass through. Some females have developed extravagant lures that resemble small fish or aquatic insects. Some of these lures are displayed at the mouth of the female's shell, while others are attached to a gelatinous string and can be "fished" several meters downstream from the mussel.

Sediment can disrupt this cycle in several ways: 1) by removing fish which deprives the *glochidia* of a host, 2) by limiting visibility and thus the female's ability to attract a host fish, and 3) by smothering the juvenile mussels during their early development, and possibly the adult colony if sedimentation is severe enough.

Riparian forests are one of the best ways to ensure water quality and in turn help develop thriving and healthy mussel populations by protecting these delicate environments. ♣