The Value of Streamside Forests / Fishes of the Mahoning River

Ohio's Streamside Forests: The Vital, Beneficial Resource

Streamside forests (riparian buffer zones) are highly productive and diverse systems which provide many important benefits. These benefits include maintaining high water quality and providing habitats for a diverse population of wildlife and fish, including some threatened and endangered species.. However, few people realize the overall importance and long-term effects of these forested buffer zones. The quality and productivity of our rivers and lakes have declined because their natural characteristics have been altered. Suitable habitat is the single most important factor determining the existence of a diverse wildlife population.

Forested buffer zones, along all waterways, act in many subtle ways to protect a river's environment. The character of Ohio's rivers, streams and groundwater have changed greatly over the last 200 years due to man's activities. Forests and prairie lands kept the streams narrower and deeper by holding the banks intact. The water was cooler and clearer and provided for a greater diversity of species.

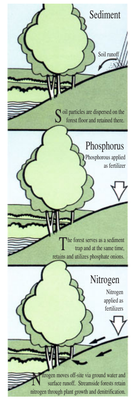
Tiling and draining of the land coupled with the loss of forested buffer zones has caused our rivers and streams to run wider, shallower and more turbid.

Flooding was not as prevalent as it is today. The practice of straightening Ohio's streams removes vegetation and also causes water to flow much faster; thus compounding the effects of flooding in downstream reaches.

Improving Water Quality

The purity of water in our lakes and streams can be protected from the effects of nonpoint source pollution by the presence of forested buffer strips along them. The trees and shrubs filter and trap sediments and absorb nonpoint pollutants from overland run-off and from the shallow groundwater zone. Two of the major pollutants are nitrogen and phosphorus. These nutrients occur naturally in the environment and are essential for the growth and development of all plants. However, an overabundance of either one will upset the delicate balance of the plant-nutrient-water relationship and can actually become toxic to plants and animals.

Fish kills can occur as a result of algae blooms, caused by an excess of nutrients in rivers and lakes.



Nitrogen and phosphorus are used extensively in chemical fertilizers. When people add too much fertilizer to their lawns and fields, the excess flows to the nearest stream or lake or infiltrates the shallow ground water. When they occur in levels in excess of natural conditions in rivers and lakes, these nutrients cause an overabundance of algae growth. Excessive algae reduces light penetration which causes submerged aquatic plants to die. These plants are essential to fish and other aquatic organisms. Also, bacteria use vast amounts of oxygen to decompose the algae and a subsequent lack of available oxygen causes fish and other aquatic organisms to die or relocate.

Preventing the excess nutrients from entering waterways as nonpoint pollutants is an important function of forested buffer strips. They act as filters by using the nutrients for growth.

When nutrient-enriched water moves over the soil, forest roots absorb large amounts of nutrients. When the water moves below the surface, denitrification takes place.

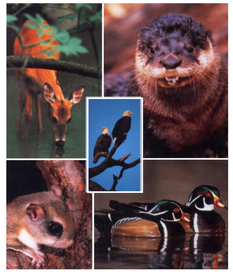
A forest buffer as narrow as 50 feet can remove the majority of nutrients from surface and subsurface flow. The Ohio Scenic Rivers Program recommends a minimum buffer of 120 feet for both sediment removal and stream habitat protection.

Denitrification occurs when nitrogen in nitrates changes to nitrogen gas. The moist soils in riparian areas contain high levels of organic matter (living and dead plant materials) which is necessary for denitrification. Forested buffer strips also filter out phosphorous. Phosphorous is primarily attached to small soil particles which move with surface water runoff. The forest buffer is an effective sediment trap. Even narrow riparian forests strips on flat land are effective filters, particularly when adjacent to cropland. A strip as narrow as 50 feet can remove the majority of nitrogen and phosphorus from surface and subsurface runoff. However, wider buffer zones are more desirable for providing other benefits, such as wildlife habitat and flow moderation of stormwater.

Maintaining Wildlife Population

The riparian forests are not only vital in improving and maintaining water quality by acting as filters for nonpoint pollutants, but they generally support a greater variety of wildlife than adjacent upland forests. The variety of plants and habitats in riparian ecosystems are the main reason why they produce a greater diversity of wildlife.

Many kinds of plants including grasses, shrubs, vines and trees grow well in the moist and fertile soils of riparian forests. Trees and shrubs are important for nesting birds and other animals and produce an abundance of food for wildlife. The unbroken riparian forest also forms protective pathways for the safe movement of migration of animals. Turtles, river otters, beaver, muskrats and mink are just a few of the animals that thrive in riparian zones. Deer, squirrels, wood ducks and cottontail rabbits use the riparian vegetation for food and shelter and the forests are home to hawks, owls, herons and songbirds. Temporary pools formed in the riparian area are excellent breeding sites for frogs, toads and salamanders.



Species of wildlife that require large riparian forests generally are less common than species that inhabit "edge" areas where two habitat types meet. The wider the riparian forest, the greater the number and variety of birds and other animals it will support.

Maintaining Aquatic Population

Forested banks help make streams suitable for many kinds of fish and other aquatic creatures. Tree roots help stabilize stream banks and provide cover for fish, crayfish and aquatic insects. Leaves and other vegetation that fall into the stream constitute the primary food source for many aquatic organisms.

Aquatic insect larvae, crayfish and other invertebrates break down the plant material into small particles. Bacteria and aquatic fungi also break down the leaf material into smaller pieces. This very fine plant material, known as detritus, is used as food by many small aquatic animals including insect larvae such as caddisflies, stoneflies, mayflies and blackflies.

Overhanging vegetation helps maintain proper water temperature and provides leaf litter as a food source for the aquatic environment.

Minnows also eat detritus and small insects. Larger gamefish species such as bass and sunfish eat the smaller fish as well as the insects that fall into streams from overhanging vegetation. The detritus that is not immediately used flows on downstream where it is available for use by other organisms.

Forested buffer zones also serve an important function in the moderation of summer water temperatures. Without the benefit of shading from streamside vegetation, water temperatures may increase, resulting in detrimental effects to the aquatic communities. As water temperatures rise, the amount of dissolved oxygen present in the stream is reduced at the same time the demand for this dissolved oxygen by the aquatic organisms is increased. If the oxygen demand by the aquatic community exceeds the amount present in the stream, a die-off of the fish and other aquatic organisms in the stream will occur. In Ohio, this situation is most likely to occur during late summer when temperatures are highest and streams are in low flow conditions. The lack of shade also allows increased amounts of sunlight to enter the stream resulting in abnormal growths of aquatic algae, particularly when coupled with the presence of excess nutrients such as phosphorous and nitrogen in the stream. As the aquatic algae dies, large amounts of dissolved oxygen are utilized in the decomposition further reducing the amount available to the rest of the aquatic community.

Streamside forests are also critical in reducing stream siltation which often results from the erosion of croplands and construction sites. The forest corridors act as sediment traps filtering out soil particles that would otherwise enter the stream as a form of nonpoint pollution. Silt, as a pollutant, acts to degrade the aquatic environment in several ways resulting in a decline in the diversity and number of aquatic animal species present. Silt settles out on the stream bottom smothering the insect larva and other aquatic invertebrates which are the food supply for many of the fish present in the stream. Stream siltation also reduces spawning success by smothering fish spawning habitat. Heavy silt loads can also smother and kill aquatic vegetation which is also important in the life cycle of many species of fish and aquatic invertebrates.

Using Streamside Forests for Recreation

Streamside forests are beneficial to people not only for maintaining biological diversity and water quality, but also because they provide other opportunities. Hunters will find a wide variety of game animals including white-tailed deer, rabbit, squirrel, raccoon, woodcock and wood duck. These species can thrive in Ohio because of the diverse variety of plants they utilize for their food and shelter requirements.

The waterways alongside these forests provide anglers with a wide variety of fish. Inland rivers and streams usually contain large or small-mouth bass, sunfish, catfish and crappie. Riparian forests provide "living classrooms" for the study of nature, especially the life history and behavior of aquatic and terrestrial plants and animals. These forests have a great variety of birds making them favorite sites for birdwatchers.

Aquatic life observation in a tributary

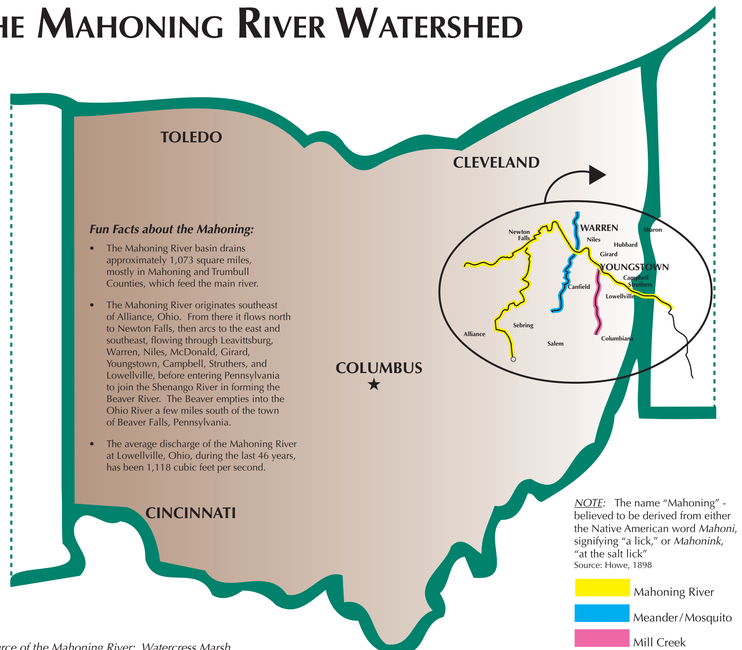
Agricultural activities and urban development have contributed to the loss of streamside forests and increased erosion.

Remember that forest buffer zones:

- Filter and reduce soil, nitrogen, phosphorous and other pollutants from entering bodies of water and thus greatly assist in controlling nonpoint source pollution.
- Produce a variety of vegetation which provides habitat and food for many birds, animal and aquatic organisms.
- Provide recreational opportunities for hunters, anglers, hikers, campers, birdwatchers and other outdoor enthusiasts.
- Save landowners from excessive loss of valuable topsoil.

The Mahoning River Watershed

Ohio's Streamside Forests:



Fun Facts about the Mahoning:

- The Mahoning River basin drains approximately 1,073 square miles, mostly in Mahoning and Trumbull Counties, which feed the main river.
- The Mahoning River originates southeast of Alliance, Ohio. From there it flows north to Newton Falls, then arcs to the east and southeast, flowing through Leavittsburg, Warren, Niles, McDonald, Girard, Youngstown, Campbell, Struthers, and Lowellville, before entering Pennsylvania to join the Shenango River in forming the Beaver River. The Beaver empties into the Ohio River a few miles south of the town of Beaver Falls, Pennsylvania.
- The average discharge of the Mahoning River at Lowellville, Ohio, during the last 46 years, has been 1,118 cubic feet per second.

NOTE: The name "Mahoning" - believed to be derived from either the Native American word *Mahoni*, signifying "a lick," or *Mahonink*, "at the salt lick"
Source: Howe, 1898

Mahoning River
Meander/Mosquito
Mill Creek

Other major tributaries not included: Yellow Creek and Eagle Creek.

○ *Source of the Mahoning River: Watercress Marsh*

Fishes of the Mahoning River and its tributaries - approximately 166 species of fish inhabit Ohio Waterways, with the well known game species (Bluegill, Bass, Walleye) comprising about 17% of the population. The Ohio Environmental Protection Agency indicates that the Mahoning River watershed is home to well over 60 species of fish. This number was determined through various collection methods throughout the watershed. Shown below are just some of the many "lesser known indigenous species" found. Some of these species are excellent indicators of higher water quality. To lose them could indicate a loss of clean water resources.

COMMON NAME: Pumpkinseed
OTHER NAMES: Punkys
SCIENTIFIC NAME: *Lepomis gibbosus*

COMMON NAME: Warmouth
OTHER NAMES: Warmouth Bass
SCIENTIFIC NAME: *Lepomis gulosus*

COMMON NAME: White Sucker
OTHER NAMES: Gray Sucker
SCIENTIFIC NAME: *Catostomus commersoni*

COMMON NAME: Rainbow Darter
OTHER NAMES: None
SCIENTIFIC NAME: *Etheostoma caeruleum*

COMMON NAME: Mottled Sculpin
OTHER NAMES: Doglish, Toadfish
SCIENTIFIC NAME: *Cottus bairdi*

COMMON NAME: Green Sunfish
OTHER NAMES: Sunfish
SCIENTIFIC NAME: *Lepomis cyanellus*

COMMON NAME: Bluntnose Minnow
OTHER NAMES: None
SCIENTIFIC NAME: *Pimephales notatus*

COMMON NAME: Northern Hog Sucker
OTHER NAMES: None
SCIENTIFIC NAME: *Hypentelium nigricans*

COMMON NAME: Log Perch
OTHER NAMES: None
SCIENTIFIC NAME: *Percina Caprodes*

COMMON NAME: Johnny Darter
OTHER NAMES: None
SCIENTIFIC NAME: *Etheostoma nigrum*

COMMON NAME: Longear Sunfish
OTHER NAMES: None
SCIENTIFIC NAME: *Lepomis megalotis*

COMMON NAME: Fathead Minnow
OTHER NAMES: None
SCIENTIFIC NAME: *Pimephales promelas*

COMMON NAME: Greenside Darter
OTHER NAMES: None
SCIENTIFIC NAME: *Etheostoma blennioides*

COMMON NAME: Creek Chub
OTHER NAMES: Common Chub
SCIENTIFIC NAME: *Semotilus atromaculatus*

COMMON NAME: Black Crappie
OTHER NAMES: Papermouth, Specks
SCIENTIFIC NAME: *Pomoxis nigromaculatus*

COMMON NAME: Striped Shiner
OTHER NAMES: None
SCIENTIFIC NAME: *Luxilus chrysocephalus*

COMMON NAME: Golden Shiner
OTHER NAMES: Shiner
SCIENTIFIC NAME: *Notemigonus crysoleucas*

COMMON NAME: Central Stoneroller
OTHER NAMES: None
SCIENTIFIC NAME: *Campostoma anomalum*

COMMON NAME: Gizzard Shad
OTHER NAMES: Shad
SCIENTIFIC NAME: *Dorosoma cepedianum*

COMMON NAME: Emerald Shiner
OTHER NAMES: Lake Shiner
SCIENTIFIC NAME: *Notropis atherinoides*

COMMON NAME: Golden Redhorse
OTHER NAMES: None
SCIENTIFIC NAME: *Moxostoma erythrurum*

COMMON NAME: Common Shiner
OTHER NAMES: None
SCIENTIFIC NAME: *Luxilus Cornutus*

COMMON NAME: Blacknose Dace
OTHER NAMES: None
SCIENTIFIC NAME: *Rhinichthys attratulus*

COMMON NAME: Southern Redbelly Dace
OTHER NAMES: None
SCIENTIFIC NAME: *Phoxinus erythrogaster*

COMMON NAME: Black Redhorse
OTHER NAMES: None
SCIENTIFIC NAME: *Moxostoma duquesnei*

COMMON NAME: Banded Darter
OTHER NAMES: None
SCIENTIFIC NAME: *Etheostoma zonale*

Donor of Sign
Mahoning River Consortium
MRC
www.MahoningRiver.com

Sources and Special Thanks:

- Ohio Department of Natural Resources / Division of Wildlife, Forestry and Natural Areas & Preserves
- Ohio E.P.A.
- The North American Native Fishes Association – Rob Carillio www.nanfa.org
- Milton B. Trautman's The Fishes of Ohio

Our Rivers: So Much More Than Water

The undisturbed forested land you see along the river, or riparian zone (Prefix "ripa"- Latin, meaning "bank"), provides numerous, yet often overlooked benefits to both wildlife and people. The riparian zone provides important habitat where animals can find food and shelter year round. Just as highways are important to humans traveling in cars from point "A" to point "B", forested riverbanks are equally important to birds and other creatures as they journey up and down the river. The riparian zone is a sort of "natural highway" which provides animals a safe passageway through our cities, towns, and countrysides.

Riparian zones also improve the quality of our drinking water by functioning as a gigantic natural water filter. Harmful rainstorm runoff from parking lots and roads may carry oil and other pollutants in it, which the riparian zone vegetation and soil can assist in filtering before the runoff reaches the river. In addition, like a enormous sponge, wetlands along a river's banks help to absorb and retain floodwater after heavy rains or snowmelts. This attribute also helps in natural water filtration.

The many trees and plants growing wild along the riparian zone help to stabilize erosion sensitive riverbank soils. Much like the steel re-enforcement rods in concrete highway bridges and overpasses help to strengthen and hold together the concrete, roots from trees and other vegetation along riverbanks serve a similar function, in holding soil in place, thereby preventing soil erosion! Trees along the river also provide shade, preventing the river's water from becoming too warm during hot weather. Add to that, leaf litter falling into the water from these trees provides food and habitat for many aquatic animals. These trees can also assist in cleaning the air we breathe!

Most notably, the riparian zones provide a wealth of recreational and educational opportunities for people of all ages. Hiking, fishing, bird watching, hunting, photography, canoeing and even swimming are a few of the many activities which can be enjoyed by those who frequent riparian zones in public areas. When preserved as much as possible, these streamside forests have also been shown to enhance property values: Lush forests and other habitats create areas that are highly desirable for marginal human settlement.

Forested riverbanks are scenic places year round, add visual appeal to any urban and suburban community, and are invaluable resources essential to our environmental, social, and economic health. The best part of all of this, is that no one is paying any extra taxes for all the above services provided courtesy of nature, and the streamside forests!

Please support riparian zone restoration efforts in your local community!