



Pennsylvania is home to some great fishing opportunities.

These opportunities are the result of diverse resources and the quality of those resources. When the habitat is great and aquatic communities are healthy, great fishing results.



photo-Don Carey

Pennsylvania anglers pursue their sport avidly. Each year, anglers take 21 million trips, spending \$1.35 billion. Pennsylvania anglers also pursue something else with nearly equal intensity: Making better fish habitat. There is an army of volunteers, partnered with the Fish & Boat Commission, rolling up their sleeves to give nature a hand. Some of these projects include trying to reverse the effects of hundreds of years of human activity. Others are trying to make what is already good even better. The Fish & Boat Commission and its partners are working to make great fishing opportunities by providing great habitat. Habitat improvement projects focus

on many components of physical habitat. The goal of all these projects is to provide a better place for fish of all sizes, shapes and ages to live.

Each year, the Commission is involved in some 700 habitat improvement projects. Cooperators, including other state and federal agencies, angling groups and concerned citizens, invest 10,000 hours annually in improving aquatic habitats. Volunteers and other parties also invest hundreds of thousands of dollars in materials and equipment building and installing habitat improvement devices. Add to this the millions of dollars the Commission has invested over the last 10 years in habitat improvement, and it's quite an effect on aquatic resources and angling opportunities. The result of these efforts is improved habitat for all fish and other aquatic organisms, as well as terrestrial wildlife. Also benefiting are those of us who enjoy Pennsylvania's water resources and the organisms that call them home.

Stream Projects

There are some 80,000 miles of rivers and streams in Pennsylvania. At one time, most of our smaller streams were surrounded by forests. These trees and other streamside vegetation sheltered the water from the heat of the summer's sun, buffered runoff from storms, and held stream banks in place. Falling leaves provided a source of food to drive ecosystems on small creeks and streams. As these forests were harvested to supply wood and wood products to our growing country, the nearby aquatic ecosystems were altered. Today, agriculture and other human activities have pushed right to the water's edge. We can see the lasting effects of the loss of this streamside vegetation--commonly called riparian buffers.



Wallenpaupack Creek, Pike and Wayne counties photos-Karl Lutz, Habitat Management Section

In a 1999 report to the US Environmental Protection Agency (EPA), the PA Department of Environmental Protection (DEP) estimated that some 2,000

miles of rivers and streams were degraded by erosion and sedimentation. In addition, thousands of miles of small streams without riparian buffers warm more than those shaded by streamside trees. In summer, shaded streams can be as much as 10 degrees cooler than those without shade. The loss of riparian buffers results in temperature increases, changes in stream banks and channels, and destruction of important spawning habitat. Often this causes decreases in natural reproduction and the loss of important links in food webs.

Streams have also been altered by humans in other ways. Over the years stream channels, beds and flows have been changed to accommodate human activities. Often these changes occurred in attempts to minimize seasonal flooding.

Instream habitat

Moving water is a complex system. Its characteristics are shaped by the surrounding watershed. Aquatic communities adapt to those characteristics. In designing habitat improvement, careful consideration must be given to hydrology and the aquatic community. Improvement goals must be clearly defined with measurable benefits. This requires specialized expertise in fish biology and management, stream hydrology, and construction design and installation. In addition, there is a system of permits that must be followed. The permit application and review system, in addition to regulations put in place by the Commission, prevents potential harm. The system is in place to ensure that the project does what it is intended to do.

The Fish & Boat Commission combines its technical expertise with the helping hands of cooperators to construct devices that improve instream habitat. Most often the projects are aimed at making things better for trout and other coldwater fishes. Habitat improvement projects focus on installation of devices that keep stream bottoms free of silt and sediment, creating meandering pools and eddies. Installing these devices results in improved spawning habitat and nursery waters, which increase the success of natural reproduction. Other devices are installed to provide shelter from predators, giving fish the opportunity to grow larger. Some projects are aimed at improving overall water quality. They provide a better place for fish of all sizes, shapes and ages to live.

Commission Stream Habitat Improvement Partners

Trout Unlimited: www.patROUT.org

PA DEP: www.dep.state.pa.us

County Conservation Districts: www.pacd.org

PA DCNR: www.dcnr.state.pa.us

US Fish and Wildlife Service: www.penn.fws.gov

FishAmerica Foundation: www.asafishing.org

Stream bank restoration and stabilization

Restoration of streamside vegetation can also be complex and technical. However, with the proper guidance, these projects are easily undertaken by volunteer groups. These projects include planting trees and other vegetation, and providing protection and maintenance to young developing trees.

The Pennsylvania Fish & Boat Commission is not alone in recognizing the value of restoring stream banks and neighboring lands. Each year, DEP provides guidance and hundreds of thousands of dollars to fund projects aimed at reducing stream bank erosion and sedimentation. In 1996, DEP embarked on a public campaign to restore streamside vegetation, or riparian buffers, through its Stream Releaf program. Through the US Fish

and Wildlife Service's Partners for Fish and Wildlife program, more than 100 miles of riparian corridors have been restored since 1989.

For More Information

PA Fish & Boat Commission
Adopt-a-Stream Program
450 Robinson Lane
Bellefonte, PA 16823
<http://www.fish.state.pa.us/>

Dam Removal

In the two centuries after William Penn's arrival, the Commonwealth's abundant water resources were harnessed to support the growing country. Dams were built to provide water to power mills, generate electricity or support the canal system.

Dams slow moving water. Slower water causes sediments to settle out, covering rocky bottoms with silt, sand and other sediments. Damming can also cause water temperature to rise and may result in other changes to water quality. These changes cause these waters to become more like lakes. The change completely alters the aquatic community.



Rock Hill Dam, Conestoga River, Lancaster County photos-R. Scott Carney

In addition, dams block the seasonal movement of resident and migratory fishes. Impassable dams keep migrating fish from reaching suitable upstream spawning habitats. This may cause a decrease in the population or the population's total demise. The shad and herring migration was stopped by construction of some of these dams hundreds of years ago on Susquehanna River and Delaware River tributaries. Dams may also block the seasonal movements of fish such as trout, smallmouth bass, walleyes, sauger and paddlefish.

Many dams constructed hundreds of years ago no longer serve the purpose for which they were built. Many are in disrepair or have been abandoned. Some are even safety hazards. The Pennsylvania Fish & Boat

Commission, in cooperation with several partners, is working to remove these dams. Since 1995, more than 50 dams have been removed in Pennsylvania.

But it doesn't end there. Dozens more need to be removed. While support of dam removal is increasing, gaining public acceptance for removal can be challenging. However, more and more people are recognizing the benefits of restoring a habitat to its free-flowing state.

Flowing freely

The signs of restoration are visible almost immediately after the removal of a dam. The stream bottom begins to be scoured free of years of sediments. Later, the stream will take on its original channel as water recedes, or it will follow a new path. By the end of the next growing season, streamside vegetation will return. Stream and river fishes will move back in as habitat recovers. In just a few years, the habitat recovers and only the memory of the dam remains.

For more information on dam removals in Pennsylvania, contact: Pennsylvania Fish & Boat Commission, Division of Research, 1225 Shiloh Road, State College, PA 16801, 814-353-2225; or the Department of Environmental Protection, Division of Dam Safety, at 717-787-8568.

Lakes

In Pennsylvania there are 3,956 lakes, reservoirs and ponds covering 161,445 acres accessible to the public. These lakes provide wonderful opportunities to fish and boat, and are home to a wide variety of birds, mammals, fish, reptiles and amphibians. Even though there are few naturally occurring lakes in Pennsylvania, most have been created by humans. There was a boom in lake construction from the 1950s through the 1970s. Because of the age of some of these lakes and impoundments, naturally available cover and habitat are limited. Some were even scoured of natural cover when constructed. This results in limited places for fish to hide. The lake is more like a bowl of water than a place where fish can grow and survive.



photo-Joe Workosky

Lake habitat improvement

The Fish & Boat Commission and its partners work to install devices that provide places for young fish and prey fish to hide. Shelter from predation allows greater recruitment, giving small fish a chance to grow larger before they can be eaten by predators. There are several different habitat device designs, each dependent on conditions of the lake and the fish community

present. Devices are installed to improve the lake bottom, duplicating the cover provided by submerged vegetation. Gravel, broken concrete, blocks and pipe are also installed on the bottom and along the shoreline, providing spawning and nursery sites. Another means currently used to improve lake habitat is to stabilize the banks of streams that provide water to the impoundment. This results in a reduction of siltation on the lake bottom, and improved water quality in the lake.

Permits are required for lake habitat devices. Technical evaluation of the aquatic community and conditions in the watershed must also be considered. The Commission combines its technical expertise in these areas with the helping hands of its partners to build and install habitat improvement devices.

For more information on the Commission's lake habitat improvement efforts, contact: PA Fish & Boat Commission Adopt-a-Lake program at 450 Robinson Lane, Bellefonte, PA 16823; 814-359-5185; www.fish.state.pa.us.



photo-Habitat Management Section

Commission Partners for Lake Habitat Improvement

DCNR, Bureau of State Parks
US Army Corps of Engineers
PA Bass Federation
PA DEP, Bureau of Watershed Conservation
PA Association of Conservation Districts members
FishAmerica Foundation

Everyone's responsibility

Good fishing is everyone's responsibility. The Commission's habitat improvement programs currently have a waiting list. But the Commission works hard to provide technical assistance and guidance even for those project participants unable to provide hands-on support in installation. If you or your group can't organize a project, perhaps you could volunteer time with those with projects already underway. Do your part at home and on the water by using water resources wisely.

Remember that each time you buy fishing tackle, motorboat fuel and boating accessories you are supporting the Commission's habitat improvement efforts. Excise taxes placed on these products enter into the Sport Fish Restoration Trust Fund. The US Fish and Wildlife Service then allocates these funds to states for fisheries and boat access projects. Annually the Pennsylvania Fish & Boat Commission receives more than \$5 million from this fund.

"Habitat" poster

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