

Trout Summit: Water Quality and Habitat Management

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This article is part of the Trout Summit report highlights that began in the January/February 2003 issue. To view all the Trout Summit files and information, visit the Commission's web site, www.fish.state.pa.us, and click on "Trout Summit Files."

In planning the program for the 2002 Trout Summit, we quickly realized that it was important to discuss the Commission's programs that concern managing wild trout populations and culturing hatchery trout to satisfy a recreational demand. However, we also discovered that something else needed to be said about what was necessary to support trout once they were either born in nature or stocked from a hatchery truck.

The Commission has jurisdiction for species ranging from the smallest flowering aquatic plants to rattlesnakes, turtles and salamanders, to the many species of fish and aquatic invertebrates that form communities in our streams, rivers and lakes.

stream photo: Art Michaels



Loyalsock Creek, Sullivan County



Trout (brooks, browns and rainbows) have been long regarded as animals that require a clean, coldwater stream to survive. Most of us envision trout habitat as a brook tumbling down a mountainside with its banks protected by mountain laurel and its surface shaded by hemlocks—a classic Pennsylvania mountain trout stream, one that changes colors with the seasons and is fueled with energy through the falling of oak and maple leaves every autumn. This picture that many of us form when thinking about a “typical” PA trout stream contains the basic ingredients that are necessary to support trout—whether they are the

hellbender photo-Tom Diez

permanent requirements necessary to support all the life stages of a wild or native trout population or the seasonal conditions that are necessary to hold hatchery trout for a shorter period of time.

These ingredients, water quality and habitat, are the

photos courtesy of the author



Lititz Run, Lancaster County, before dam removal.

reason why the Fish & Boat Commission staff is involved in efforts to protect, conserve and enhance trout streams. In April 1992, Dr. Maurice Goddard, former Secretary of the Department of Environmental Resources, accepted the Ralph W. Abele Conservation Heritage Award and said, "With Ralph's leadership, the Fish Commission was the environmental conscience for the environment in Pennsylvania." In my Trout Summit talk, I simplified this duty to: "We speak for the fish."

Water quality

Pennsylvania has over 83,000 miles of streams that include 10,200 miles of wild and stocked trout streams that have been surveyed by Commission staff. Obviously, there are many more miles of uncharted waters that have not been inventoried and that support populations of wild and native trout. One of the important lessons that we have learned over the many years of studying trout streams in PA is that the land is connected to the water. This simple but often forgotten principle is one of the basic tenets in the teachings of some of our nation's best-known ecologists such as Aldo Leopold. The land that filters the water that eventually supports the trout that grow in the coldwater streams in our valley bottoms must be managed properly to ensure the continued protection of our waters and the trout that live in them.

Our most recent estimate shows that 16 percent of PA waters are polluted (8,385 stream miles out of 52,889 stream miles that have been assessed). About 30,272 stream miles remain to be assessed. The top three sources of

pollution are abandoned mine drainage, agriculture and urban runoff/storm sewers, which are responsible for 66 percent of our impaired stream miles. The major causes of pollution include siltation (25 percent), metals (18 percent), nutrients (14 percent) and unsuitable pH (11 percent).

The legacy of water pollution in Pennsylvania began when our forefathers mined the coal from under our ground and logged the trees from our mountainsides. These historical events were an important part of our nation's growth through the industrial revolution, but they left us with a scarred landscape and far too many fishless streams filled with sediments and stained orange by acid mine drainage. In 1866, a convention was held in Harrisburg to investigate sediment pollution occurring in mountain lakes and streams from timber harvesting and American shad runs blocked by dams on the Susquehanna River. This



Lititz Run, Lancaster County, after dam removal. Trout populations respond quickly and favorably to dam removal.

historic meeting resulted in the PA General Assembly passing Act 336, which created the Commonwealth's first Commissioner of Fisheries. In 1873, the PA Fish Commission was created and then given water pollution enforcement authority in 1909.

Our law, the Fish and Boat Code (Title 30 of the PA Consolidated Statutes), has evolved through the years and currently contains two provisions (Sections 2502 and 2504) that Waterways Conservation Officers use to protect our resources from those who still bulldoze our mountains and wetlands or pollute our streams without regard to the consequences of their actions. We have jurisdiction for species ranging from the smallest flowering aquatic plants to rattlesnakes, turtles and salamanders, to the many species of fish and aquatic invertebrates that form communities in our streams, rivers and lakes.

However, we have also learned that an "ounce of

142 Mining Permits **PERMIT REVIEWS** **12 Landfill Projects**
257 US ACOE 404 Permits **13 DEP Water Allocation Permits**
69 Blasting Permits
623 DEP Stream and Wetland Encroachment Permits
2 FERC Hydropower Licenses **902 Aquatic Herbicide Permits**
2900 PNDI Reviews **680 Timber Rattlesnake Hunt Permits**
325 Triploid Grass Carp Permits **135 Scientific Collectors Permits**
50 PennDOT Projects (including 130 Stream and Wetland encroachments)

The Commission reviews several thousand permit applications for many activities to prevent or minimize damage before it occurs.

prevention is worth a pound of cure.” We invest almost \$2.8 million dollars a year in water quality and habitat protection and management programs. We review several thousand permit applications for a variety of activities in an attempt to prevent or minimize the damage before it occurs. We have agreements with the PA Department of Environmental Protection and several federal regulatory agencies like the U.S. Army Corps of Engineers to review and comment on permit applications that pose risks to the fish that live in our streams or to the anglers and boaters who use our waters for recreation. The threats to our water resources are many and varied. They include the toxic acid mine drainage that is still occasionally produced from minesites in the coalfields; sediments, nutrients and pesticides that run off our agricultural lands; and the water withdrawn from our streams that affects the amount available for other things like supporting fish or benefiting water quality.

Habitat management

In addition to the habitat protection measures that are part of our water quality protection program, we have an active habitat management program. It began in the early 1970s and involves volunteer organizations like Trout Unlimited chapters and watershed associations. Historically, we have worked on local, small-scale projects that were designed to improve trout stream habitat for adult trout. Groups that have an interest in improving habitat on their local streams often contact us. Our staff conducts a site assessment and makes recommendations that are translated into a design plan for implementation by the local project sponsor. Typical devices such as log and stone deflectors, water jacks, mud sills, channel blocks and bank cribbing are used to improve instream cover for trout, protect stream banks and minimize erosion. In 2001, 51

separate projects were completed statewide involving 199 devices.

More recently, staff has become involved in larger-scale projects using a technique called “fluvial geomorphology,” or, more simply, natural stream channel design. These projects, usually funded by Growing Greener, look at larger stream reaches at a watershed scale. Extensive measurements of the stream channel and flow are recorded on both the project stream and a reference stream so that improvements can be made that would allow the treated stream to function like the reference stream reach. Our involvement in these projects ensures that the results produce not only a stable channel for transporting stream flows and river sediments, but also good-quality trout habitat.

We also advocate removing dams on trout streams since they act as temperature and sediment sinks. The habitat upstream of the dam quickly degrades soon after the dam is built and eventually reaches equilibrium once it fills in with sediment.

These shallow pools increase water temperatures and are poor trout habitat. Our studies have shown that trout populations respond quickly and favorably to dam removal. In fact, we have data to show a 20-fold increase in brook trout numbers after a dam removal on Six Penny Creek in Berks County. Other activities in which we work in partnership with local, state and federal agencies and private landowners include stream-bank fencing projects and riparian (shoreline) buffer protection and enhancement programs.

All in all, we have two options for the future. In 1982, former colleague and Commission fisheries biologist Bob Hesser said, “Should we continue our fight for clean water and good habitat, or grow a stainless steelhead trout?” ☐