

*This article is the fifth in a series of articles on the major topics of concern in the Commission's theme, "Conserve 2000." This article focuses on why fish become threatened and endangered.*

# PA's Threatened and Endangered Fishes

by Walt Dietz

In today's world of environmental consciousness, many Americans are aware of what the words "endangered" and "threatened" mean. You may already know that an endangered species may soon become extinct or extirpated through all or a portion of its range. You might also know that a threatened species may soon become endangered. These two words conjure up thoughts of unique birds like the California condor, fuzzy mammals like the giant panda, or rare predators like the Bengal tiger. These animals are large or colorful. They get a lot of publicity and are known worldwide. It's easy for us to relate to such creatures. But there are many more threatened and endangered animals that go unnoticed by most of us.



# PA's Threatened and Endangered Fishes

These unnoticed animals aren't flashy, cute or furry. They don't live in exotic jungles or far-off mountain ranges. And you probably won't see one featured in a news magazine or television special. One hint is that they live closer to you than you might think. If your thoughts have turned to cold-blooded (ectothermic) critters like fish, then you are on the right track. A threatened or endangered fish might seem small and insignificant. But you might be surprised to learn just how important and interesting they really are. Most are important as indicators of water quality. Some were once important as a food resource or provided great sportfish recreation. Some have unique and fascinating life histories. Others are just plain neat to look at because of their colors. Certainly you will agree that they add to the biodiversity of all living creatures.

## Making the list

Of all the vertebrates in the world, fish probably rank first with the most threatened and endangered members. Nationwide, 116 fish species are listed. A fish that makes the federal list is in serious peril throughout its entire range. Our state has 43 fish listed—28 are threatened and 15 are endangered. Only one fish on the state list also appears on the federal list. It is the shortnose sturgeon. In every



case there are far more fish on these lists than mammals, birds, reptiles or amphibians. Unfortunately, it doesn't end there. That's because there is also a list of 11 candidate species. Candidate species have an uncertain future. They aren't quite troubled enough to make the threatened and endangered list. But biologists and resource agency personnel are watching them closely.

All these numbers add up to a lot of fish. This fact is especially true when you consider that threatened, endangered and candidate fish make up 34 percent of the 159 species fish that live in our state's waters. This statistic is alarming. And yet, these fish seem to get the least amount of the public's attention.

There are many reasons why a fish might become threatened or endangered. Habitat loss, habitat alteration, water pollution, overfishing, disease, predation and competition

with introduced species are all factors. The main factors are almost always related to humans. Some type of habitat loss or alteration and water pollution can be linked to just about every listed fish. To make things even worse, many of these fish have special needs or unique life cycle requirements. Most of them need very clean water and unsilted gravel bottoms to spawn in, like the darters. Some take many years to reach reproductive age, like the sturgeon. Others must migrate long distances to spawn, like the shad. Couple the human-caused maladies with the special needs of these fish and you have a sure recipe for making the list.

## Obstacles to migration

One way that humans have altered fish habitat is through dam construction. Dams are built for many reasons and they can be quite useful to us. They provide hydroelectricity, flood control and recreation. But they also have a detrimental effect on migratory fish. An example is the endangered hickory shad.



The hickory shad is an anadromous fish. It lives in the ocean, enters estuaries and then migrates into fresh water to spawn. It currently migrates up the Delaware in small numbers. It also once migrated up the Susquehanna River, but hydroelectric dams have impeded its migration since the



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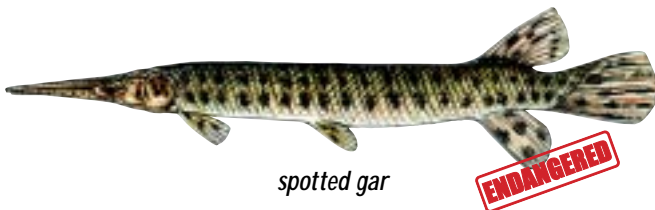
Fish lift at Safe Harbor Dam.



late 1800s. There is promise for the hickory shad in this river. It's finding its way back to spawning grounds, along with the American shad, thanks to fish lifts. This is good news for anglers because the hickory shad is a great sportfish. It's a strong fighter and can occasionally reach sizes up to 24 inches. If you catch a hickory shad, you must remember to release it immediately. It's illegal to keep or harm endangered or threatened fish.

### Deadly waters

The majority of our threatened, endangered and candidate fish occur in the western part of the state. There are several reasons for this phenomenon. One reason is that the Ohio River, Allegheny River and Lake Erie tributaries were heavily polluted in past years. Industrial discharges around cities, sewage discharges, oil spills, acid mine drainage and siltation had strong effects on fish in these rivers and streams. Some of the fish affected were the skipjack herring, bigmouth buffalo, spotted gar, warmouth and cisco. All of these fish are listed as threatened or endangered.



spotted gar

threatened or endangered status. These relict populations also include some of our most interesting and colorful fish. They include the bluebreast, longhead, Tippecanoe and spotted darters; minnows like the gravel chub; and catfish like the northern madtom.

### Taking too many

One family of fishes was once so common in our state that commercial fisheries were set up just to catch them.



lake sturgeon



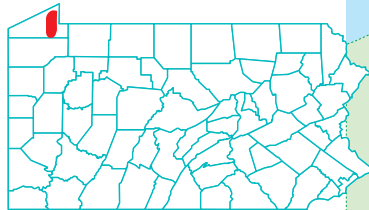
Atlantic sturgeon

The primitive Atlantic sturgeon, shortnose sturgeon and lake sturgeon were all prized for their meat and eggs (caviar). The anadromous shortnose sturgeon and Atlantic sturgeon would travel up the Delaware in large numbers to spawn. The Atlantic sturgeon would reach huge sizes of up

to 800 pounds and 14 feet long. Can you imagine hauling in a monster like that—and in fresh water to boot! The shortnose was a bit smaller, at three feet. The lake sturgeon lived in lake Erie and the western Pennsylvania rivers. The irony of these large, peaceful fish is that they feed on tiny invertebrates and small fish.

A second reason is an unusual stream flow reversal that occurred in French Creek, in northwest Pennsylvania. At one time, French Creek (Erie, Crawford and Mercer counties) flowed north into the St. Lawrence River and eventually into the Atlantic. Glacial activity caused this creek to change direction and switch its flow south to the Allegheny River, which eventually empties into the Ohio River, Mississippi River and Gulf of Mexico. This turn of events left some fish populations isolated by glaciation and its resulting melting.

Now it's easy to understand how pollution or habitat change could easily destroy one of these relict fish populations. This susceptibility is why they were given a

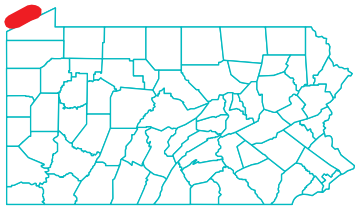




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Overfishing is what caused the demise of the sturgeon in our state's waters. Water pollution and dams (on the Allegheny) were secondary factors. The sturgeon's long reproductive cycle made it even more difficult for them to compete with human effects. It takes many years for a sturgeon to reach spawning age. Fortunately, they live long lives of up to 80 years.

The three sturgeons are currently endangered. The Atlantic sturgeon may no longer reproduce in our state waters. The shortnose population is healthy and growing.



Shortnose sturgeon can be seen migrating on the lower Delaware River. The lake sturgeon can sometimes be found in Lake Erie. It is essentially gone from the Allegheny and Ohio rivers.

## Helping hand

The Fish & Boat Commission works hard to protect threatened and endangered fish. The first step is to develop and maintain a list. The Commission has a special committee that recommends a fish's addition to or removal from this list. Decisions like these are not taken lightly and are based on sound research and studies. A cooperative study among the Commission, Penn State University and the Wildlife Resource Conservation Fund is one example. Records from fishery studies, museums, universities and other agencies were entered into a huge database. The database was then converted into a Geographic Information System (GIS). The GIS gave us new information on the range and rarity of certain fish. A few fish were removed from the list because they were more common than previously thought. Unfortunately, more fish were added because they were found to be very rare.

The Commission doesn't stop with just "listing" a fish. It also sets rules and regulations to protect these fish. It then enforces the regulations to prevent catching, killing or sell-



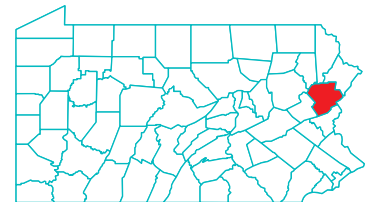
*The Commission develops and maintains lists of threatened, endangered and candidate fish species. Decisions are based on sound research and studies.*

ing protected species. There are even regulations that prevent introduction of certain exotic species that might compete with rare native fish.

Fish lists and capture regulations still might not be enough protection if there isn't a place for the fish to live. That's why the Commission plays an important role in habitat protection.

Anyone who wants to build a bridge or highway, or engage in other development must first apply for a permit from the Department of Environmental Protection (DEP) or county conservation districts. More than 1,500 permits are carefully reviewed each year. The Commission provides recommendations to DEP regarding a project's effects on endangered, threatened or candidate fishes. Permit review may be the most important part of protecting threatened and endangered fish. This process doesn't cost a lot of money. It also doesn't have to stop development from occurring. It just gives regulatory agencies the chance to work with developers on avoiding crucial habitat and minimizing effects.

A perfect example of this permit process is a highway project that would have crossed Marshall's Creek in Monroe County in several locations. It is the last known habitat in Pennsylvania for two colorful but endangered minnows, the ironcolor and bridle shiners. It was thought that the ironcolor shiner was extirpated from the state, until it was found at Marshall's Creek in 1995. You might be surprised to learn that this minnow was once common in large numbers throughout southeast Pennsylvania. Habitat alteration, water pollution, siltation and introduction of nonnative fish contributed to its demise. The permit process is what protects habitat from alteration. In this case, the highway project won't be stopped. But the effects on the two endangered fish will be minimized because the review and recommendation process led to modifications that avoid stream crossings.



## A bright future

The words "threatened" and "endangered" might seem to have a negative aura about them. Fortunately, it's not all doom and gloom for many of our troubled fish. Adding a species to the "list" is actually more positive than you might realize. It's much like being sent to the hospital when you don't feel well. It's really the first step toward recovery. It's about awareness that something is wrong. Awareness leads to education about what happened and how to make it better. Education is what causes change in our attitudes, which leads to action. Action on the part of agencies, developers and citizens is what will create a brighter future for our threatened and endangered fish. ☐