

# Saving Our Sturgeon

## *The Plight of Atlantic Sturgeon in the Delaware Bay*

What kind of fish has been around for 75 million years, grows over 15 feet long, weighs up to 800 pounds, can live to be 60 years old, lays a million eggs, and as a youngster eats bugs and worms?

And lives and breeds in the Delaware River?

It's the Atlantic sturgeon (*Acipenser oxyrinchus oxyrinchus*). As adults, they swim in the ocean close to shore between

Canada and Florida. Spawning adults migrate up rivers in the spring and lay their eggs in moving water about where saltwater and freshwater meet.

In the Delaware River they used to spawn just below Trenton. Now they spawn below Philadelphia, about 30 miles down river. (You'll learn why later.)

At one time, Atlantic sturgeon were plentiful in most coastal rivers but, because of water pollution, habitat damage, and over fishing, their numbers have decreased so much that in 1996 fishing for them was halted.

Sturgeon meat and eggs are valuable, especially the eggs which are sold as caviar for hundreds of dollar per pound.

The major fishery in the United States occurred in the Delaware River but peaked in the late 1890s and since then almost disappeared.

### **About Sturgeon in General**

There are 24 species of sturgeon, all in the Northern Hemisphere (only two occur in the Delaware, the Atlantic and the shortnose. The

most famous is probably the Beluga of Russian waters, which produces the finest caviar.

### **Atlantic Sturgeon Life History**

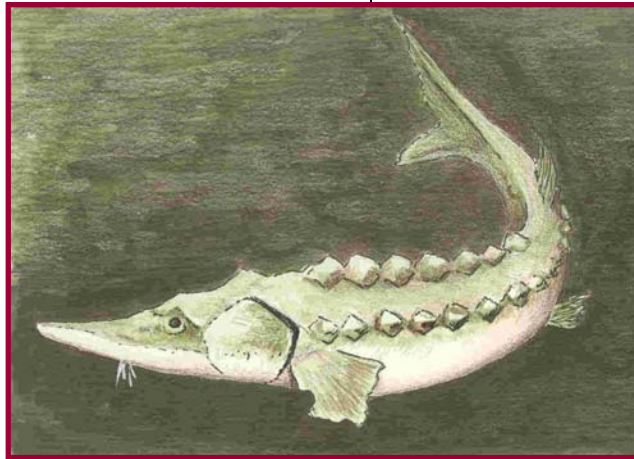
Here is a summary of the life of a Delaware River sturgeon. We'll call it Atstur. On June 23, 1970, it hatched out of a sticky egg (attached to a small rock) that was laid six days before along

the edge of the river's main channel near Camden, NJ. Its initial food source is its yolk sac; as it grows, it begins to feed on aquatic insects and worms. By the time it is about two inches long, it looks pretty much like a miniature adult.

Atstur stays in the Delaware for about two years as it grows, dropping downstream into Delaware Bay and finally out into the Atlantic. It spends most of its adult life in the ocean's

salt water, wandering both south and north along the coast as it grows. At sea, it eats worms, clams, and small fish, all caught on the bottom. Atstur is a male sturgeon and thus, at about age 14, and almost four feet long, is sexually mature and ascends the Delaware to around where it was born where it fertilizes the eggs of a mature female. The female is older and bigger and laid nearly 300,000 eggs.

Today, Atstur is seven feet long, weighs 120 pounds, and has made its trip up river for nearly 20 springs to reproduce. Among the females in the river are some nearly 50 years old, weighing as much as 500 pounds. (The record is 60 years and 800 pounds). Females grow bigger than males and live longer. Females do not spawn every year, but when they do spawn, a big female can lay up to three million eggs. Most sturgeon appear to go back to their natal rivers to spawn.



It is possible that Atsur's grand parents were alive in the Delaware River in the middle 1890s, when almost five million pounds of Atlantic sturgeon were harvested from the Delaware, 75% of the coastal catch from Maine to Florida.

## Sturgeon in Trouble

The Delaware's sturgeon population plummeted about 100 years ago; catches dropped from 2200 tons to 120 tons in three short years. It dropped even more over the next few years. It is estimated that there were 180,000 female Atlantic sturgeon in the Delaware in 1900; today it is rare to find even one of spawning size. Sturgeon are in trouble all along the U.S. coast though there seem to be fairly good numbers in Canadian waters.

The causes of the sturgeon collapse are not completely known, but several factors are suspected: loss of habitat, pollution, and over fishing.

**Loss of Habitat:** Sturgeon need to run up into rivers to spawn, but many rivers and tributaries have been dammed, blocking fish passage. In fact, the Delaware is the only river on the east coast whose main stem has not been dammed, but dams on such rivers as the Schuylkill and the Lehigh block spawning habitat. Young sturgeon often feed on shallow embayments in the Delaware. Many such habitats have been destroyed. And the Delaware is dredged for shipping from the Betsy Ross Bridge upstream to near Trenton, further stressing sturgeon populations. (A plan to dredge the Delaware deeper is under discussion; that could mean even more trouble for sturgeon.)

**Pollution:** The Delaware is dirtier than it was 300 years ago, when sturgeon (and all the other creatures) were plentiful and undisturbed. But as people settled in the watershed and industries grew from Wilmington, DE, to Easton (steel, coal, oil refining, ship building, chemicals), the waters and bottom muds of the Delaware turned lethal. For a period in the middle 1900s, levels of dissolved oxygen dropped to zero in the Philadelphia/Camden stretch of the River, fishes swimming upriver could not get past this "pollution block" (fishes need about five parts of dissolved oxygen per

million parts of water to thrive). The block deprived Atlantic sturgeon of all their breeding habitat upstream of Philadelphia; sturgeon adapted somewhat by breeding in the lower river, but their numbers have not recovered.

Two kinds of pollution are a problem, those that take oxygen out of the water and those that add materials that can be toxic to marine life. Marine animals – fishes, shellfish, and crabs – need a certain level of dissolved oxygen in water to survive. During the River's most polluted period (around 1940) levels of oxygen were so low – sometimes zero in warm months – that fishes could not swim through this low oxygen block, either up stream or down. Toxics – wastes from factories such things as producing paints, dyes, plastics, and chemicals – can poison both water and bottom sediments. Sturgeon are bottom feeders, prone to picking up and accumulating toxics when they feed.

**Overfishing:** There appears to be no argument that overfishing on sturgeon has crippled the resource, given what the numbers from the Delaware indicate: a 94% decrease in landings between 1895 and 1900. The fish suffered a population crash. In the Delaware, there are just a few sturgeon left from a population of at least 500,000 just a little more than a century ago.

## Progress

Late help for Delaware sturgeon has either arrived or is on its way. The oxygen block at Philadelphia has been eliminated by vastly improved treatment of sewage previously dumped in the river untreated. Sturgeon and other anadromous (living in both fresh and salt water) fish such as herring, shad, and striped bass can now swim 300 miles up river in the spring to spawn and their young can swim downstream in the summer and fall. This means that sturgeon may be able to reestablish their former spawning grounds around Trenton and their offspring can get down the river and into the ocean as they grow.

Some dams on tributaries of the Delaware have been breached, providing more habitat, and water quality regulations have at least slowed the addition of harmful toxics to the river.

But, the bottom sediments – the muds and silts – still contain toxics. (In fact, this project is designed includes procedures to measure the amount of certain toxics in sturgeon.) Channel dredging can be harmful. In fact, any activity which deprives sturgeon eggs of their preferred settling medium – hard clay, shell, gravel, and other hard or rough structure – is dangerous.

## **Status Today**

The Delaware contingent of Atlantic sturgeon is in trouble. There are few fish left, they have lost habitat, and it takes a long time for sturgeon to mature and reproduce (up to 20 years for females). To protect the species, the most important step taken so far has been to close the fishery for 40 years along the entire Atlantic coast. This ban went into effect in 1994. Regulations to protect and restore habitat are in place. And all along the coast, fisheries scientists have launched studies to find out how many fish are left, where they are, and how their chances of recovery can be improved. Efforts are underway to raise sturgeon in hatcheries to restock rivers (carefully, so the sturgeon' genetic differences are attended to).

## **What Can be Done?**

One important step has been taken: sturgeon fishing is banned along the Atlantic coast south of Canada. This will give the fish a chance to rebuild its population. Then, there is sturgeon habitat. That means a clean Delaware River more like what was there 100 years ago: habitat for laying eggs and for young to find food, rivers to run up, rough river bottom so the eggs can hatch. It also means reduction in bycatch, the killing of sturgeon when fishermen net other species for food and catch sturgeon accidentally.

## **Research is Needed**

One thing that almost everyone who cares about Atlantic sturgeon agrees about is that we don't have enough information about these fish. Working in cooperation with fisheries scientists in the states of New Jersey, Delaware, and Pennsylvania and the federal government, the American Littoral Society has launched a multi-

year effort to help sample Delaware Bay for Atlantic sturgeon, starting in the month of April 2007. The purpose of the project is to learn more about the numbers of this sturgeon in the Bay, to tag them to learn about their movements, get a small piece of tissue for genetic testing, and then release them to continue their normal lives.

The long-term goal is to restore sturgeon populations.

Here is a step-by-step description of the operation the Littoral Society will direct:

Each day during April of this year, veteran watermen experienced in fishing for Atlantic sturgeon in Delaware Bay will place entangling gill nets at four locations on the New Jersey side of the Bay near the mouth of the Maurice River, Salem County.

Sturgeon caught in the nets will be brought on board, weighed and measured. They will be "read" with an electronic device to see if they have within them an internal tag. They will then receive two tags, an internal tag (called a passive integrated transponder, PIT) if they do not already have one and an external tag.

A small piece of tissue will be collected from a pectoral (side) fin.

They will be released.

All data on each fish will be recorded, including such information as how the fish was caught where, and when, measurements, and tag numbers. That information will go to the central recording office of the U.S. Fish and Wildlife Service Fishery Resources Office in Annapolis, MD, to Delaware Bay and River states (NJ, DE, and PA), and to the National Marine Fisheries Service (NMFS) . All data are public information and will be of special interest to fisheries scientists studying the Atlantic sturgeon up and down the coast. The American Littoral Society will retain a copy of the data for its files.

The small tissue sample from each sturgeon will be sent to the National Oceanic and Atmospheric Administration (NOAA) Genetic Depository in Charleston, SC, where that facility will analyze

and record its genetic structure. This information will be used to determine where the sturgeon was hatched. Read more about the genetics below.

A related research project will be conducted by the NOAA Fisheries Laboratory at Sandy Hook, which will collect tissue samples for examination of potential habitat chemical contaminants. These tissue samples will not be collected from live sturgeon, only from dead sturgeon if any are found in the Delaware or on its shores during the April sampling or later into late spring independently. Concurrently, NOAA will collect sediment samples from the bottom where sturgeon are encountered.

This sturgeon project in the Delaware follows an objective of Amendment I to the Atlantic States Marine Fisheries Commission's management plan for Atlantic sturgeon to "Conduct appropriate research as needed, especially to define unit stocks of Atlantic sturgeon." Data from this project will help answer the question: Is there a genetically distinct of stock Atlantic sturgeon that that spawns in the Delaware? Beyond this, fisheries scientists will want to know how that stock is doing, where and when it is spawning, and what are the causes of its population decline and how can that decline be arrested.

### **How You Can Help**

The best way young people can help sturgeon is by becoming their champions. Learn about them, care about them, and tell others about them. E-mail copies of this article and the presentation *Saving Our Sturgeon* to others. The more people know about them, the more they will care. If you live in Cumberland, Cape May,

or Salem County, New Jersey, enter the American Littoral Society Saving Our Sturgeon poster contest. Contact [eileen@littoralsociety.org](mailto:eileen@littoralsociety.org) for information (deadline April 30<sup>th</sup>, 2007).

### **To Learn More**

Follow the progress of the Atlantic sturgeon research project in Delaware Bay at [www.littoralsociety.org](http://www.littoralsociety.org) under the programs tab. Do your own internet research by using keywords *Atlantic Sturgeon* (be sure to specify Atlantic sturgeon; remember, there are 24 species). You can enter "Atlantic Sturgeon Delaware Bay River" to be sure you get details about your bay. The Delaware Riverkeeper Network is another organization working to protect the Delaware and its marine life. Their website is [www.delawareriverkeeper.org](http://www.delawareriverkeeper.org).

This sturgeon research project is funded by the National Fish and Wildlife Foundation and conducted in cooperation with the New Jersey Division of Fish, Game, and Wildlife, the U.S. Fish and Wildlife Service, and the National Marine Fisheries Service.



***Empowering People to  
Care for the Coast***