

# Lake Sturgeon, Dinosaur of the Great Lakes

## Introduction

The lake sturgeon (*Acipenser fulvescens*) is the largest freshwater fish, is native only to North America, and is found throughout the Great Lakes. It is a native species to this region but is also found as far north as the Hudson Bay, west to the foot hills of the Rockies and south to Mississippi. Geological records indicate that the lake sturgeon we see today are virtually unchanged from fossil lake sturgeon from over 100 million years ago. Worldwide there are 29 species of sturgeon. Five sturgeon species are native to North America. Only lake sturgeon are found in the Great Lakes.

Because lake sturgeon have remained virtually unchanged for millions of years, they are unique relative to other fish species that we see today in the Great Lakes. One of the most obvious differences is that lake sturgeon have five horizontal rows of heavy, bony plates called "scutes" instead of scales on the outside of their body. When the sturgeon are young, the scutes are razor sharp and very pronounced, which provides protection from predators. Although the bony plates continue to grow with the fish as it ages, they become worn with age. Archeological records have found that native peoples of North America used sturgeon scutes for tools, such as arrow heads and piercing tools. Lake sturgeon are also unique because of their large protrusible (extendable) mouth and the sensory organs (barbels) located on the head that they use to detect food. Because they have a mouth that is positioned on the underside of the head, they are very efficient at foraging on the bottom of lakes and rivers, even in turbid, dark conditions. The four barbels (tentacle like structures) and the network of pores on the underside of the mouth enable lake sturgeon to locate prey buried deep in the mud on the bottom of lakes and rivers. Upon locating prey, a sturgeon will use its protrusible mouth like a vacuum to suck up foods. Lake sturgeon also have internal features that are unique in the world of freshwater fishes. For instance, they lack teeth, instead sturgeon are equipped with a very large muscular stomach and a large spiral shaped intestinal track. Typical food items include burrowing insect larvae, freshwater clams (including zebra mussels), snails, and fish. Foods are swallowed whole and crushed into smaller pieces in the stomach. Most digestion takes place in the spiral-shaped intestinal track.



Historic images are courtesy of Great Lakes Fishery Commission.



## The Decline of Lake Sturgeon

In the 1800s, lake sturgeon were found in all of the Great Lakes. Lake sturgeon were one of the most abundant fish species in Lakes Huron and Erie. Historical harvest data indicate that the Huron Erie Corridor was an important spawning and nursery habitat area for lake sturgeon. Information gathered at archeological sites along both the Detroit and St. Clair Rivers demonstrate that Native Americans harvested many lake sturgeon, most likely during spring spawning. When European fishermen began fishing the Great Lakes in the 1800s, their nets were full of lake sturgeon at certain times of the year. Unfortunately, lake sturgeon were then not sold and were considered to be a pest by commercial fishermen. The large fish would get tangled in gill nets and destroy the nets, then they would be removed by fishermen and stacked on to the beach to dry before being used as fuel in steam ships. Images from the late 1800's depict thousands of sturgeon piled like "cord wood". Simultaneously, sturgeon spawning habitat in smaller inland tributaries was destroyed, as the landscape was denuded of timber and sturgeon access to these spawning areas was obstructed by dams. By the late 1880's, the commercial value of lake sturgeon increased, as Europeans acquired a taste for smoked sturgeon and sturgeon caviar. By 1886, lake sturgeon harvest peaked at just over 5 million pounds for the entire Great Lakes. Today, Lake Huron supports one of the few lake sturgeon commercial fisheries in the Great Lakes Basin with approximately 11,000 pounds of sturgeon harvested annually. By the early 1900's the decline of lake sturgeon throughout the Great Lakes was obvious. Those smaller tributaries that were not destroyed from careless logging practices were now being harnessed by a growing nation for power generation and water control with dams. With the growth of the nation came pollution. First, in the form biological pollutants from raw sewage that was dumped into our lakes and rivers, then later in the form of chemical pollutants.

## Biology

The life history of lake sturgeon is also unique in many ways. Male lake sturgeon will not spawn for the first time until the age of about 15 while females will not spawn until the age of at least 20 years. When sturgeon reach sexual maturity they generally move into medium to large rivers or into the shoal areas of large lakes to spawn in the spring or early summer. They typically seek areas that provide fast, well-oxygenated water and have substrates composed of coarse rocky material. Sturgeon do not spawn every year. The amount of energy required to develop sperm and eggs means that males will spawn once every 2 to 5 years, while females generally spawn once every 4 to 7 years. In some waters, females spawn every 9 years. Older females have the capacity to produce up to 40% of their body mass in eggs. That means that a female lake sturgeon that weights 100 pounds can produce 40 pounds of eggs, which is a lot of caviar. All of these factors have put pressure on lake sturgeon populations, causing them to dwindle to 1% of their former abundance.

Lake sturgeon are anadromous, meaning that they generally spend most of their lives in open water and travel up rivers to spawn. Reproduction generally begins with the migration of both males and females to staging areas near a spawning ground. The migration takes place up to one year in advance of actual spawning. As water temperatures reach 48 - 61°F, females will leave staging areas and swim to a specific location on the spawning ground. She is typically flanked by two or more males (researchers have documented up to 8) and as she moves over her chosen site, she vibrates and deposits her eggs, while males simultaneously deposit sperm. Eggs hatch in as little as 10 days, and by the middle of the summer, sturgeon young can be 2 inches long. By age one they can reach 15 inches in length. Once they mature, sturgeon grow more slowly in length, putting more energy into weight gains. Lake sturgeon can reach enormous size in the Great Lakes, exceeding 8 feet and weighing more than 300 pounds. In the past 15 years, two fish more than 7 feet in length and 200 lb in weight have been captured in Lake Huron.

## Management

Any fish that requires up to 20 years to reach sexual maturity and reproduces only once every four years is in obvious danger of population decline and potentially extinction. Lake sturgeon have decreased in number over the past century to 1% of their former abundance. In the 19th century, over-fishing reduced lake sturgeon numbers in the Great Lakes. At the same time, forestry operations throughout the Great Lakes basin scoured the bottom of tributaries and damaged sturgeon spawning grounds. The log drives of yesteryear did considerable damage to the lake sturgeon, especially in the Upper Great Lakes. Also in the 1900's, larger rivers were dammed to power mills and manufacturing, as the human population grew in the Great Lakes basin. All of these factors destroyed lake sturgeon spawning and juvenile habitat and discharged toxic waste that contaminated remaining lake sturgeon. Remediation of Great Lakes Areas of Concern and an "ecosystem" approach to managing fish populations, has increased interest in restoring the lake sturgeon to higher levels of abundance. In 1994, the Lake Huron Technical Committee, a working group under the Great Lakes Fishery Commission, set out to gain a better understanding of lake sturgeon in this area of the Great Lakes. Initially a member from the U.S. Fish and Wildlife Service in Alpena, Michigan and one from the Ontario Ministry of Natural Resources' Lake Huron Management Unit began this enormous task. They quickly discovered that more people and other agencies needed to be involved, if efforts to restore lake sturgeon were going to be successful. Today, the technical committee is made up of representatives from the federal governments in both Canada and the U.S. in addition to state, provincial, tribal and non governmental organizations.

Several commercial fisheries on both sides of Lake Huron regularly caught lake sturgeon and have cooperated with agency fish biologists to restore lake sturgeon in lakes Huron and Erie. One family in particular, Purdy Fisheries of Point Edward, has collected and provided biological information on over 4,000 lake sturgeon since 1994. They regularly transport hundreds of juvenile and adult lake sturgeon live from their trap nets to their fish holding facility where OMNR biologists (often with help from other U.S. agency staff) tag and release hundreds of lake sturgeon into the St. Clair River. They have hosted workshops where biologists and scientists from across North America have studied lake sturgeon in great detail. Purdy Fisheries also holds live lake sturgeon for a variety of University and government research projects. To date, over 4,100 lake sturgeon have been marked by OMNR, USFWS and commercial fishermen in Lake Huron. All but about 300 of those fish were tagged and released back into the lake. Commercial fishermen around Lake Huron continue to report information on tagged lake sturgeon, releasing many of them, even though they could be legally harvested. It is obvious that they want to enhance lake sturgeon, learn more about them, and restore lake sturgeon to high abundance in Lake Huron.

Today, around all the Great Lakes, Universities and federal, state, and provincial research agencies cooperate with the commercial fishing industry to gather new information about this once mysterious species. With everyone's cooperation, this "Giant" of the Great Lakes will be saved from extinction and restored to higher abundance for all to enjoy.

