

INDICATOR: LAKE STURGEON POPULATION

Background

The lake sturgeon (*Acipenser fulvescens*) is one of 29 species worldwide (five are native to North America) and is the only native sturgeon in the Great Lakes. This species still retains many characteristics from its existence 100-200 million years ago as evidenced from the fossil record (Figure 1). Lake sturgeon is considered a species of special concern by the U.S. Fish and Wildlife Service, a threatened species in North America by the American Fisheries Society, a globally rare species by The Nature Conservancy, and a threatened species in the State of Michigan. The lake sturgeon population in Michigan



Figure 1. Lake sturgeon (*Acipenser fulvescens*)
(Photo credit: U.S. Fish and Wildlife Service).

is estimated to be about one percent of its former abundance (Tody 1974; Michigan Sea Grant 2005). The Huron-Erie corridor was, at one time, one of the most productive waters for lake sturgeon in North America.

In Lake Erie in the 1800s, sturgeon frequently caused heavy damage to fishing gear in nearshore waters. As a result, they were perceived as a nuisance and frequently killed upon capture to eradicate them (Hartman 1973). In the 1860s, lake sturgeon were destroyed in large numbers as bycatch of the gill net fishery (Regier and Hartman 1973). Years following, the value of sturgeon increased as their eggs and smoked flesh became a delicacy. In 1890, a “caviar factory” was located in Algonac, Michigan on the St. Clair River (Harkness and Dymond 1961). Populations

quickly plummeted due to overharvesting, limited reproduction, and destruction of spawning habitats. Female lake sturgeon do not reproduce until they are approximately 20 years old and even then, they only spawn once every few years. Spawning sites also disappeared due to extensive dredging to create and maintain shipping channels in the Huron-Erie corridor. For example, the construction of the Livingstone Channel greatly decreased lake sturgeon and lake whitefish spawning habitats in Canadian waters, southeast of Stony Island.

Lake sturgeon are an indicator of ecosystem health because they are very sensitive to human disturbances, such as habitat destruction and pollution, as shown by their sharp decline in the late 1800s and early 1900s. Lake sturgeon are considered a keystone species in the Detroit River ecosystem.

Status and Trends

In 1880, Lakes Huron and St. Clair produced over 1.8 million kg (four million pounds) of lake sturgeon (Hay-Chmielewski and Whelan 1997). In 1890, Lake Erie produced over 272,000 kg (600,000 pounds) of lake sturgeon in Canadian waters. During the spawning

period in June 1890, upwards of 4,000 adult lake sturgeon were caught in Lake St. Clair and the Detroit River on setlines and in pond-nets (Figure 2; Post 1890; Harkness and Dymond 1961). Today, there is no active commercial fishery for lake sturgeon in the Huron-Erie corridor; sport fishing harvest is now restricted in the St. Clair River and Lake St. Clair, and no sturgeon may be possessed by anglers from Michigan or Ontario waters of the Detroit River (Great Lakes Fishery Commission 2003; MDNR 2005; OMNR 2005).

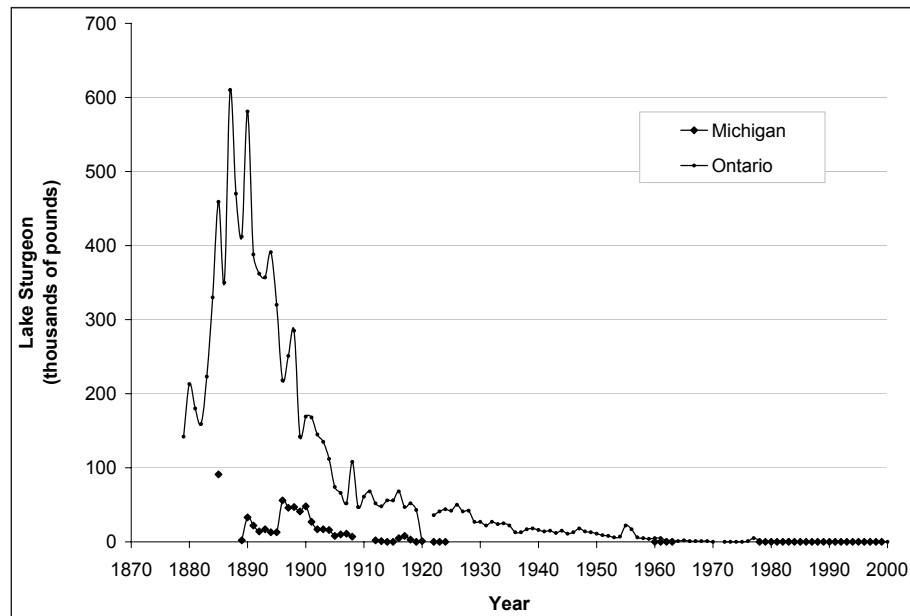


Figure 2. Lake Erie commercial fish catch in Michigan and Ontario waters, 1879-2000. The Canadian catch peaked in 1887 at 610,000 pounds, declining steeply until 1920 when commercial fishing of sturgeon was prohibited in Canadian waters. The Michigan catch was consistently lower than Canada's and its commercial fishery was closed in 1929 (data from U.S. Fisheries Commission Report - Fishing industry of the Great Lakes, Appendix 11 to the 1926 report by W. Koelz and in Baldwin et al. 2002). Note: One pound = 0.45 kg.

From the 1970s to 1999, no lake sturgeon spawning was reported in the Detroit River. In 2001, however, lake sturgeon spawning was documented on a cinder pile near Zug Island in the Detroit River for the first time in over 20 years (Caswell et al. 2004).

In response to the discovery of sturgeon spawning, scientists conducted research to determine the extent of the sturgeon population in the Detroit River, including possible spawning locations and success rates. From 2000 to 2002, they fished with setlines for 741 days total while the river was ice free and only caught 85 lake sturgeon. If this same experiment had been conducted in the late 1800s, over 1,000 lake sturgeon would likely have been captured. Relative to historical catch rates, the catch per unit of effort during 2000-2002 was low (Figure 3).

Management Next Steps

Restoration of lake sturgeon in Michigan waters is the primary goal of a lake sturgeon rehabilitation strategy developed by Hay-Chmielewski and Whelan with the Michigan Department of Natural Resources (1997). In that strategy, sub-goal one recommends “for

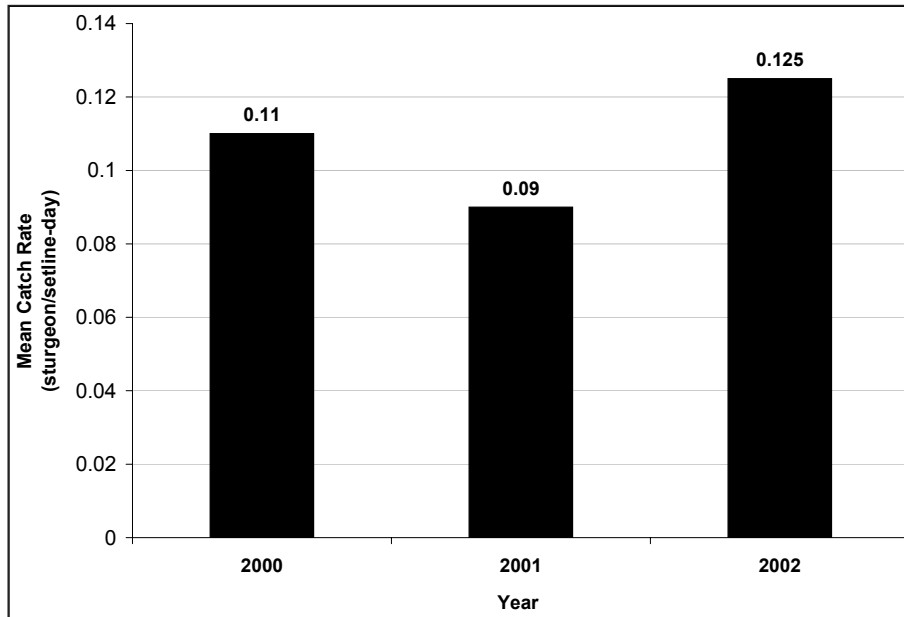


Figure 3. Lake sturgeon mean catch rate (sturgeon/setline-day) on the Detroit River in U.S. and Canadian waters, 2000-2002 (data collected in 2000 and 2001 by Nathan Caswell with Central Michigan University (Caswell 2003), in 2002 by James Boase with the U.S. Fish and Wildlife Service).

existing populations [of lake sturgeon] that have less than 100 adult breeding fish, raise populations to that level within 20 years to maintain genetic integrity...” and “...if a population (population is used referencing its true definition—a collection of organisms of a particular species living in a given geographic area) has 500 or more breeding adults, a harvestable fishery may be considered.” For a basin of the Great Lakes, the age structure of a restored lake sturgeon population would include a gradient of year-classes with ten to fifteen percent of those being mature fish and three percent of those being 40 years or older (Holey et al. 2000). Recommended actions include:

- enforcing conservative sturgeon harvest regulations throughout the Huron-Erie corridor;
- enhancing and protecting sturgeon habitat in the Detroit River (sturgeon habitat has been constructed off Belle Isle in Detroit, McKee Park in Windsor, and Fort Malden in Amherstburg);
- controlling pollution from combined sewer overflows and other sources within the watershed;
- undertaking regular sturgeon population assessments, including the use of telemetry to decipher spawning sites; and
- establishing a Sturgeon Guarding Program with active, progressive public involvement.

Achievement of the above goals, in conformance with the Convention on International Trade in Endangered Species of Wild Fauna and Flora (Raymakers and Hoover 2002), could in theory create a healthy, self-sustaining and harvestable lake sturgeon population in the Detroit River. Options for management of lake sturgeon populations in Ontario waters, including closed fishing seasons where sturgeon are rare or only a remnant population exist, are being considered by Ontario biologists (OMNR 2004).

Research/Monitoring Needs

Research and assessment to restore lake sturgeon at newly created spawning habitats in the Detroit River should continue. Such studies could address whether a discrete population of lake sturgeon inhabits the Detroit River. The need for the construction of additional spawning reefs could be determined by assessing whether lake sturgeon numbers in the Detroit River exceed the population size needed to sustain the lake sturgeon reproduction in this river. Additional monitoring is warranted using egg-mats and telemetry to verify spawning activity at suspected spawning sites near Fighting, Grassy, Sugar, and Zug Islands, as well as in the Amherstburg Channel.

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Links for More Information

U.S. Environmental Protection Agency. Spawning by Lake Sturgeon in the Detroit River: <http://www.epa.gov/ecopage/aquatic/lkstrugeon/index.html>

Evaluation of Lake Sturgeon in the Detroit River as Reported by Sport Anglers, 1999: <http://www.fws.gov/midwest/alpena/rpt-detriv98.html>

USGS Great Lakes Science Center. Lake sturgeon, dinosaur of the Great Lakes: http://www.glsc.usgs.gov/main.php?content=research_sturgeon&title=Fish%20at%20Risk0&menu=research_risk_fish

Great Lakes lake sturgeon website: <http://www.fws.gov/midwest/sturgeon/michigan.htm>

Great Lakes lake sturgeon rehabilitation, 2005: <http://www.fws.gov/midwest/sturgeon/documents/CoopConservation-LAS1.pdf>

Development of a management plan for lake sturgeon within the Great Lakes basin based on population genetics structure, 2004: <http://www.fws.gov/midwest/sturgeon/documents/GLFTfinal-LASgeneticMgmt.pdf>

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