

Species Status Assessment

Class: Osteichthyes (bony fishes)
Family: Percidae (perch)
Scientific Name: *Sander canadensis*
Common Name: Sauger

Species synopsis:

Sauger are North American members of the true perch family, Percidae, and closely resemble walleye in both appearance and function. They typically occur in large turbid rivers and lakes and their highly migratory nature reflects their dependence on the diversity of physical habitats that are present in these systems. Their historical range included the St. Lawrence River, Great Lakes, Hudson Bay, and Mississippi River basins from Quebec to Alberta and southward to northern Louisiana. Sauger are common and considered a popular sportfish in portions of their range, but have been declining or disappearing from the Great Lakes and the periphery of their range. In New York, sauger were known to inhabit the Lake Erie, Lake Ontario, St. Lawrence River and Lake Champlain drainage basins, but the Great Lakes/St. Lawrence watershed populations are now extirpated. Lake Champlain may have the last known viable population in New York, but recent records of their occurrence there are scarce.

I. Status

a. Current and Legal Protected Status

- i. **Federal** Not Listed **Candidate:** No
ii. **New York** SGCN

b. Natural Heritage Program Rank

- i. **Global** G5
ii. **New York** S1 **Tracked by NYNHP** No

Other Rank:

Status Discussion:

Sauger is globally ranked as Secure due to a large number of locations and subpopulations, but its New York state rank is Critically Imperiled because the species has declined or become extirpated from most of its historical range within the state (NatureServe 2012).

III. Abundance and Distribution Trends

a. North America

i. Abundance

declining increasing stable unknown

ii. Distribution:

declining increasing stable unknown

Time frame considered: Based on global rank (NatureServe 2012)

b. Regional

i. Abundance

declining increasing stable unknown

ii. Distribution:

declining increasing stable unknown

Regional Unit Considered: Region 5 - Northeast

Time Frame Considered: _____

Adjacent States and Provinces

CONNECTICUT Not Present X No data _____
MASSACHUSETTS Not Present X No data _____
NEW JERSEY Not Present X No data _____

ONTARIO Not Present _____ No data _____

i. Abundance

____ declining ____ increasing ____ stable ____ unknown

ii. Distribution:

____ declining ____ increasing ____ stable ____ unknown

Time frame considered: _____

Listing Status: Not Listed

PENNSYLVANIA Not Present _____ No data _____

i. Abundance

____ declining ____ increasing ____ stable ____ unknown

ii. Distribution:

____ declining ____ increasing ____ stable ____ unknown

Time frame considered: _____

Listing Status: Not Listed SGCN? No

d. NEW YORK

No data _____

i. Abundance

declining increasing stable unknown

ii. Distribution:

declining increasing stable unknown

Time frame considered: Past 30 years

Monitoring in New York.

Monitoring programs are carried out by the NYSDEC Rare Fish Unit, 1998-2012.

Annual NYSDEC/USFWS electrofishing collections of broodstock walleye in South Bay, Lake Champlain.

NYSDEC Region 5 electrofishing and trapnetting surveys in South Bay, Lake Champlain, spring 2011.

NYSDEC Region 5 electrofishing survey in Great Chazy River, 2012.

Annual NYSDEC warmwater gillnetting surveys in Lake Erie and Lake Ontario.

NYSDEC Region 9 Allegheny River watershed fish community surveys, 2012-13.

Trends Discussion:

Sauger are widely distributed across eastern and central North America and their historical range included the St. Lawrence River, Great Lakes, Hudson Bay, and Mississippi River basins from Quebec to Alberta and south to northern Louisiana. It was introduced to several Gulf and Atlantic coast drainages. However, the once thriving Lake Erie population is now considered “regionally extinct” and sauger are declining in abundance or disappearing from other portions of their range, especially at the periphery. Despite this, populations do still exist in the lower Saint Lawrence River drainage and in Lake Winnebago in the upper Great Lakes drainage.

In New York, this species has declined or been extirpated in the Erie, Ontario, Oswego and St. Lawrence watersheds, but there was a surprising catch of one by an angler in the lower Niagara River in 1990. The population in South Bay of Lake Champlain was studied in the 1960s, and in 1983 and 1984. After a sauger was caught in the southern part of Lake Champlain in 2010, NYSDEC began a monitoring program to help track its occurrence.

The distribution of this species among sub-basins within each watershed (HUC 10) has declined substantially, with records from 13 of the units prior to 1977 and from only 2 units since 1976. Statewide, the number of records for this species in the last 30 years has been 3, compared to only 31 reports prior to 1977. It appears to be nearly eliminated from NY and a draft recovery plan has been developed (Loukmas 2011).

The most proximal sauger populations to New York are those in the Ottawa River, Ontario, Lake Saint Pierre - Saint Lawrence River and Richelieu River, Quebec, and the Allegheny River, Pennsylvania. There is recent evidence to suggest that sauger may be moving from the Richelieu River to northern Lake Champlain through the Vianney-Legendre fishway at the St. Ours Dam (Thiem et al. 2012). This fishway was constructed in 2001 and sauger have been documented in small numbers moving upriver through the fishway every year from late May to late June. In the Allegheny River, sauger are common in the 60 mile stretch of river above Pittsburgh (to Lock and Dam 9) and are found as far north as Warren, PA. The lowhead dam at the mouth of Conewango Creek at Warren was removed in 2009, providing sauger access to the New York portion of the watershed.

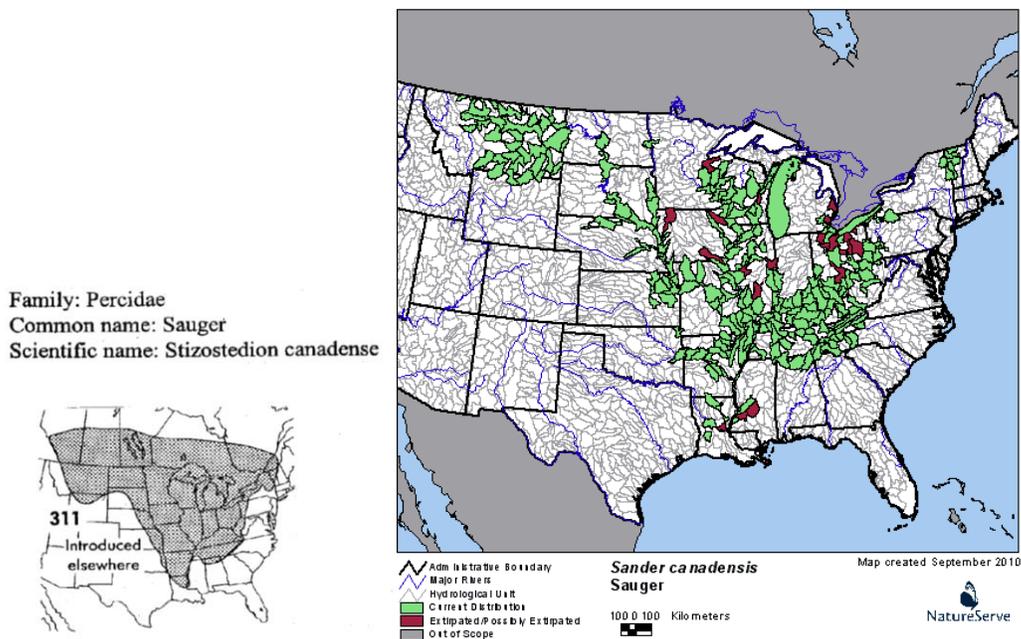


Figure 1. National range map of sauger and U.S. distribution by watershed (Page and Burr 1991, NatureServe 2012).

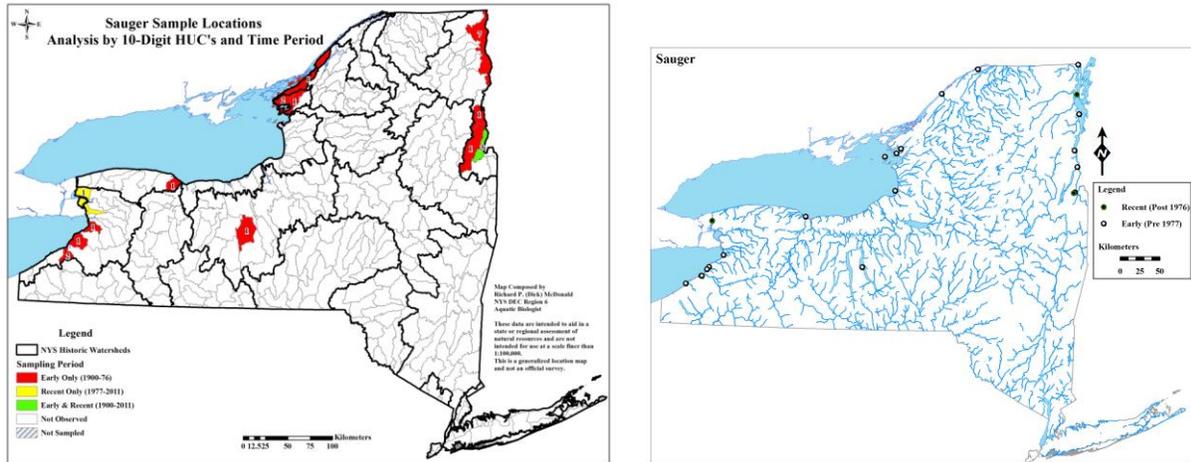


Figure 2. Sauger distribution in New York, depicting fish sampled before 1977 and from 1977 to current time, showing the corresponding HUC-10 units where they were found along with the number of records.

Watershed name	Total # HUC10	Early only	Recent only	both	Watershed status
Champlain	4	3	0	1	
Erie-Niagara	4	3	1	0	loss
Ontario	3	3	0	0	loss
Oswego	1	1	0	0	loss
St. Law	1	1	0	0	loss
sum	13	11	1	1	

Table 1. Records of rare fish species in hydrological units (HUC-10) are shown according to their watersheds in early and recent time periods (before and after 1977) to consider loss and gains. Further explanations of details are found in Carlson (2012).

IV. New York Rarity, if known:

Historic	<u># of Animals</u>	<u># of Locations</u>	<u>% of State</u>
prior to 1977	_____	<u>31 records</u>	<u>5/18 watersheds</u>
prior to 1980	_____	_____	_____
prior to 1990	_____	_____	_____

Details of historic occurrence:

Sauger were commonly caught in Lake Erie and peaked in the commercial landings around 1916. However, it decreased gradually to very low levels by 1956. It appears to be extirpated in Lake Ontario, but was reported as abundant in the mid-1800s in Burlington Bay (Ontario). The Allegheny

River had sauger as far upstream as Warren, PA, but there are no reports for an extension the 30 mi farther north to NY (Fowler 1909, 1919). Another early record of interest is from Cayuga Lake (Meek 1884) and possibly associated with Seneca River (Greeley 1928).

Current	<u># of Animals</u>	<u># of Locations</u>	<u>% of State</u>
(since 1977)	_____	<u>3 records</u>	<u>1/18 watersheds</u>

Details of current occurrence:

Sauger has become extirpated in New York’s watersheds of the Erie-Niagara, Ontario, Oswego and St. Lawrence River and still may occur at very low levels in Lake Champlain. Some of the recent catches were reported by Anderson (1978), Aquatec (1988), Nettles et al. (2005) and E. Zollweg of DEC (2010).

New York's Contribution to Species North American Range:

% of NA Range in New York	Classification of New York Range
<input type="checkbox"/> 100 (endemic)	<input type="checkbox"/> Core
<input type="checkbox"/> 76-99	<input checked="" type="checkbox"/> Peripheral
<input type="checkbox"/> 51-75	<input type="checkbox"/> Disjunct
<input type="checkbox"/> 26-50	Distance to core population:
<input checked="" type="checkbox"/> 1-25	_____

IV. Primary Habitat or Community Type:

1. Large/Great River, Low-Moderate Gradient, Assume Moderately Buffered, Transition Cool
2. Summer-stratified Monomictic Lake

Habitat or Community Type Trend in New York:

Declining Stable Increasing Unknown

Time frame of decline/increase: _____

Habitat Specialist? Yes No

Indicator Species? Yes No

Habitat Discussion:

Sauger typically occur in large turbid rivers and lakes (Becker 1983). The highly migratory nature of sauger reflects their dependence on unimpeded access to the wide diversity of physical habitats that are present in large river and lake systems. Physiological adaptations, such as a highly advanced light-gathering retina, allow sauger to thrive in low light environments, and thus turbidity is considered a key component of suitable habitat (Crance 1987). Other important riverine habitat features include low channel slope and deep, low-velocity pools (Crance 1987, Hesse 1994). Diverse, natural river channels are preferred over relatively simple, uniform channelized segments (Hesse 1994). River impoundments and lakes can be seasonally important as overwintering and

pre- and post spawning habitats (Nelson 1968, Pitlo 1992). In large lakes and reservoirs, sauger may depend on lentic habitats year-round, only using tributaries during spawning (Ickes et al. 1999). It prefers sand and gravel runs, sandy and muddy pools and backwaters. In rivers, it spawns in deep rocky runs, while in lakes it spawns along sandy and rocky shores and over rocky reefs at depths of 0.6-3.6 m. (NatureServe 2012). Spawning areas in the Great Lakes were inventoried by Goodyear et al. (1982).

V. New York Species Demographics and Life History

- Breeder in New York**
 - Summer Resident**
 - Winter Resident**
 - Anadromous**
- Non-breeder in New York**
 - Summer Resident**
 - Winter Resident**
 - Catadromous**
- Migratory only**
- Unknown**

Species Demographics and Life History Discussion:

This species has an intermediate length life span. In the north, males sexually mature in 2-3 years and females mature in 4-6 years (Scott and Crossman 1973). During late winter adult sauger begin to migrate to spawning locations. Spawning commences when water temperatures reach about 43 - 55 F; spawning can last for 2 weeks or more (Nelson 1968, Pitlo 1992, Etnier and Starnes 1993). Females deposit 9,000 to 200,000 eggs, depending on size of fish, and leave the area soon after spawning (Etnier and Starnes 1993, Rohde et al. 1994, Ross 2001). No parental care is provided and eggs hatch in 1 to 4 weeks, depending on water temperature; the higher the water temperature, the sooner the eggs will hatch (Nelson 1968, Smith 2002, Pitlo et al. 2004). Young sauger grow rapidly, attaining half their maximum adult size in two years. Growth is positively related to water temperature and is typically faster in reservoirs than in rivers. Southern sauger grow faster than those in the north, but northern sauger tend to live longer and can attain the same ultimate size as their southern counterparts (Scott and Crossman 1998, Boshung and Mayden 2004). The average lifespan of sauger is about 7 years old, but this varies by location (Preigel 1969). Sauger are the most migratory percid in North America and have been found to move great distances in large river systems (Collette et al. 1977, Pegg et al. 1997, Jaeger et al. 2005). These long migrations are most often linked to the need to find suitable spawning habitats and the return trip to non-spawning "home" locations (Mammoliti 2007).

VI. Threats:

The sauger is perhaps New York's most imperiled fish species. There is only one known location where it currently exists, and the status of that population is unknown; because of the scarcity of records over the last 15 years it is at risk of extirpation. The reasons for the decline of sauger in Lake Champlain are unknown, therefore threats specific to this population cannot be assessed at this time.

In general, sauger are highly migratory, spawn in few specialized areas, and rely on a diverse mix of habitats with high turbidities, flowing waters, and natural temperatures throughout their lifespan. They have evolved to benefit from the continuity and complexity of large river and lake systems (Mammoliti 2007). These characteristics make sauger highly sensitive to habitat fragmentation and alterations. Migration barriers, operation of impoundments, low water flows, and channelization have all been implicated as causes of sauger population declines (Regier et al. 1969, Hesse 1994, Pegg et al. 1997, McMahon and Gardner 2001, Jaeger et al. 2005).

The elimination of this species in western Lake Erie is recognized as resulting from pollution and siltation near spawning bars, contaminants, changes (more clarity) in lake turbidity and introgressive hybridization with walleye (Leach and Nepszy 1976, Ryan et al. 2003). Overharvest may have contributed to its demise since the species exhibits slow growth and late maturity. Also, the development of a salmonid fishery may have increased the abundance of predators to a number sufficient to reduce walleye, sauger and smelt.

Are there regulatory mechanisms that protect the species or its habitat in New York?

No Unknown

Yes

Sportfishing regulations set to restrict take under the authority of the NYS Fish and Wildlife Law (Article 11) and detailed in NYCRR Title 6.

Describe knowledge of management/conservation actions that are needed for recovery/conservation, or to eliminate, minimize, or compensate for the identified threats:

The sauger is still considered a sportfish in New York and in 2008 a harvest regulation change for Lake Champlain was made (3 sauger or walleye [combined]/day at a minimum of 18 inches), in part, to limit the harvest of sauger while maintaining the ability to harvest larger walleye. Statewide, the sauger fishing regulation is all year, any size, any number. Sauger are not thought to occur in any other waters of New York State, but recent anecdotal angler reports from the lower Niagara River, the potential introduction into the Allegheny watershed, and Ohio DNR's plans to restore the western basin Lake Erie population suggest that a more restrictive statewide regulation should be put in place to protect sauger in areas other than Lake Champlain.

A sauger recovery plan is being developed (Loukmas 2011). Current draft plan objectives include: (1) restoring a self-sustaining sauger population in Lake Champlain; (2) establishing a self-sustaining sauger population in the upper Allegheny River watershed (NY); and (3) determining the suitability of Lake Erie's eastern basin watershed for sauger restoration. Management actions vary by objective, but include a combination of fish population/community surveys, habitat assessments, stocking feasibility assessments, establishment of stocking programs, and development of outreach/educational materials.

Conservation actions following IUCN taxonomy are categorized in the table below.

Conservation Actions	
Action Category	Action
Land/Water Protection	Resource/Habitat Protection
Land/Water Management	Habitat/Natural Process Restoration
Land/Water Management	Invasive/Problematic Species Control
Species Management	Species Reintroduction
Law/Policy	Policy/Regulation Change/Implementation
External Capacity Building	Alliance & Partnership Development

The Comprehensive Wildlife Conservation Strategy (NYSDEC 2005) includes recommendations for the following actions for the sauger.

Fact Sheet:

---- Develop fact sheet on sauger.

Habitat Monitoring:

---- Monitor habitat for changes in turbidity.

Habitat Research:

---- Research habitat requirements for sauger in New York.

Life History Research:

---- Research biology of sauger as it relates to hybridization with walleye.

Population Monitoring:

---- Monitor for presence in Lake Champlain watershed to determine whether or not species is decline in this watershed.

---- Monitor existing sauger populations in Lake Champlain and the Poultney River.

Sauger are a popular sportfish in much of their range and were an historically important commercial species in the Great Lakes. Because of this, sauger have been relatively well-studied, with approximately 500 articles and reports in publication (Mammoliti 2007). Information is

generally available on their occurrence, distribution, habitat, demographics, and life history, but little is known specifically about New York's historic and current sauger populations. Only the Lake Champlain population still presumably exists, but the reasons for the decline of this population, and hence the most significant threats, are unknown.

VII. References

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