

2015 St. Lawrence River Fisheries Update

Background - The international portion of the St. Lawrence River (hereafter “system”) is managed cooperatively by the New York State Department of Environmental Conservation (DEC) and the Ontario Ministry of Natural Resources and Forestry (OMNRF) under the Great Lakes Fishery Commission’s (GLFC) *Joint Strategic Plan for the Management of Great Lakes Fisheries* (Plan). The Plan calls for the development of fish community objectives (FCOs) for each of the Great Lakes and their connecting channels. FCOs define the desired structure of the fish community and fisheries in a given water, and are developed in consultation with stakeholders. FCOs also provide a foundation for discussions with management agencies, interest groups and the general public for developing more specific fisheries, habitat, and watershed management plans. St. Lawrence River FCOs were first drafted in 1999 (see <http://www.dec.ny.gov/outdoor/102945.html>), and while fish species status reports are outdated, this document provides useful background information on the river’s historical fish community and physical habitat alterations.

The fish community inhabiting the international portion of the St. Lawrence River (see <http://www.dec.ny.gov/outdoor/102945.html>) is very diverse, including over 80 species. While a number of non-native species were intentionally or unintentionally introduced, the fish community is comprised primarily of native species sustained through natural reproduction. Habitat protection and enhancement, regulation of fisheries, and fish stocking are the primary management options available to DEC and OMNRF for managing the fish community, and the results of these actions are often imprecise. It must be recognized that fish stocking, if undertaken, will be for the purpose of rehabilitating spawning stocks of native species and/or expanding their range into new habitats. Fish will not be stocked to supplement abundance of wild, native fish where a sufficient spawning stock exists. Other than a small-scale lake sturgeon restoration program in New York, the DEC and OMNRF do not stock fish in the system.

This document provides a status update since 1999 on a number of fish species, fish habitat improvements, and aquatic invasive species introductions. Unless noted otherwise, information on fish species status is provided through annual, standardized “index” netting programs conducted by DEC and OMNRF in the Thousand Islands, and by DEC in Lake St. Lawrence. Index nets do not effectively track abundance of some fish species, and may be less effective for the same species in a different habitat type. In addition to index netting projects, the State University of New York College of Environmental Science and Forestry (ESF), under contract with DEC, conducts comprehensive studies on muskellunge, northern pike, and wetland habitats in the Thousand Islands region. Reporting on these activities can be found in the “Lake Ontario and St. Lawrence River Fisheries Reports” link at the above referenced web site.

Aquatic Invasive Species Established Since 1999 – It is important to note that the following is not likely comprehensive, as aquatic invasive species are typically in a system for a number of years prior to their detection. The most notable new “invader” to the system is the round goby (*Neogobius melanostomus*), a prolific bottom-dwelling fish likely introduced from ship ballast water. Round goby were first observed in index nets in this system in 2007, and is now abundant throughout. Round goby are known to eat fish eggs and fry, however, it is unknown if this behavior has significantly impacted native fishes in the system. Round goby have become an important food item for a variety of predators, including smallmouth bass, yellow perch, and Double-crested cormorants. Body growth rates of

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smallmouth bass and yellow perch have increased markedly, likely due to this new food source; however, the population trends of these species have varied (see below).

The *bloody red shrimp* (*Hemimysis animola*) is a small amphipod (freshwater shrimp) first documented in the system in 2008. Its' impacts on the St. Lawrence River ecosystem are unknown.

Viral Hemorrhagic Septicemia Virus (VHSV) was first documented in the New York waters of Lake Ontario and the St. Lawrence River in 2006. Substantial freshwater drum and round goby mortality was documented, as well as numbers of dead muskellunge, smallmouth bass, and a moribund burbot. VHSV has also been identified in surveillance testing of healthy fish, including rock bass, bluegill, brown bullhead, emerald shiners and bluntnose minnows.

Eurasian watermilfoil (*Myriophyllum spicatum*) has become established in Goose Bay (Town of Alexandria), and experimental control efforts are underway there. Small amounts of water chestnut (*Eleocharis dulcis*) have been identified at two locations in the Thousand Islands, and eradication efforts were undertaken at those sites.

Fisheries Updates – Thousand Islands

The following information on a select number of fish species is excerpted from annual reports prepared by DEC, OMNRF, and ESF (see “Lake Ontario Fisheries Unit Reports” at <http://www.dec.ny.gov/outdoor/7969.html>, and OMNRF reports at http://www.glf.org/lakecom/loc/mgmt_unit/).

Smallmouth bass - Smallmouth bass are the most sought-after sport fish in the Thousand Islands fishery. Abundance of smallmouth bass was relatively high in the late 1970's, declined through 1982, then increased to its highest recorded level in 1988. After 1988 bass abundance generally declined and was low from 1996 through 2004 (Figure 1). The 2005 catch increased and has varied at relatively high levels since. Catch in 2012 reached its highest level since 1988.

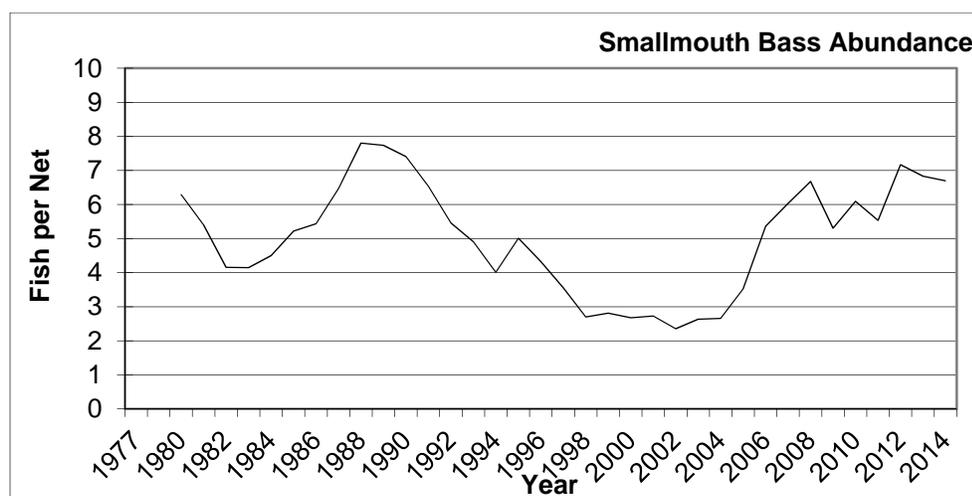


Figure 1. Smallmouth bass abundance index in the Thousand Islands area of the St. Lawrence River.

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Northern Pike. Northern Pike are an important part of the sportfishery. Their abundance peaked in 1981, generally declined through 2005 and has varied without trend since (Figure 2). Evidence suggests that spawning habitat changes resulting from water level management may be impairing pike reproduction. Cormorant predation on young fish has also been implicated as a factor interfering with pike recruitment.

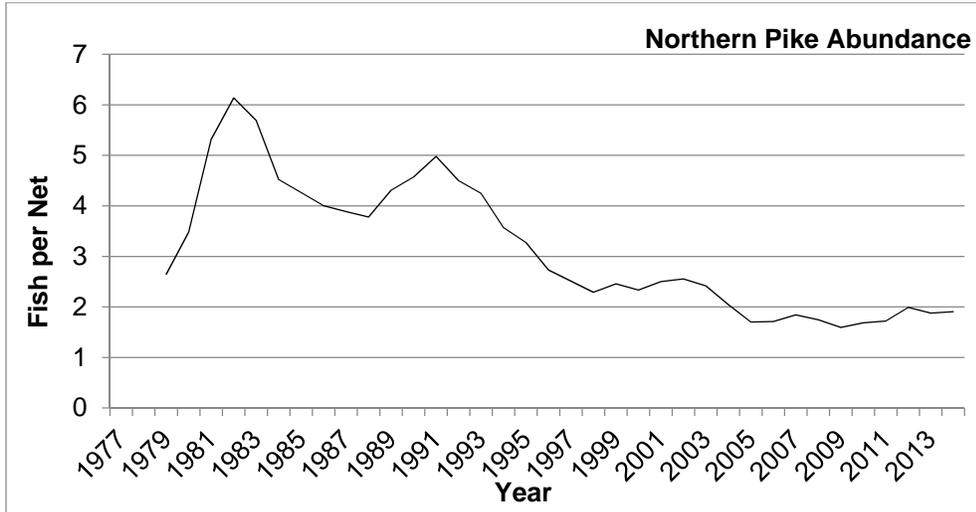


Figure 2. Northern Pike abundance index in the Thousand Islands area of the St. Lawrence River.

Walleye. Walleye abundance was very low prior to 1982, and they were caught regularly in low numbers throughout the 1980s and 1990s (Figure 3). Abundance increased in the early 2000s and, while still relatively uncommon, walleye catches have been substantially more abundant over the last decade.

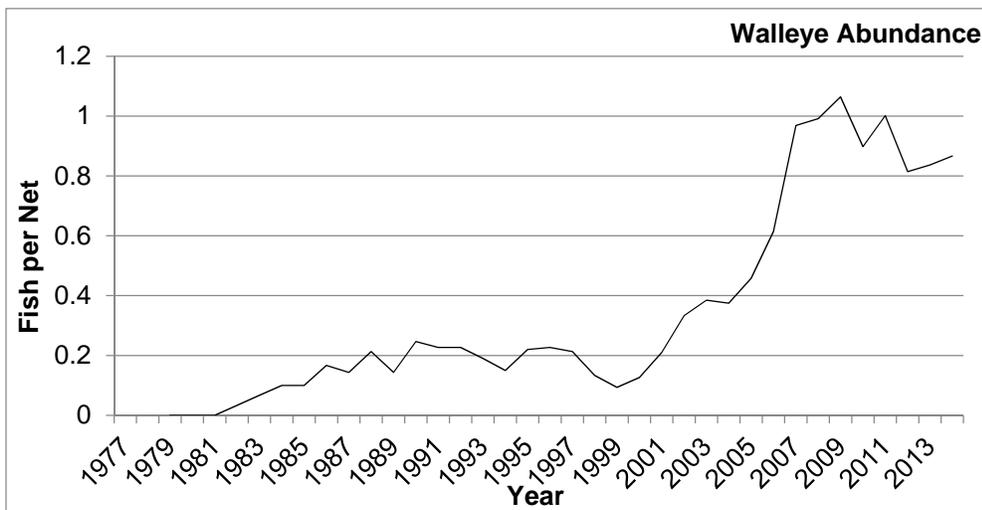


Figure 3. Walleye abundance index in the Thousand Islands area of the St. Lawrence River.

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Muskellunge – Muskellunge are rarely encountered in standard index net surveys, so information on adult abundance is limited to trapnet catches during the spawning season (Figure 4) and angler catch rates (i.e. the number of muskellunge caught per hour of angling; Figure 5). Both data series suggest a decline in adult muskellunge abundance, possibly related to VHSV, which was implicated in the deaths of numerous large adult muskellunge during 2005 and 2006.

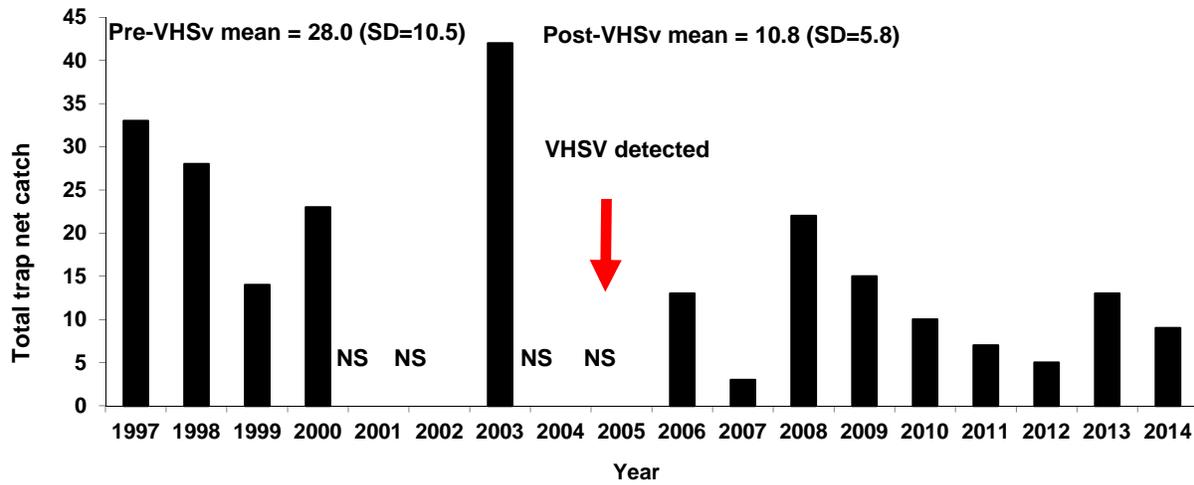


Figure 4. Total catch of muskellunge during spring trapnet sampling during 1997- 2014. Number of trap net sites and effort are approximately equal over the series. Netting was not conducted in 2001-02 and 2004-05 (no sampling=NS).

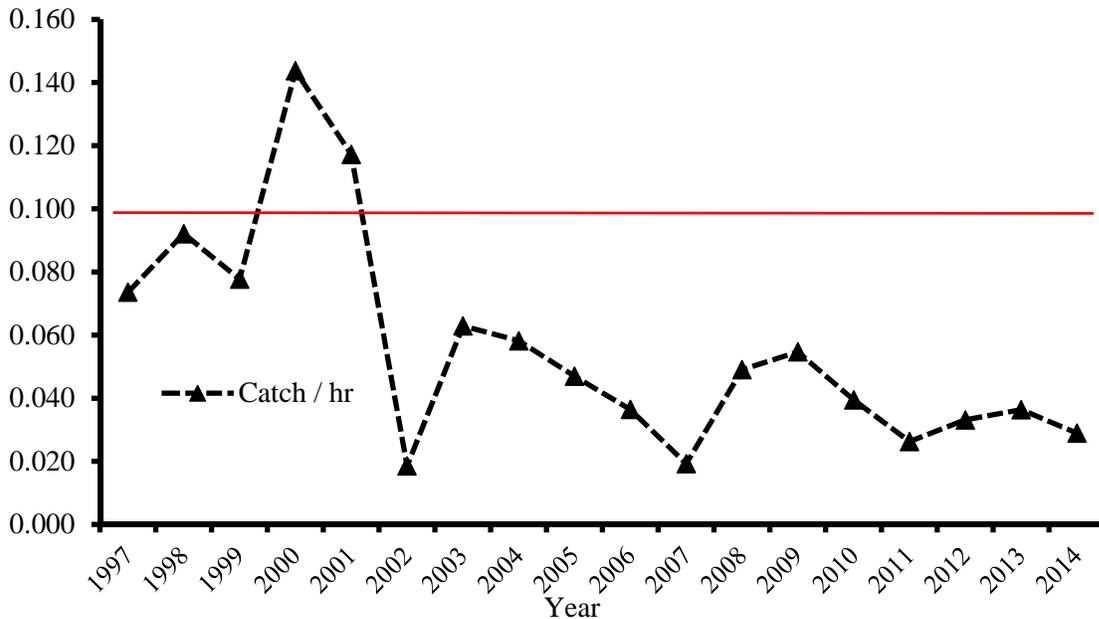


Figure 5. Muskellunge catch per angler hour in the Thousand Islands area. Red line denotes the management target goal of 0.1 fish per angler hour.

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In addition, abundance of young-of-the-year muskellunge (i.e. during their first summer of life) has been monitored in seine net hauls since 1996 (Figure 6). Abundance declined sharply in 2007, and has remained relatively low since. This decline could be linked to a reduction in the number of adult muskellunge, changes in spawning/nursery habitat structure and function, or a combination of factors.

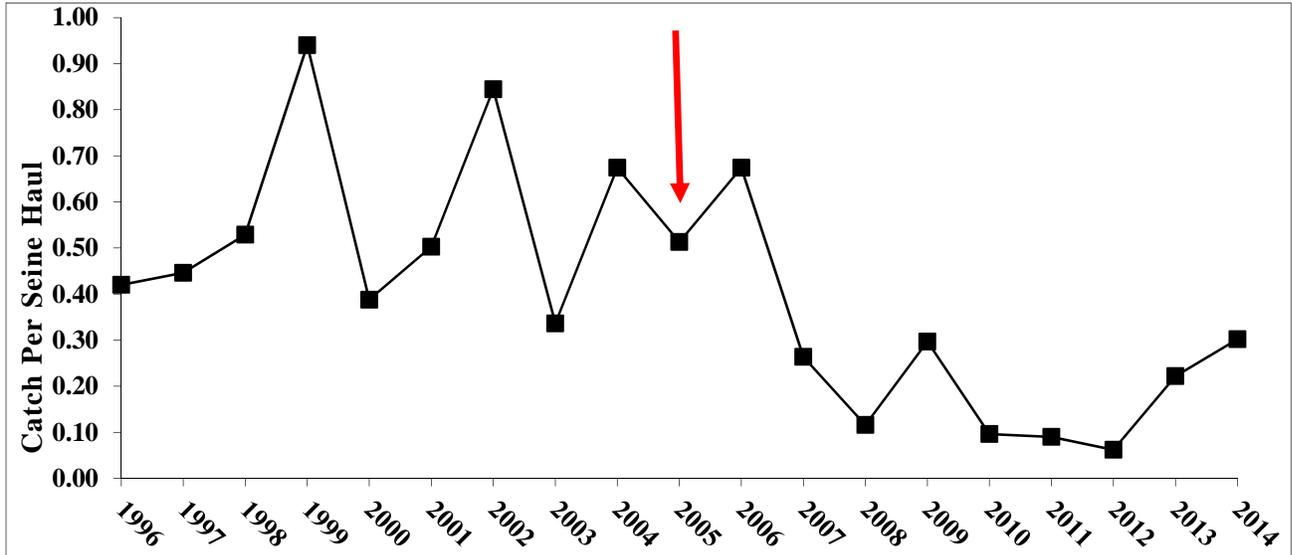


Figure 6. Catch of young-of-the-year muskellunge in standardized seine hauls in Thousand Islands area nursery sites from 1996 to 2014. The arrow indicates the year of VHSV detection (2005) and widespread mortality of adult muskellunge in the upper River.

Yellow Perch. Yellow perch abundance peaked in the late 1970's then generally declined through 1992, possibly linked to larval predation by a relatively large alewife population during that period (Figure 7). Following a population increase that persisted through 1999, yellow perch catch generally declined, falling to its lowest recorded level in 2014. The cause(s) of this recent decline are unknown.

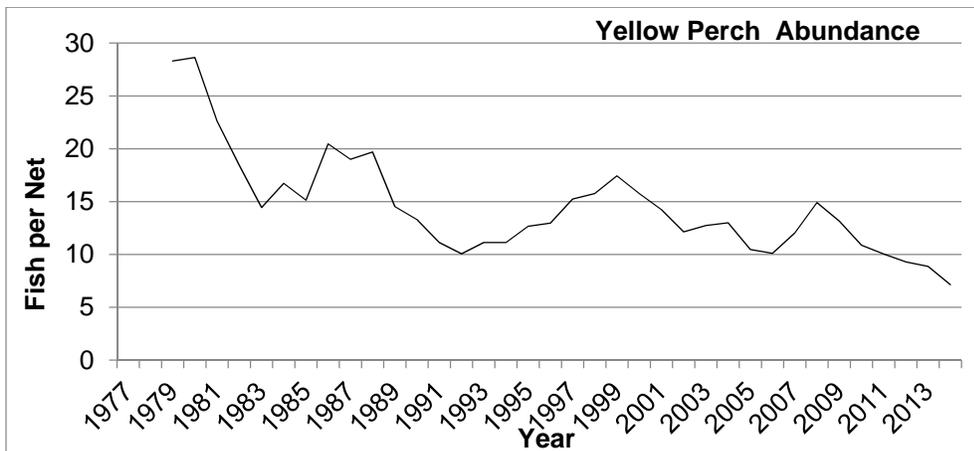


Figure 7. Yellow Perch abundance in the Thousand Islands area of the St. Lawrence River.

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Sunfishes. Pumpkinseed sunfish and rock bass have historically been the most common sunfishes in Thousand Island index netting and tended to vary inversely. From 1977 through 1999 abundance of pumpkinseed and rock bass varied at somewhat comparable levels (Figure 8). Since 2000, however, rock bass have generally increased while pumpkinseed have decreased in abundance. In 2014 rock bass were an order of magnitude more abundant than pumpkinseed, which were at record low abundance.

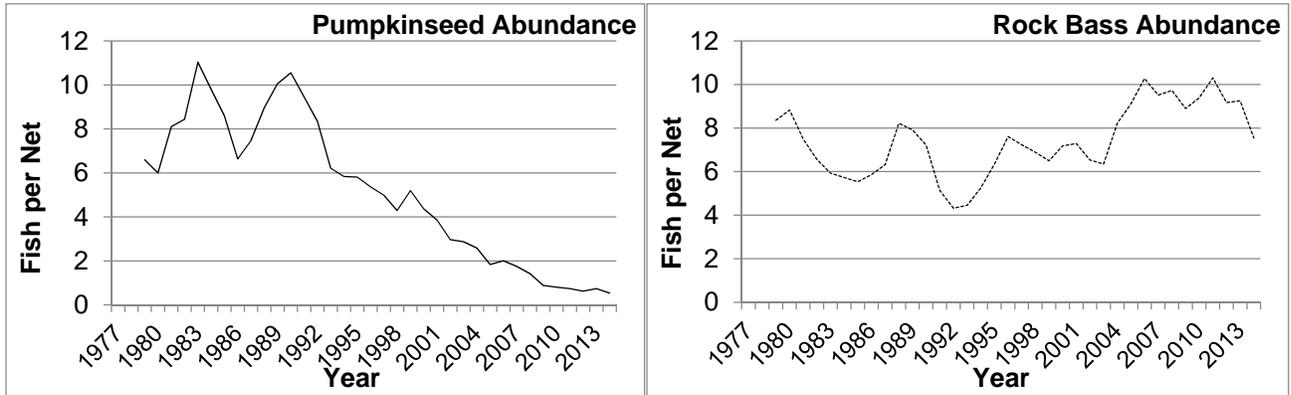


Figure 8. Abundance indices for Rock Bass and Pumpkinseed sunfish in the St. Lawrence River Thousand Islands area.

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Fisheries Updates – Lake St. Lawrence

Differences between Thousand Islands and Lake St. Lawrence fish habitats and physical alterations resulting from the construction of the St. Lawrence Seaway and Power Project are discussed in the 1999 FCO document. The following information on a select number of fish species is excerpted from annual DEC reports (see “Lake Ontario Fisheries Reports” at <http://www.dec.ny.gov/outdoor/7969.html>).

Smallmouth bass – When compared to smallmouth bass abundance in the Thousand Islands, Lake St. Lawrence bass abundance has been generally lower with smaller fluctuations (Figure 9). The difference in abundance may be related to less productive bass habitat in Lake St. Lawrence, less effective index netting in the faster waters of Lake St. Lawrence, or a combination of factors.

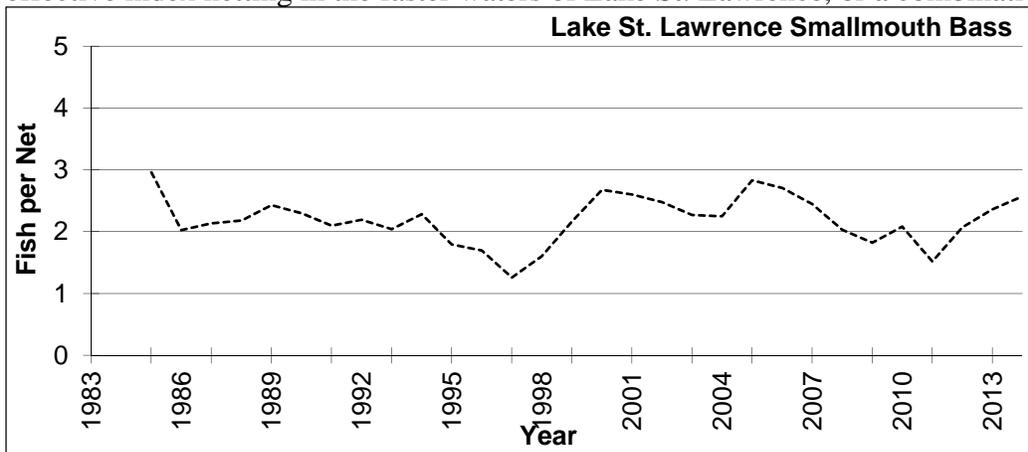


Figure 9. Smallmouth bass abundance index in Lake St. Lawrence.

Yellow Perch - Yellow perch abundance remained relatively low through 2006 during a period of substantial predation by Double-crested cormorants (DCC). Increased perch abundance in recent years is likely due to a shift in DCC diets from yellow perch to round gobies (Figure 10).

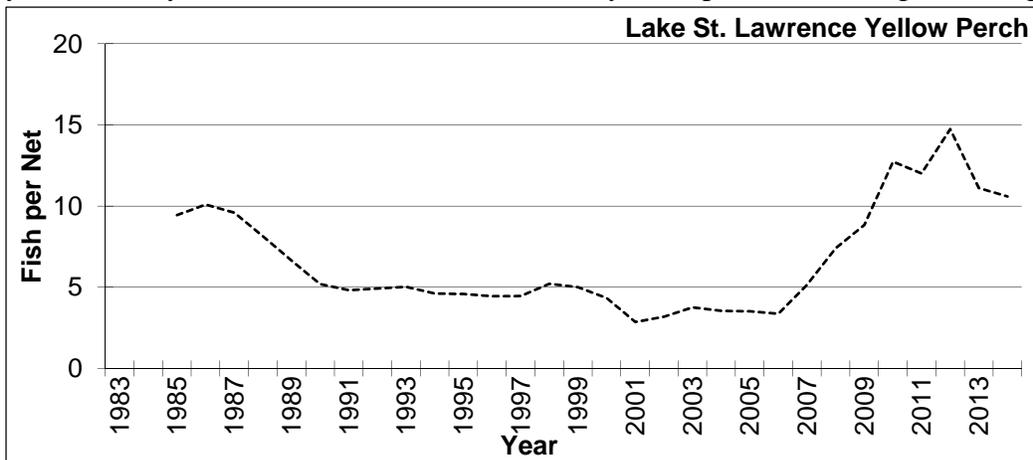


Figure 10. Yellow perch abundance index in Lake St. Lawrence.

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Northern Pike – Information on northern pike in Lake St. Lawrence is less reliable than in the Thousand Islands, as northern pike habitat is more limited in Lake St. Lawrence and the index netting program does not specifically target these habitats. Northern pike abundance is relatively low, and has been slowly declining since the early 2000s (Figure 11).

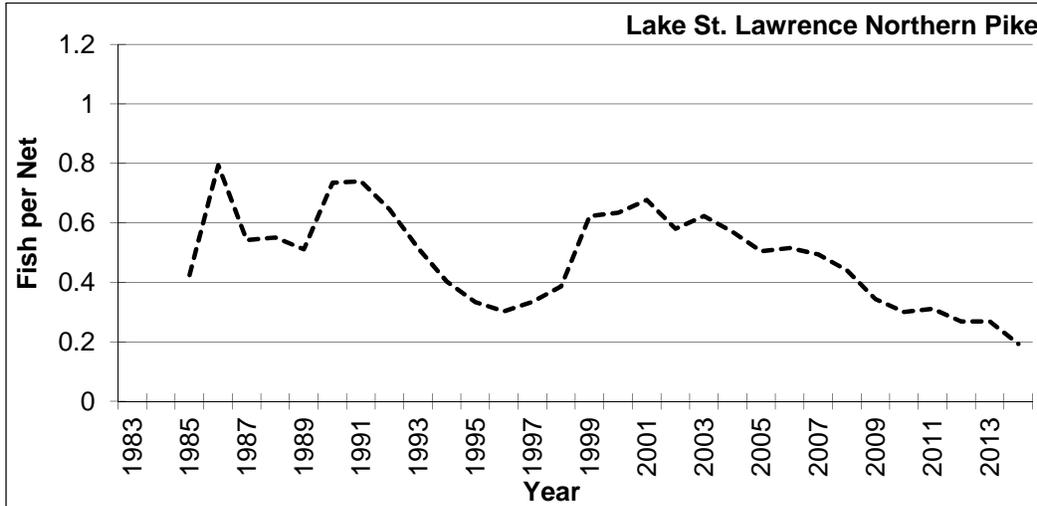


Figure 11. Northern pike abundance index in Lake St. Lawrence.

Walleye - Walleye abundance in index nets has been higher relative to the Thousand Islands, and generally increased from 1985 through 2011 (Figure 12). Walleye spawning habitat enhancement projects have been implemented in Lake St. Lawrence tributaries by OMNRF, DEC, and the New York Power Authority, and additional projects are in the planning stage.

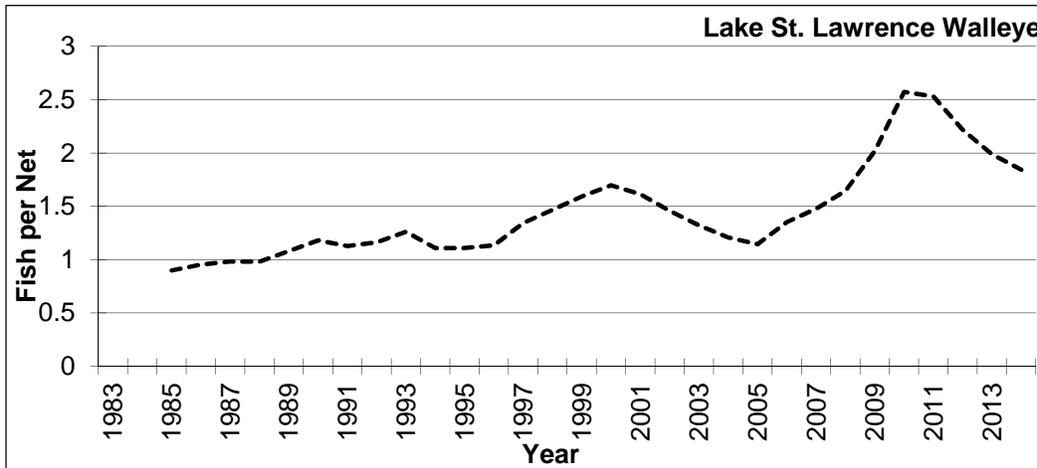


Figure 12. Walleye abundance index for Lake St. Lawrence.

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Updates on Non-Game Species

Lake sturgeon were historically abundant in the St. Lawrence River. Commercial and recreational fishing for sturgeon was common through the 1950's, but sturgeon catches were rare by the 1980's. Like walleye, lake sturgeon spawn in rapids, and the construction of the St. Lawrence Seaway and Power Project destroyed or greatly altered historic spawning sites. Sturgeon are currently protected in both U.S. and Canadian waters of the St. Lawrence River, and both jurisdictions are actively involved in research and restoration activities. The DEC began stocking lake sturgeon in the St. Lawrence River and its tributaries in 1996 and 1993, respectively. In addition, several lake sturgeon habitat enhancement projects have been completed by the New York Power Authority. Catches of lake sturgeon are now much more frequent, and successful natural reproduction has been documented.

The *American eel* has the most complex and remarkable life history of any Great Lakes fish species. American eel spawn in the Sargasso Sea, and their young finally reach the Moses-Saunders Power Dam (MSPD) at Massena/Cornwall in about 7 years. Only female eels exist in the upper St. Lawrence River/Lake Ontario system, and spend about 15-25 years in the system before returning to the Sargasso Sea to spawn and die.

One index of American eel abundance in the system is the number of juvenile eels annually ascending eel ladders built to facilitate upstream migration of juvenile eels on the Ontario and New York portions of the MSPD in 1974 and 2006, respectively. Counts of migrating eels peaked at over 1 million in 1983, and declined dramatically thereafter to less than 10,000 eels annually from the mid-1990s through 2004 (Figure 13). Eel numbers have modestly increased more recently, but remain significantly lower than historic counts. The Province of Ontario listed American eel as “endangered” in 2007, and possession of American eel taken from the system is prohibited in New York. Eel conservation efforts include research to reduce mortality of outmigrating adult eels in hydroelectric turbines, and implementation of harvest restrictions.

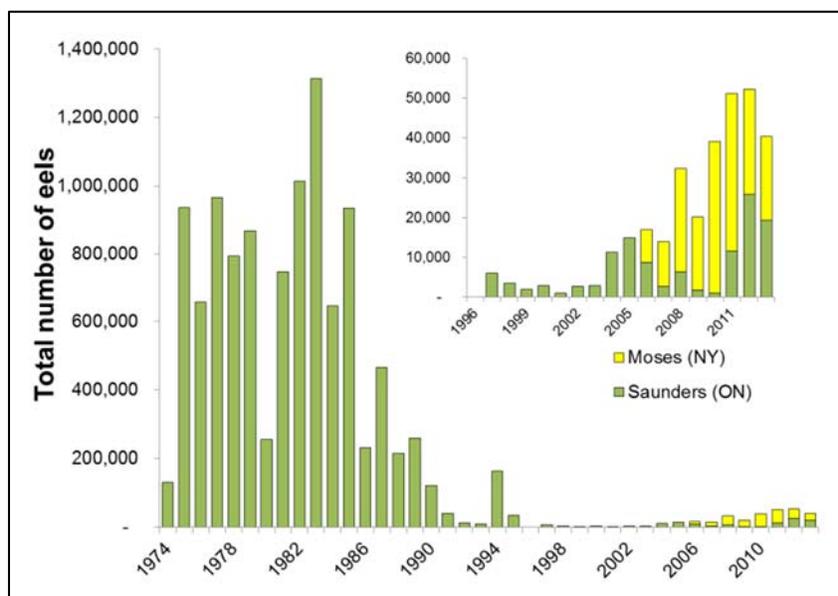


Figure 13. Numbers of juvenile American eels ascending eel ladders at the Robert Moses (NY) and R.H. Saunders (Ontario) portions of the Moses-Saunders Power Dam.

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Fish Habitat Improvement

A number of fish habitat improvement projects have been completed or are underway in the system, including:

- Thousand Islands wetland enhancements, including re-creation of pools/channels in invasive cattail mats, to restore fish spawning and nursery habitat (also benefits amphibians, reptiles, marsh birds, and some mammals). These projects have been implemented collaboratively by ESF, the US Fish and Wildlife Service (Service), Ducks Unlimited, the National Oceanic and Atmospheric Administration, and DEC.
- Watershed connectivity enhancements (Thousand Islands and Lake St. Lawrence). These projects restore fish passage within St. Lawrence River tributaries. This work is being conducted by the Service and ESF with funding from the Service's Fish Enhancement, Mitigation and Research Fund (FEMRF). For more information on FEMRF, see: <http://www.fws.gov/northeast/nyfo/fwc/femrf.htm>
- Lake sturgeon spawning habitat enhancements have been completed by the New York Power Authority (NYPA) above and below the Iroquois Control Dam (Waddington) and below the MSPD.
- Walleye spawning habitat enhancements have been undertaken by the OMNRF (Hopple Creek), NYPA (Brandy Brook), and DEC/St. Lawrence Valley Sportsman's Club (Oswegatchie River).
- NYPA/DEC are also collaborating on fish habitat improvement projects at Little Sucker Brook, Coles Creek and Nichols Hill Island (Lake St. Lawrence).

Additional fish habitat improvement funding is available through the DEC's Lake Ontario Natural Resource Damages fund (see: <http://www.dec.ny.gov/outdoor/40068.html>)