

Trent River Lake Sturgeon Survey - 2017

**Ontario Ministry of Natural Resources
Lake Ontario Management Unit**

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Colin Lake

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Introduction

This report describes the results of the 2017 Lake Sturgeon (*Acipenser fulvescens*) survey of the Lower Trent River by Lake Ontario Management Unit (LOMU) staff. The goal of this project is to: document the presence of Lake Sturgeon in the Trent River, obtain baseline biological data of captured fish, and apply internal acoustic tags to permit long-term monitoring of fish movement, including timing and habitat use.

Lake Sturgeon numbers have declined throughout their range in North America. In Ontario, the presence of dams and hydro-electric generating stations on rivers have been shown to be negatively correlated with Lake Sturgeon abundance (Haxton, Friday, Cano, & Hendry, 2014). This survey was focused on determining the presence or absence of Lake Sturgeon exclusively, and was not intended to provide a quantitative estimate of the entire fish community.

Methods

Study Site

Sampling took place in the Trent River, downstream of Lock 1 in the town of Trenton (Figure 1). This is the downstream terminus of the Trent-Severn waterway, a 386 km canal that connects Lakes Huron and Ontario via a series of smaller lakes and rivers. Navigability of the waterway is facilitated by 45 locks as well as various swing bridges.

Fish Sampling

Several gears were used in order to maximize the likelihood of capturing Lake Sturgeon, including: baited hook-lines, large-mesh gillnet, and boat electrofishing. Sampling ran from April 25 – May 4, 2017 (eight days on the water). Not all gear types were deployed every day, due to weather and river conditions. *Rogue*, LOMU's 24-foot custom-built electrofishing boat was used as a work platform for the entire project.

Baited Hook lines

Hook lines were constructed similarly to those used in other areas of the Great Lakes to sample Lake Sturgeon (Biesinger et al., 2014; Thomas & Haas, 1999), in addition to refinements suggested by Dr. Dimitry Gorsky, U.S. Fish and Wildlife Service, Basom, NY (pers. comm.). The main lines ("mother line") used were either 30 or 45 m in length, with up to 30 dropper lines attached with quick-snaps. Each dropper line was approximately 1 m in length, and tied to a 12/0 circle hook (details on gear construction are included in a separate operations document).

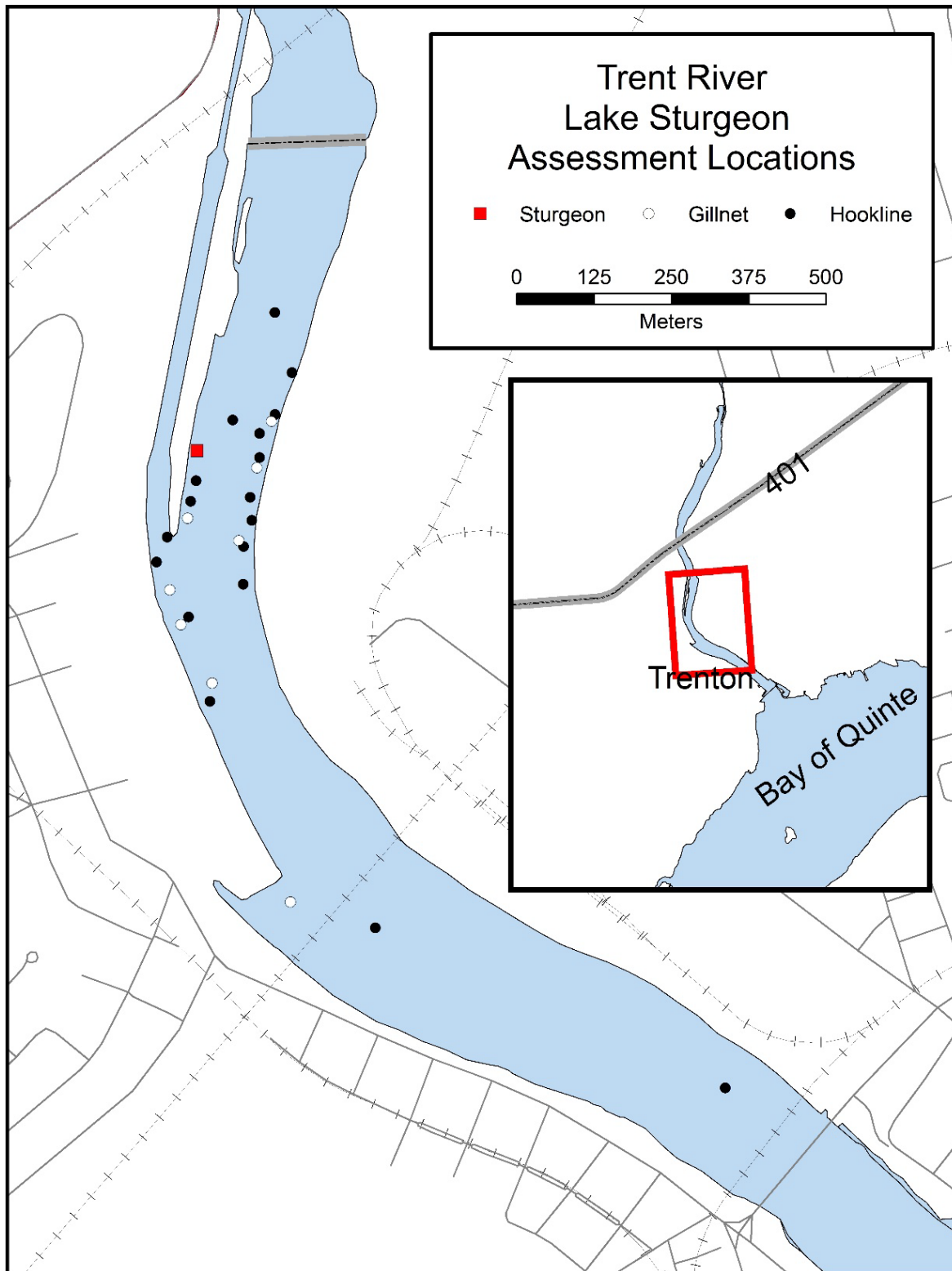


Figure 1. Map of the lower Trent River, showing set locations for hook lines and gillnets, as well as the electrofishing capture location of the Lake Sturgeon

Hooks were baited with cut Alewife and Walleye. Alewife were collected in other concurrent assessment programs in Lake Ontario, and the Walleye was a mortality collected from a previous large mesh gillnet sets. Between two and four hook lines were set each day for approximately 24 hours (Table 1). Catches were minimal; only one Common Carp was captured (and released alive). There was also a Double-crested Cormorant captured at the very shallow end of one set.

Table 1. Basic set data (means and SD) for hook line and gill net sets made from April 25 – May 4, 2017.

Gear	Sets	Mean Set Time (hours)	Total Set Time (hours)	Min Depth (m)	Max Depth (m)	Temperature (°C)
Hook lines	18	22.9 ± 0.58	413.9	1.9 ± 0.8	2.4 ± 1.2	10.9 ± 0.5
Gillnet	8	22.5 ± 0.98	202.5	2.4 ± 1.0	3.1 ± 1.2	10.9 ± 0.5

Large Mesh Gillnet

Three 20 m panels of large mesh (8", 10", 11") multi-filament gillnet were set parallel to the current for approximately 24 hours (Table 1). Gillnets were set adjacent to fast moving sections of the river as well as in deeper pools. Extreme high flows during the survey period made gill netting difficult. No Lake Sturgeon were captured with the gill nets, and by-catch was minimal (5 Walleye, 1 Redhorse, 1 Common Carp). Some of the Walleye were still in spawning condition at the time of capture (ripe and running).

Boat Electrofishing

Generally, electrofishing was done after all of the hook lines and gillnets had been fished and reset. Shock times and setting varied according to water conditions and weather. Skilled boat operating allowed us to sample extensively throughout the upper portion of the river, including the extensive riffle area downstream of the dam.

Total electrofishing effort for the entire project was 221 minutes, 42 seconds. The lowest effective setting were used to minimize negative impacts to the fish, and fish were identified without removing them from the water (with only a few exceptions). As a result, the total numbers are estimates, and some fish were not identified to species level. The main focus of this program was to capture and tag Lake Sturgeon, so other species were not sampled intensively. See Table 2 for the catch summary.

Table 2. Fish abundance (# of fish) captured/observed - boat electrofishing from April 25 - May 4, 2017.

Sample #	1	2	3	4	5	6	7	8	Total
Sample Date	Apr-26	Apr-26	Apr-27	Apr-27	Apr-28	May-03	May-04	May-04	
Duration (min:sec)	16:13	25:30	13:43	21:34	42:12	32:04	32:09	38:17	221:42
American Eel	3		15		15	1		1	35
Brook Silverside					50*				50
Common Carp				1	500*	18	100*	500*	1119
Cyprinid spp.					100*				100
Freshwater Drum		1			1				2
Lake Sturgeon							2		2
Largemouth Bass	2								2
Lepomis spp.					3				3
Longnose Gar					2				2
Muskellunge			1		2		2		5
Rainbow Trout					1				1
Redhorse	3	100*	1	400*	500*	100*	500*	500*	2104
Rock Bass	1								1
Round Goby	15								15
Smallmouth Bass			1						1
Unknown Sucker				6					6
Walleye	2	50	5	500*	500*	20	50*	300*	1427
White Sucker	2								2
Yellow Perch	20	1	100		100*				221
Totals	48	152	123	907	1774	139	654	1301	5098

* Estimated numbers.

Sturgeon Captured

On the last day of the project (May 4, 2017), two Lake Sturgeon were observed. The first fish was too large (estimated 1.8 m total length) to fit into the dip nets, and it avoided capture after being observed at the bow of the electrofishing boats (between the anodes) for several seconds. Approximately 20 minutes later, a second Lake Sturgeon was successfully captured. This individual was measured, a small tissue sample taken, and both external and internal tags were applied (Table 3; Figure 2).

Table 3. Summary statistics for Lake Sturgeon sampled May 4, 2017 in the Trent River.

Weight:	12.6 kg		External Tag:	Fluorescent green Floy tags (x2)
Total Length:	1.29 m		Internal Tag:	Vemco V16
Girth:	48 cm			Serial Number: 1240400
Sex:	unknown			Tag ID: 18988
Approximate Capture Location:	44.115953 -77.591853			



Figure 2. Lake Sturgeon captured from the Trent River, May 4 2017.

Some preliminary acoustic tracking data were obtained in 2017, prior to the receivers being retrieved for the winter (Figure 3). The tagged Lake Sturgeon was first detected at the mouth of the Trent River on October 2 (approximately 3 kilometers from the tagging site, 152 days after tagging). It then moved east past other receivers over the next 10 days (approximately 21 kilometers). The acoustic tag used has an expected battery life of ten years; hopefully this fish will continue to provide valuable data for some time to come.

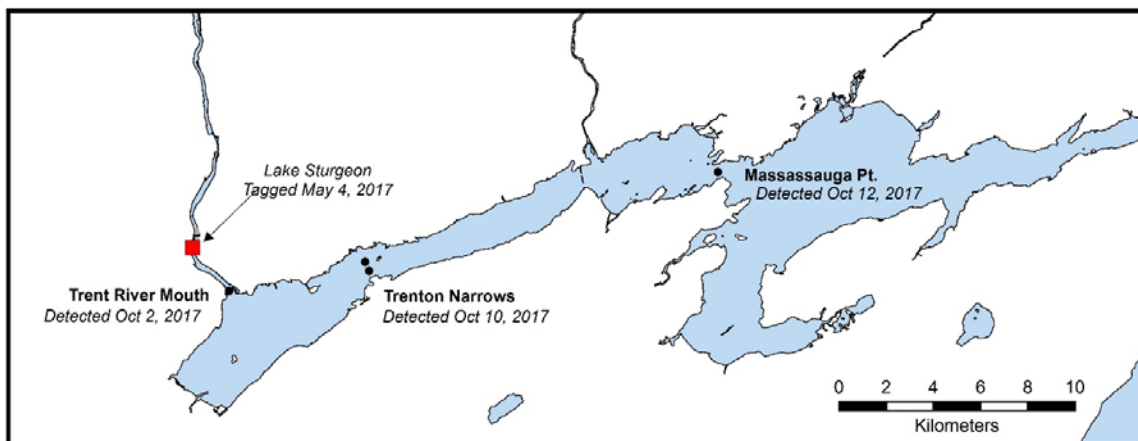


Figure 3. Detections of tagged Lake Sturgeon at receivers in the Upper Bay of Quinte.

Scientific names of species used in this report

Alewife	<i>Alosa pseudoharengus</i>
American Eel	<i>Anguilla rostrata</i>
Brook Silverside	<i>Labidesthes sicculus</i>
Common Carp	<i>Cyprinus carpio</i>
Freshwater Drum	<i>Aplodinotus grunniens</i>
Lake Sturgeon	<i>Acipenser fulvescens</i>
Largemouth Bass	<i>Micropterus salmoides</i>
Longnose Gar	<i>Lepisosteus osseus</i>
Minnows	Cyprinid sp.
Muskellunge	<i>Esox masquinongy</i>
Rainbow Trout	<i>Oncorhynchus mykiss</i>
Redhorse	<i>Moxostoma</i> sp.
Rock Bass	<i>Ambloplites rupestris</i>
Round Goby	<i>Neogobius melanostomus</i>
Smallmouth Bass	<i>Micropterus dolomieu</i>
Sunfishes	Lepomis sp.
Unknown Sucker	<i>Catostomidae</i>
Walleye	<i>Sander vitreus</i>
White Sucker	<i>Catostomus commersonii</i>
Yellow Perch	<i>Perca flavescens</i>
Double-crested Cormorant	<i>Phalacrocorax auritus</i>

References

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- Haxton, T., Friday, M., Cano, T., & Hendry, C. (2014). Variation in lake sturgeon (*Acipenser fulvescens* Rafinesque, 1817) abundance in rivers across Ontario, Canada. *Journal of Applied Ichthyology*, 30 (6), 1335–1341. <https://doi.org/10.1111/jai.12550>
- Thomas, M. V., & Haas, R. C. (1999). Capture of Lake Sturgeon with Setlines in the St. Clair River, Michigan. *North American Journal of Fisheries Management*, 19(2), 610–612. [https://doi.org/10.1577/1548-8675\(1999\)019<0610:COLSWS>2.0.CO;2](https://doi.org/10.1577/1548-8675(1999)019<0610:COLSWS>2.0.CO;2)