

## STUDY PERFORMANCE REPORT

State: Michigan

Project No.: F-53-R-14

Study No.: 491

Title: Evaluation of lake sturgeon *Acipenser fulvescens* populations in the St. Clair River and Lake St. Clair

Period Covered: April 1, 1997 to March 31, 1998

**Study Objective:** The objectives of this study are (1) to determine spawning period, areal distribution of spawning activity, and characterize spawning habitat in the St. Clair River, (2) to determine early (juvenile) life history of lake sturgeon in the St. Clair River and Lake St. Clair and identify habitat requirements of young lake sturgeon, (3) to document lake sturgeon population parameters for Lake St. Clair and the St. Clair River, including estimated abundance, exploitation, age composition, growth rate, and age/sex composition of the spawning stock.

**Summary:** A total of 187 lake sturgeon were collected from the St. Clair River and Lake St. Clair in 1997. Sturgeon were collected with trap nets, bottom trawls, and baited setlines. Pectoral fin ray sections were used to age 172 fish. Ages ranged from 1 to 42 years and included 33 year classes. Mean length at age suggests that these sturgeon grow faster as juveniles when compared with inland lake sturgeon in Michigan. A total of 182 sturgeon were tagged with serial numbered monel cattle ear tags and released. Only one tag recovery has been reported. A spawning site has been identified in the St. Clair River and documentation of the habitat characteristics at the site began in 1997 and will continue in 1998.

**Job 1. Title:** Collect biological data and tag juvenile and adult sturgeon with monel tags in the St. Clair River and Lake St. Clair.

**Findings:** Sturgeon were collected and tagged with three gear types in 1997. In early May, 13 sturgeon were incidentally caught in trap nets set in the northern portion of Lake St. Clair, referred to as Anchor Bay. These fish ranged from 497mm to 1333mm total length, with a mean length of 1104mm (Table 1). Ages were determined by sectioning pectoral fin rays. Ages ranged from 3 to 18 years (Table 2). All thirteen fish were tagged with monel cattle ear tags and released into Anchor Bay.

A total of 84 sturgeon were caught in 67 overnight sets using setlines in the North Channel of the St. Clair River between May 19 and June 13. Comparison of various bait types during May indicated that round gobies were the preferred bait. All hooks were baited with round gobies in June. Total length ranged from 633mm to 1762mm. Age ranged from 4 to 42 years. A total of 80 fish were tagged with monel cattle ear tags and released. Additionally, 6 large sturgeon captured with setlines in the North Channel were implanted with sonic tags as part of a cooperative telemetry study with the University of Michigan.

A total of 235 trawl tows (168 10m headrope tows and 67 4.8m headrope tows) from June through October on Lake St. Clair captured 90 lake sturgeon. All sturgeon were collected in the 10m headrope bottom trawls. Total length of sturgeon captured ranged from 244mm to

1613mm. Age ranged from 1 to 36 years. A total of 89 fish were tagged with monel cattle ear tags and released into Lake St. Clair.

Comparison of age distribution of the catch between the three gear types suggests that younger fish may be more vulnerable to the trawl than setlines (Table 2). However, younger fish may be more common in Lake St. Clair where the trawl is fished, and less common in the St. Clair River where setlines are used. Additional data will allow further evaluation of this theory. Overall, the age distribution appears well balanced with a total of 33 year-classes represented among the 172 lake sturgeon sampled for age. Based on this sample, the strongest year-classes were produced in 1991, 1990, 1989, 1988, 1986, 1985, 1979, and 1976. Only 3 fish younger than age 4 were collected in 1997. Again, this may be due to gear selectivity, juvenile distribution, or poor recruitment in recent years.

Growth of lake sturgeon in the St. Clair River and Lake St. Clair is rapid, with some fish attaining a total length of 1 m as early as age 8 (Table 2). A mean length of 1270mm (or the current minimum size limit of 50 inches) is attained by age 19. Inland lake sturgeon in Michigan grow slower, particularly from age 1 to age 15, and attain a mean length of 1270mm at age 22 (Baker 1980).

**Job 2. Title: Characterize adult spawning habitat and juvenile habitat, based on catch distribution, using underwater video, sidescan sonar, doppler flow meter, temperature and oxygen profiles.**

**Findings:** In 1997 we identified a spawning location in the North Channel of the St. Clair River. This site was initially discovered through contacts with local riparians, fishermen, and conservation officers. On June 13 and 14, divers documented sturgeon spawning behavior and egg deposition on the site, which is characterized by water depths of 9m to 12m, flow rates of 1m/sec, and substrate composed of coal cinders ranging in size from <25mm to over 200mm in diameter. The coal cinders are believed to have been deposited at the site during the late 1800's when coal burning vessels moored and emptied their cinders into the river. The cinder substrate is now zebra mussel encrusted and the 3 dimensional structure of the cinders combined with the zebra mussel layer provide a high level of interstitial space, offering excellent protection for deposited eggs. Water temperature at the time of peak spawning activity was 13.2 °C.

Divers and the video equipped USGS remotely operated underwater vehicle (ROV) were used to determine the areal extent of the cinder substrate at the site. Numerous sturgeon were observed during the ROV observations, nearly all of them over the cinder substrate. Round gobies and redhorse suckers were also commonly observed. The cinder bed measures approximately 25m by 54m in size and roughly parallels the shoreline.

**Job 3. Title: Collect and analyze tag recovery data.**

**Findings:** No tag recoveries for sturgeon tagged and released in Lake St. Clair or the St. Clair River were reported to the Mt. Clemens station in 1997. However, one lake sturgeon tagged and released in the St. Clair River in June 1997 was caught in an Ontario commercial trap-net in southern Lake Huron between October 8 and November 3, 1997. The fish, tag #1138, was held captive at Purdy Fishery in Sarnia and returned alive to the St. Clair River near the Bluewater Bridge after examination by MDNR and Ontario Ministry of Natural Resources personnel on November 4, 1997. It was originally caught on a set-line in the North Channel of the St. Clair

River on June 6, 1997, tagged, and released. The fish was 1148mm total length on June 6 and measured 1178mm total length on November 4. The fish was aged at 19 years by pectoral fin ray section.

Tracking of the 6 fish tagged with sonic tags in the North Channel of the St. Clair River in late May and early June produced some interesting results. One of the fish was never found after its release. Three of the fish quickly moved downstream and into Lake St. Clair and were routinely located throughout the summer and fall in the same area of the lake where sturgeon have been consistently caught in bottom trawls. A comparison of the centroids of the locations for each sturgeon tracked with sonic tags is depicted in Figure 1. These results suggest that a large number of the sturgeon found in the North Channel during the spawning season move into Lake St. Clair and spend the summer and fall months in the deepest portion of the US area of the lake.

**Job 4. Title: Analyze data and prepare annual performance report, final report, and other reports.**

**Findings:** A paper based on the 1997 results of this study was prepared and presented at a lake sturgeon symposium at the Midwest Fish and Wildlife Conference held in Milwaukee in early December, 1997. A summary of all Mt. Clemens sturgeon assessment activities was prepared for inclusion in the annual Interbasin Sturgeon Working Group Report, compiled by the Alpena Fisheries Resource Office, and distributed at the Great Lakes Fisheries Commission lake meetings. This annual performance report was also prepared.

**Literature Cited:**

Baker, J.P. 1980. The distribution, ecology, and management of the lake sturgeon (*Acipenser fulvescens* Rafinesque) in Michigan. Fisheries Research Report No. 1883. Michigan Department of Natural Resources, Fisheries Division, Ann Arbor.

**Prepared by: Michael V. Thomas and Robert C. Haas**  
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Figure 1.—Centroid of locations for 5 sturgeon tracked with sonic tags in 1997.

Table 1.—Mean length and weight for lake sturgeon collected from St. Clair River and Lake St. Clair in 1997.

	Gear type		
	Trap net	Set-line	Trawl
Total number caught	13	84	90
Mean length	1104 mm	1213 mm	1055 mm
Length range	497 mm - 1333 mm	633 mm - 1762 mm	244 mm - 1613 mm
Mean weight	9.3 kg	14.2 kg	9.8 kg
Weight range	0.7 kg - 14.8 kg	0.8 kg - 45.5 kg	0.1kg - 35.1 kg

Table 2.—Age distribution and mean length at age for 172 lake sturgeon collected from the St. Clair River and Lake St. Clair in 1997 with three gear types.

Age	Year class	Gear type			Total catch	Mean length (mm)	
		Trap net	Set-line	Trawl		SCR&LSC	Michigan Inland <sup>1</sup>
1	1996	0	0	1	1	244	152
2	1995	0	0	0	0	—	279
3	1994	1	0	1	2	614	318
4	1993	0	1	5	6	669	409
5	1992	0	1	1	2	650	513
6	1991	1	4	8	13	830	561
7	1990	0	6	4	10	832	627
8	1989	0	2	7	9	906	699
9	1988	0	4	5	9	930	770
10	1987	0	3	2	5	955	810
11	1986	0	0	10	10	952	884
12	1985	2	4	5	11	1015	940
13	1984	1	0	4	5	1051	1008
14	1983	0	4	1	5	1055	1054
15	1982	1	1	3	5	1158	1133
16	1981	0	1	0	1	1154	—
17	1980	2	2	1	5	1259	1171
18	1979	2	4	3	9	1250	1171
19	1978	0	3	3	6	1275	1173
20	1977	0	7	1	8	1274	1242
21	1976	0	5	4	9	1392	1245
22	1975	0	2	4	6	1357	1278
23	1974	0	1	1	2	1211	1288
24	1973	0	2	2	4	1389	1293
25	1972	0	1	1	2	1324	1341
26	1971	0	2	1	3	1439	1344
27	1970	0	2	2	4	1344	1392
28	1969	0	2	2	4	1469	1389
29	1968	0	1	2	3	1448	1463
30	1967	0	4	0	4	1538	1384
31	1966	0	2	3	5	1408	1466
32	1965	0	0	1	1	1575	1453
33	1964	0	0	0	0	—	1440
34	1963	0	0	0	0	—	1511
35	1962	0	0	0	0	—	1496
36	1961	0	1	1	2	1525	1529
37	1960	0	0	0	0	—	1557
38	1959	0	0	0	0	—	1542
39	1958	0	0	0	0	—	1638
40	1957	0	0	0	0	—	1651
41	1956	0	0	0	0	—	1590
42	1955	0	1	0	1	1762	1623

<sup>1</sup> From Baker (1980).