

**Status of Lake Sturgeon in U.S. Waters of Lake Huron,
Reported by Commercial Fisheries 2004-2005**

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INTRODUCTION

In 1995 the Lake Huron Committee (LHC) published the Fish Community Objectives (FCOs) for Lake Huron in which the stated objectives for lake sturgeon were 1) to increase the abundance of lake sturgeon to the extent that the species is removed from its threatened status in U.S. waters, and 2) to maintain or rehabilitate populations in Canadian waters (DesJardine et al., 1995). In 1995 the Lake Huron Technical Committee (LHTC) completed an examination of Lake Huron fish stocks in relation to the FCOs (Ebener 1995). At that time very little was known about the status of lake sturgeon in the basin.

In an effort to better understand the status and trends of Lake Huron lake sturgeon stocks, the U.S. Fish and Wildlife Service's Alpena FRO (Alpena FRO) in cooperation with the Ontario Ministry of Natural Resources initiated a project in 1995 utilizing the voluntary participation of commercial fishers in U.S. and Canadian waters of the lake who routinely encounter lake sturgeon as by-catch in their fisheries. The project included a tagging program to assemble crucial information on relative abundance, movement and distribution of Lake Huron lake sturgeon.

This report summarizes those activities in U.S. waters of Lake Huron through 2005, inclusively, and provides an update for data collected during 2004 and 2005.

METHODS

Michigan state-licensed and tribal commercial fishers sometimes encounter lake sturgeon as by-catch while fishing trap nets to harvest lake whitefish (*Coregonus clupeaformis*), yellow perch (*Perca flavescens*), and channel catfish (*Ictalurus punctatus*). When lake sturgeon are captured in one of the nets data are collected that will aid in analysis of age and growth characteristics of the Lake Huron population. Total length (TL), fork length (FL), and girth are recorded using a soft measuring tape and the leading (marginal) ray of the left pectoral fin is removed using a fin ray saw. Alpena FRO staff cross-sectioned each fin ray sample to determine age using a digital image capture system (Figure 1). All sturgeon are returned to the water live.

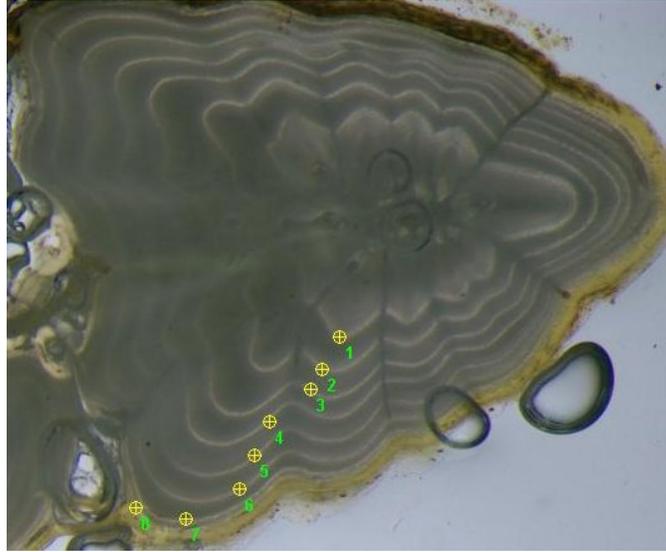


Figure 1. Cross-section of a lake sturgeon fin ray using digital image capture system showing annuli to estimate age (8yrs old).

In addition to use for ageing, the distal portion of each fin ray is being utilized for genetic analysis. All fish are tagged at the base of the dorsal fin with a serially numbered cinch Floy tag (Floy tag and Manufacturing Inc, Seattle, Washington). All data collection and tagging for these by-caught lake sturgeon is completed by the commercial fishers. All materials necessary to collect the biotic information were provided by the Alpena FRO (Figure 2). Each fisher was provided a box containing instructions for fish tagging and fin ray removal, tags and an applicator, fin ray saw, data notebook and cards, fin ray envelopes, a soft measuring tape, and a disposable camera. Abiotic data recorded for each lake sturgeon captured included date, latitude/longitude, water depth, water temperature, and bottom type. In addition, tag type, agency, and identification number of tag applied or observed (if fish was previously tagged) were recorded. The Alpena FRO has been working closely with the Ontario Ministry of Natural Resources-Lake Huron Management Unit (OMNR-LHMU) for standardized data collection for lake sturgeon. This coordinated approach led to a more lakewide tagging effort, improved tag recapture efficiency, resulting in a better understanding of the seasonal movement patterns of Lake Huron lake sturgeon.



Figure 2. Equipment provided by Alpena FRO to each commercial fisherman for taking and recording data from captured lake sturgeon.

RESULTS

Since 1995, 343 lake sturgeon have been tagged in U.S. waters of Lake Huron with the assistance of commercial fishers. These lake sturgeon have been encountered as far north as Detour, MI in the upper peninsula and as far south as Saginaw Bay by commercial fishers. Figure 3 illustrates the five statistical grids where the majority of lake sturgeon have been tagged since 1995 in Saginaw Bay. Table 1 is a list of grids and number of lake sturgeon tagged within each grid since 1995 in Saginaw Bay. The 2004 and 2005 fishing seasons yielded 46 lake sturgeon, 37 in 2004 and 9 in 2005. The 2005 catch represents the least number of fish encountered since 1995 (Table 2). The 2001 season was the highest season with 69 lake sturgeon caught. Figure 4 illustrates the months sturgeon were most frequently captured from 1995-2005.

From 1995 through 2005 the mean fork length (FL) of 420 captured sturgeon was 107.5 cm (range 40.0 – 185.0 cm), the mean total length (TL) was 116.3 cm (range 45.7 – 190.5 cm) and the mean girth was 44.7 cm (range 14.0 – 109.0 cm).

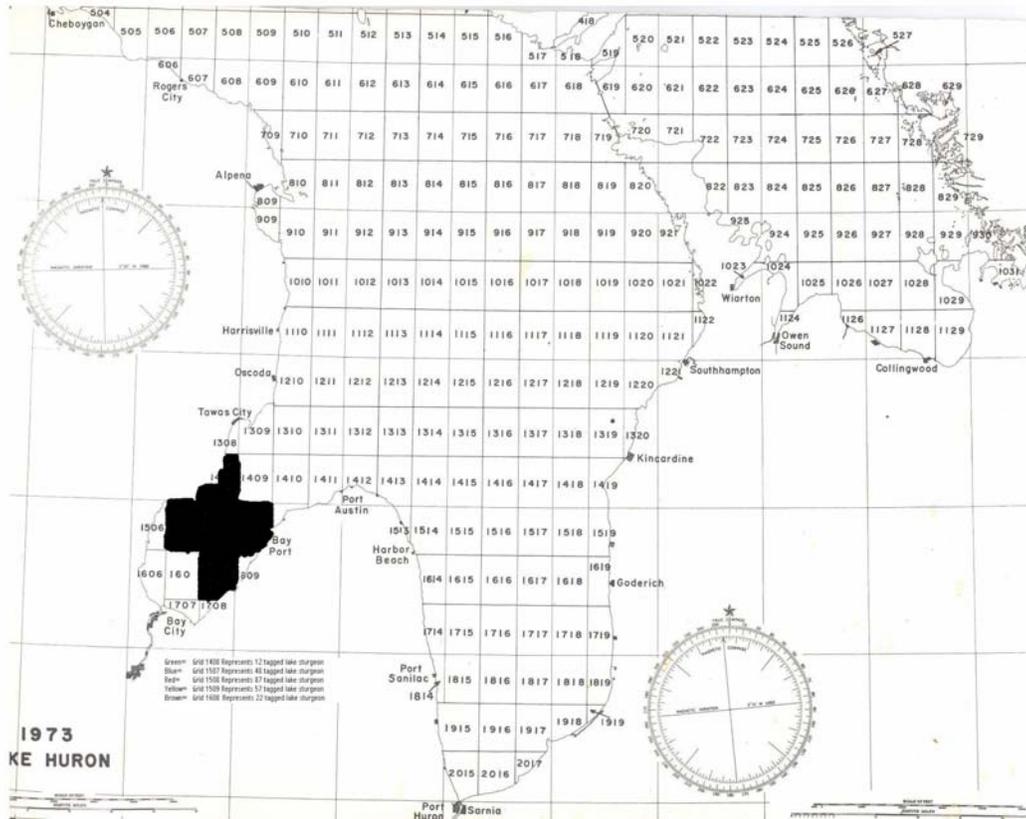


Figure 3: Shows five grids in Saginaw Bay where the majority of lake sturgeon are encountered during the commercial fishing seasons.

Table 1. Lists the grids in the shaded area of the above figure and gives the number of lake sturgeon tagged within each grind since 1995.

Grid #	# of sturgeon tagged
1408	12
1507	48
1508	87
1509	57
1608	22

Table 2. Number of lake sturgeon caught by participating commercial fishers, (/) indicates the fisher was not participating .

Fisher	Status	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	Total
Barbeaux Fishery	Tagged	/	1	7	0	3	2	0	0	0	0	0	13
	Recapture	/	0	0	0	0	0	0	0	0	0	0	0
	Not Tagged	/	0	0	0	0	0	0	0	0	0	0	0
Bay Port Fish Company	Tagged	13	7	10	10	10	2	2	0	1	1	3	59
	Recapture	0	0	1	0	2	1	0	0	0	0	0	4
	Not Tagged	0	0	0	0	0	0	0	0	0	0	0	0
Beardsley Fishery	Tagged	/	/	0	0	0	1	0	0	0	0	0	1
	Recapture	/	/	0	0	0	0	1	0	0	0	0	1
	Not Tagged	/	/	0	0	0	0	0	0	0	0	0	0
Hammel and sons	Tagged	/	/	1	6	6	3	4	1	2	5	0	28
	Recapture	/	/	0	0	3	1	3	1	0	0	0	8
	Not Tagged	/	/	0	0	0	0	0	0	0	0	0	0
Gauthier-Spaulling Fishery	Tagged	2	0	2	2	4	1	0	0	0	0	0	11
	Recapture	0	0	0	0	0	0	0	0	0	0	0	0
	Not Tagged	0	0	0	0	0	0	0	0	0	0	0	0
Kuhl Fishery	Tagged	/	/	/	1	1	0	1	1	0	0	2	6
	Recapture	/	/	/	0	0	0	1	0	0	0	0	1
	Not Tagged	/	/	/	0	0	0	0	0	0	0	0	0
Lentz Fishery	Tagged	0	0	5	10	7	4	6	13	6	9	1	61
	Recapture	0	0	1	0	3	2	1	1	1	2	0	11
	Not Tagged	4	8	2	0	0	0	0	0	0	0	0	14
M & W Fish Company	Tagged	0	0	4	4	3	9	13	16	6	9	1	65
	Recapture	0	1	0	0	0	5	4	2	1	1	0	14
	Not Tagged	1	2	0	0	0	0	0	2	0	1	0	6
Sebewaing Fish Company	Tagged	/	/	/	/	/	/	2	2	2	0	0	6
	Recapture	/	/	/	/	/	/	0	2	0	0	0	2
	Not Tagged	/	/	/	/	/	/	0	0	0	0	0	0
Serafin Fishery	Tagged	/	7	16	3	4	7	17	10	0	9	1	74
	Recapture	/	0	1	0	0	1	3	3	0	0	0	8
	Not Tagged	/	3	0	0	0	0	0	0	0	0	0	3
Warren Beers Fishery	Tagged	0	0	0	0	0	0	2	0	0	0	0	2
	Recapture	0	0	0	0	0	0	0	0	0	0	0	0
	Not Tagged	2	0	1	0	0	0	0	0	0	0	0	3
Whytes Fishery	Tagged	0	3	4	4	3	1	1	0	0	0	0	16
	Recapture	0	0	0	0	0	2	1	0	0	0	1	4
	Not Tagged	2	4	0	0	0	0	0	0	0	0	0	6
Total		24	36	55	40	49	42	62	54	19	37	9	427

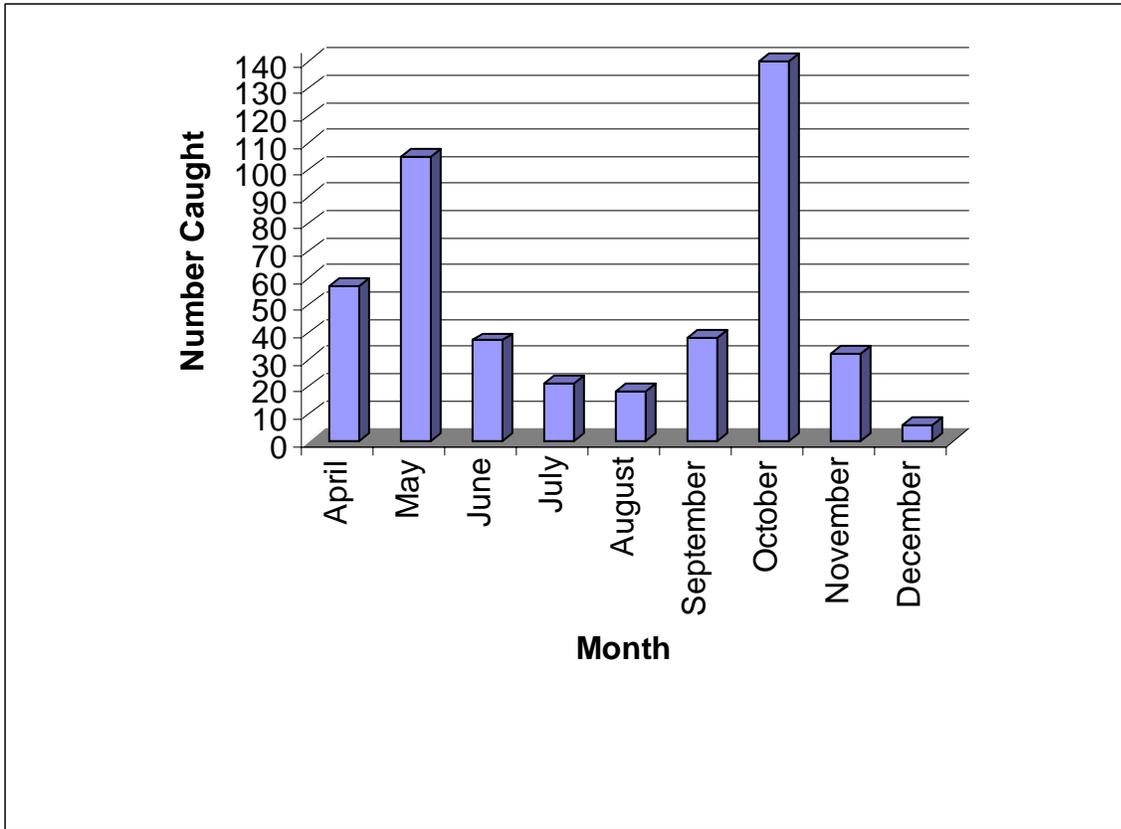


Figure 4. Number of sturgeon caught by month during the fishing seasons from 1995-2005 in Lake Huron by commercial fishers.

Figure 5 illustrates the length frequency for 420 lake sturgeon captured from 1995 through 2005. Lake sturgeon between 90cm and 129cm were most frequently caught representing 55 % of captured individuals. Lake sturgeon 130cm and greater make up 28% of the individuals captured and 17% less than 90cm.

Figure 6 shows the average age of lake sturgeon caught from 1995 through 2005 by 10cm group. Lake sturgeon in the most frequently captured size range of 90 to 129cm range in age from 9 to 14 yrs. This size group should consist of males that are both sexually mature and immature. Females would be sexually immature. The 130cm and above group has an average age range of 19yrs to 41yrs and should consist mainly of mature adults from both sexes. The under 90cm group has an average age range of 4yrs to 7yrs and would consist of all sexually immature individuals. Sex is not determined at the time of capture so the sex ratio within Saginaw Bay is unknown. It would appear that Saginaw Bay lake sturgeon have a diverse age structure having approximately equal numbers of mature and immature individuals (Figure 6). Figure 7 shows the age frequency of lake sturgeon caught by age from 1995 through 2005.

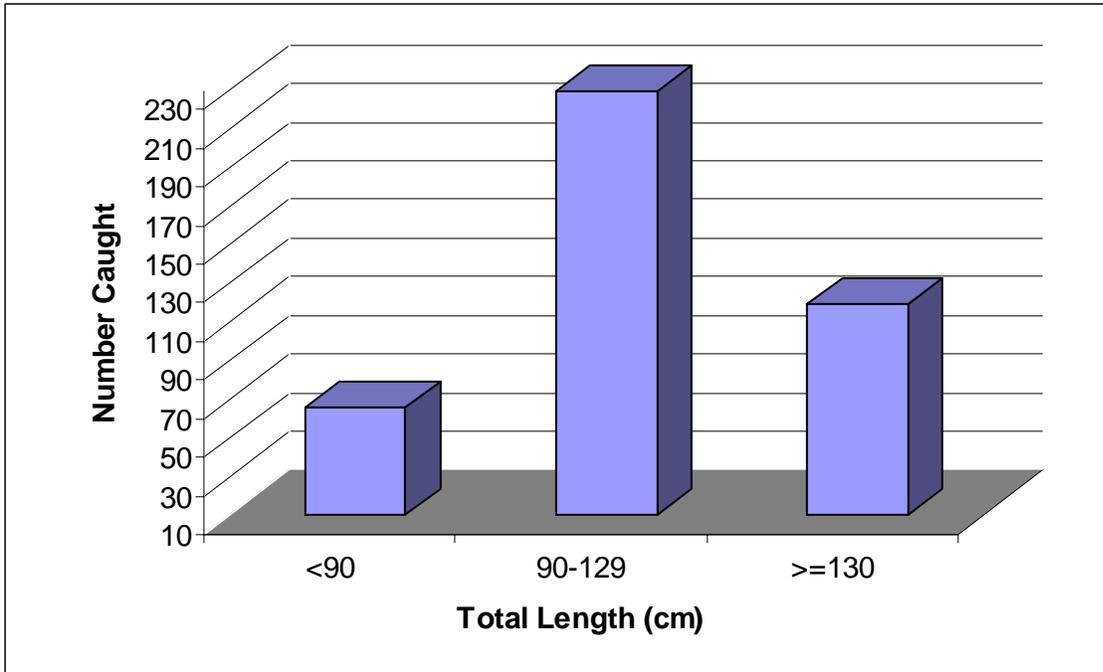


Figure 5. Number of sturgeon caught by commercial fishers by length from 1995 through 2005

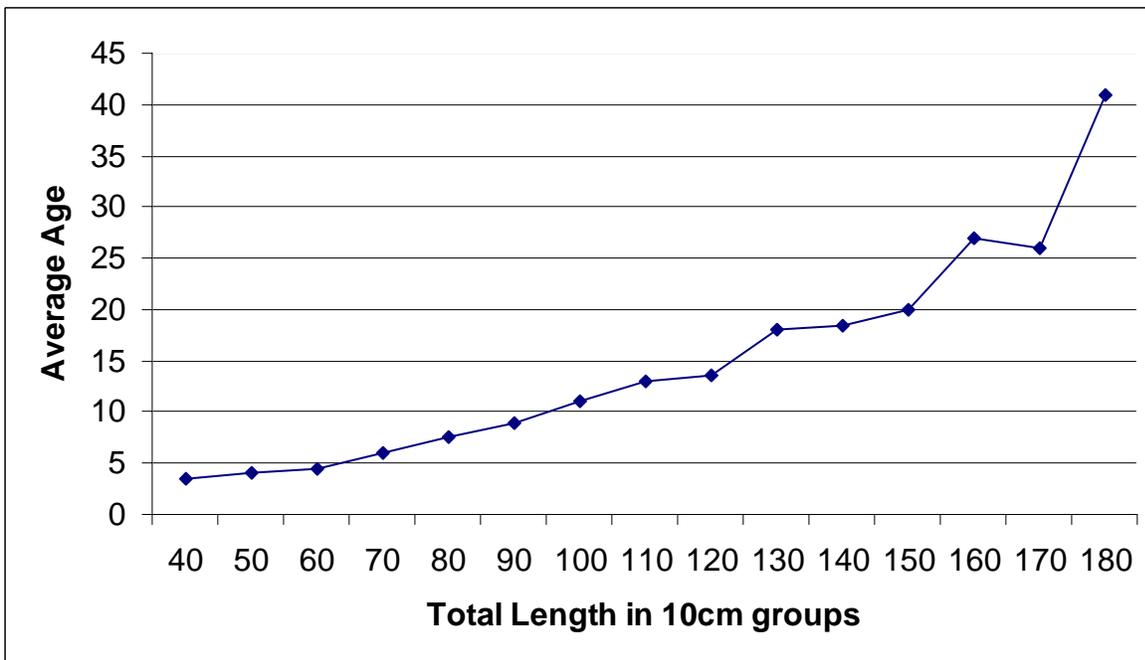


Figure 6. Average age of lake sturgeon caught from 1995 through 2005 in 10cm groups

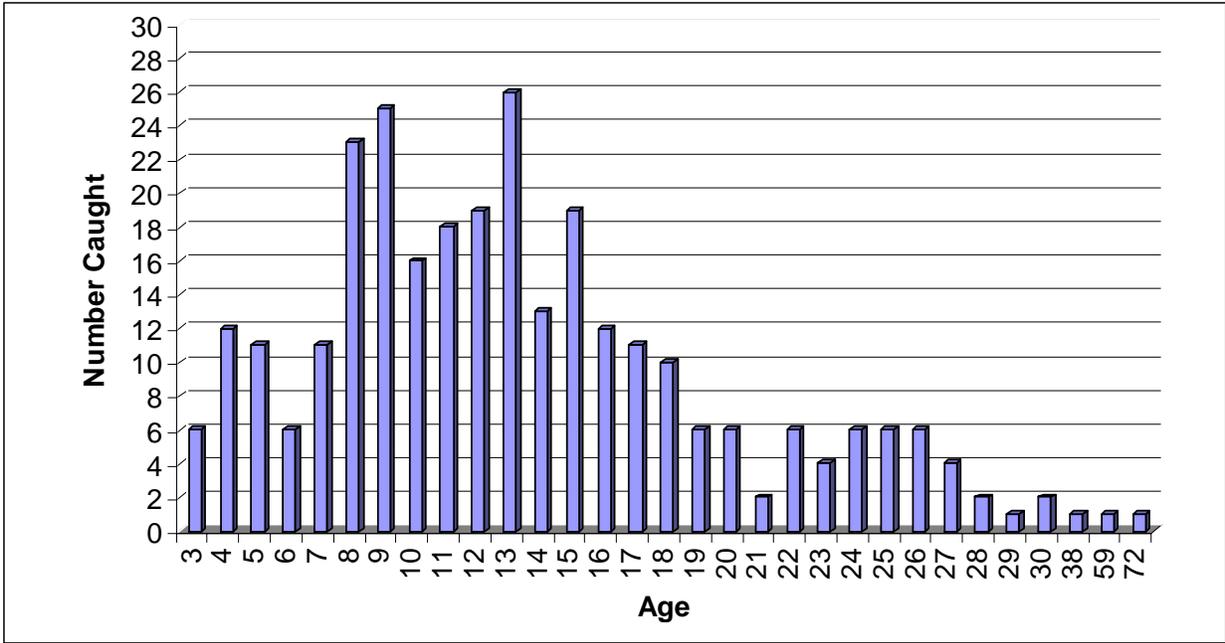


Figure 7. Age frequency of Lake Huron lake sturgeon caught by commercial fishers in Saginaw Bay from 1995 through 2005.

Since 1996 there has been a total of 49 different lake sturgeon recaptured in Saginaw Bay, 37 of which were originally tagged by Michigan licensed commercial fishers. Twelve were originally

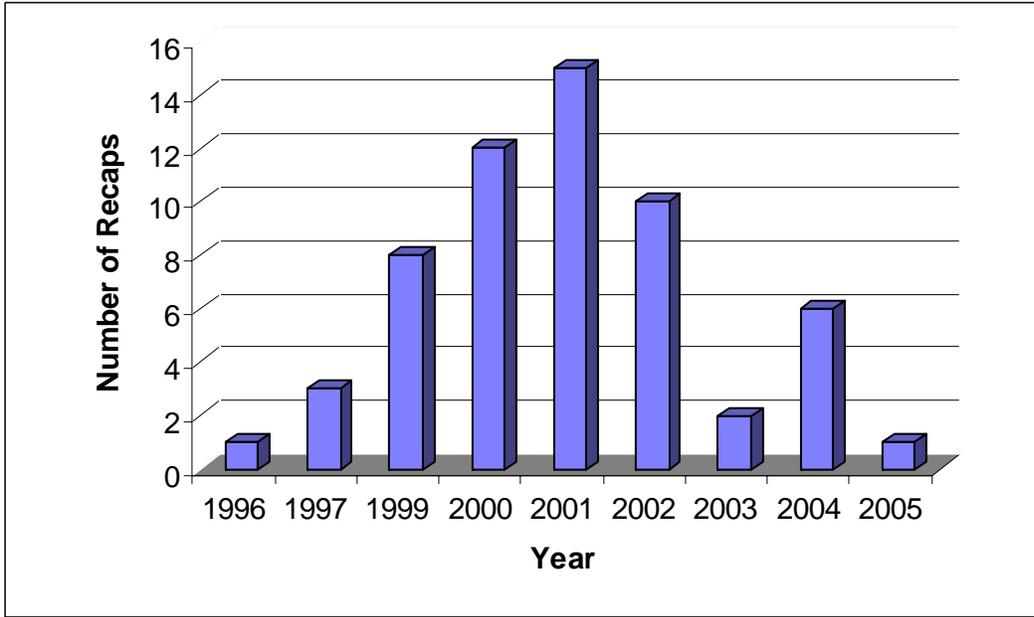


Figure 8. Number of lake sturgeon recaptured by commercial fishers from 1996 through 2005.

tagged by Ontario Ministry of Natural Resources in Canadian waters of Lake Huron. The 37 recaptures of sturgeon tagged by fishers in Saginaw Bay represents 10.8% of the fish tagged there. Table 3 shows the grid of original tagging and the recapture grid.

Table 3. All recapture events with grids and original tagger.

Tag Number	Date Tagged	Grid Tagged	# Times Recaptured	Grid Recaptured	Tagger
36	10/4/1995	1509	1	1606	USFWS
4033	10/29/1996	1508	1	1508	USFWS
4036	4/26/1997	1508	1	1509	USFWS
4054	4/28/1997	1607	1	1507	USFWS
4125	6/6/1997	1508	2	1509, 1309	USFWS
4047	10/6/1997	1408	1	1507	USFWS
4056	10/24/1997	1508	1	1507	USFWS
4059	5/4/1998	1508	1		USFWS
4114	9/20/1998	1507	1	1508	USFWS
4159	10/12/1998	1608	1	1508	USFWS
6270	10/19/1998		1	1408	OMNR
4204	10/25/1998	1508	3	1408, 1507	USFWS
4110	11/17/1998	1507	3	1507	USFWS
4093	4/17/1999		1	1509	USFWS
4064	9/25/1999	1508	2	1507	USFWS
4168	10/31/1999	1608	1	1608	USFWS
4258	4/11/2000	1507	1	1509	USFWS
4169	4/28/2000	1408	1	1509	USFWS
4255	5/30/2000	1509	1	1408	USFWS
4066	10/24/2000	1508	1	1507	USFWS
9106	5/7/2001		1	1509	OMNR
4216	5/14/2001	1508	1	1508	USFWS
4214	9/16/2001	1508	3	1507, 1408	USFWS
4432	10/4/2001	1508	1	1508	USFWS
4434	10/8/2001	1507	1	1507	USFWS
4016	10/11/2001	1507	1	1507	USFWS
4068	10/22/2001	1507	1	1509	USFWS
652	8/9/2002	1508	1	1507	USFWS
650	9/29/2002	1508	1	1509	USFWS
10067	4/19/2003		1	1507	USFWS
119			1	1508	OMNR
285			1	1408	OMNR
485			1	1509	OMNR
4152			1	1309	USFWS
6723			1	1507	OMNR
6778			1	1509	OMNR
6785			1	1509	OMNR
9106			2	1509, 1507	OMNR
9158			1		USFWS
9175			1	1509	OMNR
9452			1	1507	OMNR
13264			1	1508	OMNR
647	5/5/2002	1509	1		USFWS
617	10/2/2004		1		USFWS
703			1	41	USFWS
943			1		USFWS
4387			1		USFWS
9484			1		USFWS
905			1		USFWS

DISCUSSION

There are five main grids in Saginaw Bay that are producing the majority of the lake sturgeon captured from 1995 through 2005 but is likely biased by fishing effort. Commercial fishers have caught lake sturgeon along most of the western shore of Lake Huron but the majority of the commercial fishers operate in these areas. Figure 7 shows that the youngest lake sturgeon captured is 3yrs old and the oldest is 72. There have not been many lake sturgeon captured above the age of 27 and none below the age of 3. Based on the data we have collected, Saginaw Bay seems to be occupied by many lengths and ages of lake sturgeon except for the very young (under 3 yrs of age) and the very large (over 160cm). The lack of very young lake sturgeon in the catch is probably due to the gear used in commercial fishing activities in the bay. Trap nets used by the commercial fishers have mesh sizes that are probably too large to capture small lake sturgeon (the target species are lake whitefish and yellow perch). Also, we do not see many very large lake sturgeon which may also be biased by the gear used. It may also be that the missing size groups of lake sturgeon represent fish that are occupying areas of the bay that are not being fished with trap nets. Because limited numbers of very young and very old lake sturgeon have been captured in Saginaw Bay and restoration depends on an understanding of the status and limitations of all life stages, future studies should focus on using different gear to catch more of these missing lake sturgeon.

One possible future study would be to initiate fishery independent assessment using different gear more likely to capture the larger and smaller lake sturgeon if they are present. This effort should also focus on various habitats within the bay in an effort to more effectively sample the population without the biases associated with the commercial effort.

ACKNOWLEDGEMENTS

The information presented in this report was collected entirely through the voluntary assistance of Barbeaux Fishery, Bay Port Fish Company, Beardsley Fish Company, Cedarville Fish Company, Gauthier-Spaulding Fishery, Lentz Fishery, Kuhl Fishery, M&W Fishery, Sebewaing Fish Company, Serafin Fishery, Beers Fishery, and Whytes Fishery. Their cooperation, interest, and enthusiasm continue to be invaluable in defining the current status and trends of this native Lake Huron fish species.