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**MICHIGAN DEPARTMENT OF NATURAL RESOURCES
FISHERIES DIVISION**

**Fisheries Technical Report 2011-2
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Michigan's St. Clair System Lake Sturgeon Fishery: Results of an Angler Postal Survey

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Abstract.—Lake sturgeon, *Acipenser fulvescens*, is the only species of sturgeon endemic to the Great Lakes. The largest population of this species in Michigan exists in Lake St. Clair and the St. Clair River. In 1999, lake sturgeon anglers were required to obtain a harvest tag in order to fish for lake sturgeon in Lake St. Clair and the St. Clair River (St. Clair System). This provided the opportunity to evaluate the fishery by contacting anglers who were interested in lake sturgeon fishing with a questionnaire sent through the US Postal Service. The objectives of this survey were: 1) to quantify the fishing effort, catch, and harvest for the St. Clair System lake sturgeon fishery in 2006 and 2007; 2) to characterize the demographics of the anglers participating in the St. Clair System lake sturgeon fishery in 2006 and 2007; and 3) to quantify angler opinions regarding lake sturgeon harvest and the fishing regulations for the St. Clair System lake sturgeon fishery. We mailed a questionnaire and a letter explaining the purpose of the survey to 458 anglers in 2008. Three hundred anglers returned a questionnaire and thirteen addresses were reported as undeliverable, resulting in an adjusted response rate of 67.4%. Lake sturgeon anglers were predominantly male (90%), with an average age of 40.7 years. They resided in 16 Michigan counties, but St. Clair, Macomb, and Oakland counties accounted for about 84% of the anglers. Of the 300 respondents, 156 reported they fished at least one time for lake sturgeon in 2006, while 188 reported fishing for lake sturgeon at least once in 2007. Anglers reported catching 683 lake sturgeon in 2006, and 573 in 2007. The average catch per active angler was 4.4 and 3.1 lake sturgeon in 2006 and 2007, respectively. Angler effort was reported as 979 fishing trips targeting lake sturgeon in 2007. Lake sturgeon caught by anglers in 2007 ranged from 12 inches to 88 inches in total length, with 22% (124) legal-sized (42-50 inches). Anglers reported keeping (harvesting) only four, or roughly 3% of the legal-sized lake sturgeon caught during 2007. Most lake sturgeon fishing activity took place during dark hours and from boats. Nearly half of the anglers that responded indicated they had little or no interest in keeping a lake sturgeon and practiced catch-and-release. Most lake sturgeon anglers were satisfied with the current tag and fish registration system, with over 92% of the responding anglers indicating they were satisfied. When combined with all other known sources of fishing mortality for lake sturgeon in the waters from Port Huron south to Lake Erie during 2006 and 2007, we estimate total fishing mortality remained well below the recommended threshold in the Michigan Lake Sturgeon Rehabilitation Strategy. The St. Clair system lake sturgeon sport fishery and associated regulations appears to provide anglers with a unique fishing opportunity while protecting and conserving a unique fishery resource.

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Introduction

Lake sturgeon, *Acipenser fulvescens*, is the only species of sturgeon endemic to the Great Lakes. Within the last century, lake sturgeon populations have been dramatically reduced or extirpated from much of their native range. In recent times, these populations are believed to be at 1% of their former size (Hay-Chmielewski and Whelan 1997). Lake sturgeon is listed as a threatened species by states throughout most of its native range, including Michigan (Baker 2006).

The Michigan Department of Natural Resources (DNR), Fisheries Division, developed a Lake Sturgeon Rehabilitation Strategy (Hay-Chmielewski and Whelan 1997) to help manage this species. That strategy recommended: 1) that harvest fisheries be limited to those populations supporting 500 or more breeding adult lake sturgeon, and 2) where a harvest fishery exists, that total annual fishing mortality should be below 3% for an expanding population and below 6% to maintain lake sturgeon abundance. This strategy requires the measurement of fishing mortality, something which has been difficult to achieve.

The St. Clair System (comprised of Lake St. Clair and the St. Clair River) supports the largest population of lake sturgeon in Michigan (Baker 2006; Thomas and Haas 2004). In 1999, conservative fishing regulations were implemented for the St. Clair System lake sturgeon fishery, consistent with increased protection for lake sturgeon across the state. All lake sturgeon anglers were required to obtain a lake sturgeon fishing tag, free of charge, at one of several locations in the geographic area of the fishery. Other regulations included a restricted recreational harvest (one fish per angler per year), size limit of 42 to 50 inches (slot limit), and open season from 16 July to 30 September with mandatory registration of harvested fish. Since these regulations were implemented in 1999, the only documentation of this fishery has been through the lake sturgeon tag registration system and the registration of harvested fish. Creel surveys (field surveys of what anglers have caught) conducted during daylight hours on the St. Clair River and Lake St. Clair in 2002 to 2005 did not record lake sturgeon fishing effort or harvest (Thomas and Towns 2011). We suspected this was largely due to 1) low numbers of anglers participating in the fishery; 2) much of the fishing activity taking place after dark, and 3) most fishing was from private docks or boats that returned to private docks. Standard DNR creel survey techniques using on-site clerks, have been restricted to daylight hours due to safety concerns.

The Michigan Natural Resources Commission (NRC) and the Michigan DNR have the authority and responsibility to protect and manage the fish and wildlife resources of the state of Michigan. Harvest surveys are one of the management tools which can be used to accomplish this statutory responsibility (Frawley and Etter, 2008). Postal surveys have often focused on demographics of the resource users and estimating fishing and hunting participation and harvest (United States Department of the Interior, Fish and Wildlife Service and United States Department of Commerce, Bureau of Census 2008; Quinn 1993; McLeod et al. 1999), but they can also be used to poll user attitudes regarding special seasons, regulations and other important issues relating to game management (Niesar et al. 2004; Quinn 1992; Edison et al. 2006; Ebert et al. 1993; Margenau and Petchenik 2004). The objectives of this survey were: 1.) to quantify the fishing effort and catch for the St. Clair System lake sturgeon fishery in 2006 and 2007; 2.) to characterize the demographics of the anglers participating in the St. Clair System lake sturgeon fishery in 2006 and 2007; and 3.) to quantify angler opinions regarding lake sturgeon harvest and the fishing regulations for the Lake St. Clair sturgeon fishery.

Methods

Under the lake sturgeon fishing tag regulation, anglers first had to obtain a general fishing license (restricted license – good for all species except trout and salmon) and a lake sturgeon harvest tag in

order to fish for lake sturgeon. A lake sturgeon harvest tag was a plastic locking tag meant to be used around the tail, gill or through the mouth of a harvested fish. These tags were designed for one use and a different color tag was used each year. When anglers obtained a harvest tag they were required to provide their driver's license number or DNR sportcard number (i.e., an identification number issued by the DNR for the purpose of purchasing licenses through the Retail Sales System). This provided the opportunity to evaluate the fishery by contacting anglers who were interested in lake sturgeon fishing with a questionnaire sent through the US Postal Service. Anglers who received a lake sturgeon tag during either 2006 or 2007 comprised our population of anglers. There were seven sites in southeastern, Lower Michigan where these tags were available – two were DNR facilities and five were local fishing tackle retail stores. The lake sturgeon harvest tag system was not part of the statewide Retail Sales System used for fishing and hunting licenses sales. As a result, all bookkeeping was done by hand, and angler's names and driver's license or sports card numbers were sometimes difficult to decipher.

Survey questions were developed in consultation with several DNR, Fisheries Division biologists. The survey questionnaire was modeled after those used by DNR Wildlife Division for hunter and trapper surveys (Frawley and Etter 2008). The final version of the survey was a 2-page questionnaire that included 11 questions and space for anglers to include written comments for 2 of the questions (Appendix A). Anglers were also asked whether they were interested in participating in an Angler Diary Program to monitor future fishing activity.

There were 501 unique identification numbers (either driver licenses or sportcards) for anglers obtaining a lake sturgeon tag in 2006 and/or 2007. Of those, 119 obtained tags in both years, 178 obtained a tag only in 2006, and 204 obtained a tag only in 2007. We obtained the addresses of 458 tag holders (91%) by matching their identification numbers to records of license buyers in the Retail Sales System database. Unmatched records probably resulted from incorrect interpretation of hand written numbers during the process of obtaining a tag, incorrect transcription, or other human error. Demographic data (gender and age) were also obtained for tag holders through the Retail Sales System.

A questionnaire and a letter explaining the purpose of the survey (Appendix B) were mailed to each angler in mid-January 2008 – about 3.5 months after the close of the 2007 lake sturgeon season. Non-respondents were mailed up to two follow-up letters (Appendices C and D) and questionnaires at approximately 14 day intervals after each previous mailing.

We calculated the response rate as the number of usable returns/total sample, and the adjusted response rate as the number of usable returns/(total sample – non-deliverables). There are two types of non-response: item non-response and total questionnaire non-response (Kalton 1983). Both types occurred in this survey. There was no attempt to adjust any estimates from this survey for non-response bias. In addition, we generally did not attempt to extrapolate our estimates from the respondents to all tag holders; thus, we did not calculate confidence intervals for our estimates.

Results

Of the 458 surveys mailed out to lake sturgeon anglers, 300 were completed and returned for a 65.5% response rate. As with similar surveys of this nature (B. Frawley personal communication), the largest single response rate was realized from the first mailing. Of the 458 mailings, 183 were returned after the first mailing. The remaining anglers were sent a second letter and questionnaire and 83 more were returned within two weeks. A third mailing was sent to the remaining nonrespondents, and 34 more were returned. Thirteen addresses were reported as undeliverable by the US Postal Service, resulting in an adjusted response rate of 67.4%. A total of 145 tag holders in 2006 or 2007 did not respond to any of the three mailings.

Lake sturgeon anglers were predominantly male (90%) and ranged in age from 4 to 84 years, with an average age of 40.7 years. They resided in 16 Michigan counties (Table 1), but St. Clair, Macomb, and Oakland Counties combined to account for about 84% of the anglers participating in the St. Clair lake sturgeon fishery. Over 27% of the anglers resided in the zip code areas bordering the North Channel of the St. Clair River. Although there was no residency requirement for obtaining a lake sturgeon tag, there were no non-resident tag holders in 2006 or 2007.

A total of 178 respondents obtained a lake sturgeon tag in 2006, but only 156 (88%) reported they fished at least one time for lake sturgeon that year (Table 2). Those anglers reported catching a total of 683 lake sturgeon, for an average of 4.4 lake sturgeon per active angler (Table 3). Ten anglers reported harvesting a lake sturgeon in 2006.

In 2007, about 92% (188) of the total of 204 respondents who had obtained a lake sturgeon tag reported they fished at least once for lake sturgeon during that year (Table 2). These anglers took 979 fishing trips targeting lake sturgeon, with an average of 5.26 trips per active angler (Table 3). The maximum number of trips reported by a single angler was 40. A total of 573 lake sturgeon were reported caught, with an average of 3.1 fish per active angler. Lake sturgeon caught by anglers in 2007 ranged from 12 to 88 inches in total length. Anglers reported 124 (22%) of the lake sturgeon caught in 2007 were legal-sized. Anglers reported harvesting only four lake sturgeon, or roughly 3% of the legal-sized lake sturgeon caught during 2007.

About 61% of the respondents reported they fished for lake sturgeon at night, while 27% fished both at night and during daylight hours (Table 2). Only 12% reported fishing strictly during daylight hours. Nearly 70% of the anglers reported using boats to access their lake sturgeon fishing locations, but 19% of the anglers fished from a dock or shore. Only 11% of the respondents indicated they fished from both boats and docks or shore.

Lake sturgeon anglers were almost evenly divided in their interest in harvesting a lake sturgeon (Table 2). Over 35% of the anglers, who responded to the question, indicated they would be 'very likely' or 'somewhat likely' to harvest a legal-size lake sturgeon. On the other hand, 49.7% of the respondents reported they were 'not very likely' or 'not at all' interested in harvesting a lake sturgeon. Only 15% of the respondents were unsure if they would harvest a lake sturgeon. Over 50% of the anglers were 'very likely' or 'somewhat likely' to fish for lake sturgeon during the extended catch-and-release (C&R) fishing season which was scheduled to start in fall 2008.

Fishing success was not equal among anglers. Anglers that were "very likely" or "somewhat likely" to harvest a legal-size fish accounted for only 20% of the total number of lake sturgeon reported caught in 2006 and 2007 combined (Table 4). In contrast, anglers that indicated they had little interest in harvesting a legal-size fish accounted for 68% of the total number.

Lake sturgeon anglers were generally satisfied with the current tag and fish registration system, with over 92% of the responding anglers indicating they were satisfied (Table 2). Interestingly, over 70% of the anglers who were not satisfied with the current system indicated that they had little or no interest in harvesting a legal-sized lake sturgeon (Table 5). Anglers that were not satisfied most frequently commented that it was difficult to obtain tags due to the location and limited number of tag distribution sites. Some anglers also cited it was difficult to find an open fish registration site late at night. Several anglers also expressed concern that the current regulations were unclear.

We compared the lake sturgeon harvest data from the mail survey with the lake sturgeon harvest data from the mandatory registration system for 2006 and 2007. Lake sturgeon anglers responding to the mail survey reported harvesting ten lake sturgeon in 2006 and four lake sturgeon in 2007 (Table 2). There were six fish registered in 2006, and three fish registered in 2007 (DNR, unpublished data). For the six fish registered in 2006, angler data was available for only four of the fish, because data for the others was not recorded on the fish registration log at one of the registration sites. Cross-referencing the angler data for the four registered fish with the mail survey data found that two anglers responded to the survey and indicated they had harvested a lake sturgeon, one angler did not

respond to the survey, and one survey was returned as undeliverable (Table 6). Eight lake sturgeon were reported harvested by anglers in the mail survey, but not listed in the fish registration log for 2006. If we assume that the two registered fish lacking angler data accounted for two of the unregistered fish, then a total of six unregistered fish were reported harvested by anglers in the mail survey. For 2007, cross-referencing the angler data for the three registered fish with the mail survey angler data found that one angler responded to the survey and indicated a fish was harvested, one angler did not respond to the survey, and one angler was not in the survey database. Three lake sturgeon were reported harvested by anglers in the mail survey, but not listed in the fish registration database. For both 2006 and 2007, these data indicated that only half of the lake sturgeon harvested each year were properly registered at a fish registration site.

The final item on the survey questionnaire asked if the angler was interested in participating in a voluntary angler diary program. Of the 300 anglers that responded to the survey, 128 indicated they would be interested in participating in the diary program. Diary program start-up packets were mailed to those individuals during July 2008.

Discussion

A search of Fisheries Division publications found only one record of a previous Michigan lake sturgeon angler postal survey. A postal survey targeting lake sturgeon spearers on the Black/Burt/Mullet lake complex was conducted in 1956 (Vondett 1957). No other records of postal surveys for Michigan lake sturgeon anglers were found. In fact, few similar surveys have been done by Fisheries Division in recent years with the exception of a bass angler survey in 2005 (Todd Grischke, DNR Fisheries Division, personal communication). In contrast, DNR Wildlife Division has been conducting several postal surveys each year for various hunting and trapping activities.

St. Clair system lake sturgeon anglers responded to the mail survey at a 67.4% adjusted response rate. This compares favorably to other outdoor recreational user surveys in Michigan in recent years. Frawley and Rudolph (2008) reported a 64% response rate from deer hunting license buyers in Michigan. Michigan furbearer hunting and trapping license buyers responded at a 68% rate (Frawley 2006a), while turkey hunting license buyers responded at a 71% adjusted response rate (Frawley 2006b). A recent study of hand fishing for catfish (noodling) in Missouri realized a 55.9% response rate, even though the practice was illegal (Morgan 2008). It seems that resource users who are strongly vested in their sports are quite willing to respond to mail-back surveys.

The St. Clair System lake sturgeon fishery was largely a local fishery as 84% of the anglers were residents of Oakland, Macomb, and St. Clair Counties. Similarly, those same three counties accounted for 77% of the St. Clair River anglers interviewed during DNR creel surveys from 2002 to 2005 (Thomas and Towns 2011). Clearly, local residents account for a large portion of the fishing activity for both lake sturgeon and other species on the St. Clair River.

The length range of lake sturgeon reported caught by survey respondents was wider than that for lake sturgeon captured in DNR assessment surveys on the same waters. Anglers reported catching fish ranging from 12 to 88 inches in length during 2007. Lake sturgeon captured in surveys on the St. Clair River during 2007 ranged from 19.5 to 70.8 inches (M. Thomas, unpublished data). This discrepancy may in part be a function of sample size. Anglers reported catching a total of 573 lake sturgeon, while only 151 were caught in the DNR survey. Another factor could be length estimation by anglers, particularly for large fish, since some may lack a measuring device long enough or techniques to hold and measure a large lake sturgeon.

Anglers reported that 22% of the lake sturgeon they caught in 2007 were within the legal harvest slot size of 42 to 50 inches. Surprisingly, 22% of the lake sturgeon caught during DNR surveys in 2007, were also within the legal harvest slot size (M. Thomas, unpublished data). We believe that this

confirms that the current slot size limit protects nearly 80% of the lake sturgeon population from legal harvest.

The mail survey responses suggested that most fishing effort directed at lake sturgeon takes place at night. This has several implications for fisheries management. First, because standard DNR creel surveys do not include periods of darkness, the lake sturgeon fishery will be under-represented in standard creel survey results. As a result, fisheries managers will need to use other tools, such as angler diary programs or mail surveys like this one, to better monitor the lake sturgeon fishery. Secondly, enforcement after dark is more challenging, since angler activity is more difficult to monitor at night. Fisheries managers should encourage Law Enforcement Division to conduct night patrols during the lake sturgeon fishing season to encourage compliance. Thirdly, the heavy night component of the lake sturgeon fishery clearly makes fish registration for many anglers difficult. None of the fish registration sites are open all night and retaining a lake sturgeon until the next day for registration may be viewed as an unnecessary nuisance by some anglers. As a result, it is likely that some harvested lake sturgeon are not properly registered. Compliance could be improved by offering an alternative registration method, such as a phone registration system, which would be available at all hours.

While 35% of the survey respondents indicated they were interested in harvesting a lake sturgeon, nearly 50% of the anglers indicated they had little or no interest in harvesting a lake sturgeon. This strong C&R component of the fishery presents some challenges to fisheries managers. The current set of fishing regulations, including the harvest tag and fish registration system, was developed with harvest anglers in mind. Efforts are underway to tailor the lake sturgeon fishing regulations to better address the strong C&R component of the fishery. In fact, a new C&R season has been added for the St. Clair River lake sturgeon fishery beginning in fall 2008. Additional changes in the future will likely include a revised system with a fishing permit for lake sturgeon (good for all types of lake sturgeon fishing) and a separate harvest tag, only to be used when a fish is legally harvested. Ultimately however, the C&R interest poses the greatest difficulty for maintaining a closed season. If seasons for other fish species, such as channel catfish, freshwater drum, or walleye are open, unethical anglers interested in C&R fishing for lake sturgeon can simply claim to be fishing for one of the other species. From an enforcement standpoint, C&R fisheries can be quite difficult to regulate because angler intent is unknown.

A majority of the lake sturgeon anglers that responded to the survey were satisfied with the current lake sturgeon harvest tag and fish registration system. Interestingly, C&R anglers were the most dissatisfied with the system. Based on their comments, much of their dissatisfaction arises from the need for C&R anglers to obtain and possess a "harvest" tag, when they have no intention of harvesting a fish. Some C&R anglers were also concerned about confusion with the regulations among lake sturgeon anglers. As previously mentioned, changes to the system are likely in the near future. These changes will help clarify the regulations and better address the C&R portion of the fishery. Incorporation of the lake sturgeon fishing permit and harvest tag into the statewide Retail Sales System will further address issues regarding availability of tags, as well as reliability and accessibility of data for both fisheries managers and law enforcement officers.

From a management standpoint, it was desirable to attempt to estimate the total recreational harvest of lake sturgeon from the St. Clair system in 2006 and 2007. Based on the responses from 67.4% of the lake sturgeon anglers that obtained tags in those years, a total of ten lake sturgeon were harvested in 2006, and four in 2007. If we assumed that non-responding anglers harvested lake sturgeon at the same rate as responding anglers, then the estimated total lake sturgeon harvests were 21 in 2006 and 7 in 2007. If non-responding anglers harvested lake sturgeon at double the rate of responding anglers, then the yearly estimated harvest totals were 26 for 2006, and 9 for 2007, or an average of 17 fish per year.

The DNR Lake Sturgeon Rehabilitation Strategy (Hay-Chmielewski and Whelan, 1997) recommended fishing mortality remain below 3% for an expanding population and below 6% to maintain lake sturgeon abundance. A mark-and-recapture population estimate by Thomas and Haas (2002) resulted in an estimate of 45,506 lake sturgeon for the St. Clair system (St. Clair River and Lake St. Clair). However, more recent mark-recapture estimates based on a longer survey time series have produced estimates of 15,000 to 20,000 lake sturgeon (DNR, unpublished data). Tagging studies have also demonstrated that lake sturgeon, especially fish larger than 42 inches, regularly move between the St. Clair River, Lake St. Clair, and southern Lake Huron (Thomas and Haas 2004). If we consider all lake sturgeon within this area as a single population, then an annual harvest of less than 450 fish would be necessary to maintain annual fishing mortality rate of less than 3% for a population of 15,000 fish. Results of this survey suggest that the Michigan lake sturgeon sport harvest accounts for an average harvest of about 17 fish per year. The Ontario commercial harvest from southern Lake Huron averaged about 212 lake sturgeon in 2006-2007 (based on an average weight of about 15 kg per harvested fish; Currie and Gile 2008). Estimates of Ontario sport or tribal harvest for the area were unavailable, but we believed these to be quite low based on low observed angler presence, anecdotal angling reports, and discussions with conservation officers and Ontario fisheries biologists. Considering all the factors discussed above, we estimate the total lake sturgeon harvest from these waters in 2006 and 2007 averaged less than 450 fish per year, thus remaining below the 3% annual fishing mortality threshold recommended in the Rehabilitation Strategy. During summer 2008, Ontario announced regulation changes which closed the commercial lake sturgeon fishery and all recreational lake sturgeon harvest in Canadian waters of Lake Huron in 2009. Thus, fishing mortality on this population of lake sturgeon should decline even further.

Some anglers and other people have expressed concern about possible delayed mortality of lake sturgeon caught and released by recreational anglers in the St. Clair River. Our experience in handling these fish during surveys has been that lake sturgeon are capable of surviving substantial handling and exposure to air. In fact, recent physiological studies report lake sturgeon can survive maximal stress levels due to the capture, handling and tagging associated with a fisheries survey, but quickly return to normal levels with no mortality (Baker et al. 2008). During DNR surveys, setlines and trawls have been used to capture lake sturgeon from May through September. Fish caught on survey setlines can be hooked for many hours until retrieved, taken aboard the research vessel, measured, sampled, tagged, and released. Similarly, lake sturgeon caught in survey trawls can be dragged in the trawl for several minutes, then exposed to air for two or three minutes while being removed from the net, and further exposed to air during the measuring and tagging procedures, prior to being released. In practice, survey-caught fish likely experience longer air exposure than a fish hooked by an angler, boated, measured, photographed, and then released. Further, since 1997, a total of 35 lake sturgeon caught on survey setlines in the St. Clair River have been surgically implanted with sonic tags for various telemetry studies, with the surgery requiring additional air exposure time. Tracking of individual fish during these studies confirmed survival rates were near 100% with many fish tracked over a period of 24 to 36 months. We believe that these telemetry examples of survey caught fish surviving for years after the initial capture event, as well as the many examples of survey-caught fish which have been recaptured (sometimes multiple times) during subsequent surveys, and also by sport anglers (Thomas and Haas 2004), provides strong evidence that delayed mortality due to capture and handling is low.

The development of the Michigan St. Clair River lake sturgeon sport fishery since the regulation change in 1999 has been interesting to observe. The strong C&R component of the fishery was unexpected, and generated several issues related to harvest tags and other wording of the regulations. Many lake sturgeon anglers have adopted the various fishing report forums and websites on the internet as venues for exchanging information such as daily catch reports (often with pictures), fishing locations and techniques, suggestions for improving C&R fish handling methods, and even questions about the lake sturgeon regulations and lake sturgeon surveys (including this postal survey) conducted

by the DNR. Based on the materials we have observed on these websites, it appears that a growing group of lake sturgeon fishing enthusiasts, has developed a sense of ownership and concern about conserving and protecting this unique fishery. From our perspective, this has benefited the St. Clair lake sturgeon population, as these anglers have provided numerous tag recovery reports, provided peer pressure to respect the regulations and resource, and have even volunteered to help with lake sturgeon research in the area. We have used this internet connection to inform our lake sturgeon anglers about survey activities and to request their assistance in monitoring for suspicious activity in the vicinity of the survey gear. Perhaps it is not a coincidence that survey gear tampering, which was a problem in past years, was not a problem in 2006 and 2007, when we asked for anglers to help us by reporting any suspicious behavior near our sampling gear.

Summary

The postal survey indicated that St. Clair System lake sturgeon sport fishery and associated regulations provided anglers with a unique fishing opportunity while protecting and conserving the fishery resource. Harvest was low, while C&R fishing was widely practiced. Furthermore, lake sturgeon anglers have become valuable partners in local lake sturgeon research by reporting tagged fish, providing on-water survey gear monitoring, and voluntarily participating in an angler diary program. All available evidence suggests that mortality due to C&R fishing was negligible. When combined with all other sources of fishing mortality for lake sturgeon in the waters from southern Lake Huron south to Lake Erie during 2006 and 2007, total fishing mortality remained well below the recommended threshold in the Michigan Lake Sturgeon Rehabilitation Strategy. Still, we need to stay diligent and watch for changes in the fishery, such as a shift away from C&R and toward increased harvest. Also, illegal harvest of lake sturgeon may be a growing problem since the Russian sturgeon populations which have supplied the bulk of the world's caviar have recently collapsed. In fact, illegal harvest in other locations in Ontario has been linked to black market commercialization of lake sturgeon roe for caviar. While a strong presence and awareness of the poaching threat by law enforcement officials on both sides of the border will be an important factor in protecting the lake sturgeon resource in the St. Clair system, the on-water presence of legal lake sturgeon anglers, many armed with digital cameras and video recorders, may provide further deterrence to poaching activity.

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Table 1.—County of residence for St. Clair system lake sturgeon anglers in 2006–07.

County	Frequency	Percent
St. Clair	164	35.8
Macomb	158	34.5
Oakland	62	13.5
Wayne	36	7.9
Livingston	9	2.0
Sanilac	7	1.5
Lapeer	5	1.1
Washtenaw	4	0.9
Genesee	3	0.7
Kent	3	0.7
Ottawa	2	0.4
Clinton	1	0.2
Grand Traverse	1	0.2
Mecosta	1	0.2
Midland	1	0.2
Ogemaw	1	0.2
Total	458	100.0

Table 2.—Angler responses to survey questions about fishing preferences and interest.

Question	Attribute	N	Percent (%)
Q1a: Did you fish for sturgeon in 2006?	Yes	156	52.5
	No	141	47.5
Total		297	
Q1b: Did you fish for sturgeon in 2007?	Yes	188	62.9
	No	111	37.1
Total		299	
Q3: Do you mainly fish for sturgeon	During daylight hours?	27	11.6
	During night time hours?	142	61.2
	Both during daylight and after dark?	63	27.2
Total		232	
Q4: Do you usually fish for sturgeon from:	A boat?	162	69.8
	From shore, a dock, or a pier?	44	19.0
	Both?	26	11.2
Total		232	
Q6a: Did you catch a legal size sturgeon in 2007?	Yes	53	23.8
	No	170	76.2
Total		223	
Q8a: Did you keep (harvest) a sturgeon in 2006?	Yes	10	4.4
	No	219	95.6
Total		229	
Q8b: Did you keep (harvest) a sturgeon in 2007?	Yes	4	1.8
	No	222	98.2
Total		226	
Q9: If you catch a legal-size lake sturgeon in the future, how likely are you to keep it?	Very likely	65	22.1
	Somewhat likely	39	13.3
	Unsure	44	15.0
	Not very likely	50	17.0
	Not at all	96	32.7
Total		294	
Q10: Are you satisfied with the current sturgeon tag and fish registration system?	Yes	271	92.2
	No	23	7.8
Total		294	
Q11: How likely are you to fish for sturgeon during the new catch-and-release season during October and November?	Very likely	77	26.0
	Somewhat likely	75	25.3
	Unsure	67	22.6
	Not very likely	38	12.8
	Not at all	39	13.2
Total		296	

Table 3.—Fishing effort (trips), numbers, and sizes of lake sturgeon caught by anglers responding to the survey.

Item	N	Sum	Mean	SE	Min	Max
Q2: How many sturgeon fishing trips did you make in 2007?	186	979	5.3	0.48	0	40
Q5a: How many sturgeon did you catch in 2006?	154	683	4.4	0.59	0	42
Q5b: How many sturgeon did you catch in 2007?	187	573	3.1	0.43	0	35
Q6b: How many legal-size sturgeon did you catch in 2007?	51	124	2.4	0.29	1	10
Q7a: Approximately how long (inches) was the largest sturgeon you caught in 2007?	109	–	54.2	1.27	20	88
Q7b: Approximately how long (inches) was the smallest sturgeon you caught in 2007?	87	–	31.2	1.32	12	60

Table 4.–Angler lake sturgeon fishing success compared with interest in harvesting a lake sturgeon.

	Q9: If you catch a legal-size lake sturgeon in the future how likely are you to keep it?					Total
	Very likely	Somewhat likely	Unsure	Not very likely	Not at all	
Q5a: How many sturgeon did you catch in 2006?	91	25	103	162	302	683
Q5b: How many sturgeon did you catch in 2007?	90	53	49	127	254	573
Q6b: How many legal-size sturgeon did you catch in 2007?	7	9	19	29	58	122
% of total sturgeon catch for 2006 and 2007 combined	14	6	12	23	44	

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Table 5.–Lake sturgeon angler satisfaction with current tag registration compared with interest in harvesting a lake sturgeon in the future.

Q10: Are you satisfied with the current sturgeon tag and fish registration system?	Q9: If you catch a legal-size lake sturgeon in the future how likely are you to keep it?					N
	Very likely	Somewhat likely	Unsure	Not very likely	Not at all	
Yes	23.0%	14.0%	15.8%	17.7%	29.4%	265
No	13.0%	4.3%	8.7%	8.7%	65.2%	23

Table 6.–Comparison of harvested lake sturgeon registered at designated registration sites and anglers reporting lake sturgeon harvested in the mail survey.

Item	Year	
	2006	2007
Fish registered and reported by angler in survey	2	1
Fish registered but not reported by angler in survey response	0	0
Fish registered but no angler response to survey	2	1
Fish registered but angler data not in tag database	0	1
Fish registered but no angler data recorded at registration site	2	0
Fish reported harvested by angler in survey but not registered ^a	6	3
Minimum estimated number of harvested sturgeon	12	6
% of reported harvested fish registered at check sites	50%	50%

^a Two sturgeon registered without accompanying angler data were assumed to have been among the eight fish reported as harvested by anglers in the mail survey but not listed in the fish registration database.

References

- Baker, D. W., S. J. Peake, and J. D. Kieffer. 2008. The effect of capture, handling, and tagging on hematological variables in wild adult lake sturgeon. *North American Journal of Fisheries Management* 28:296–300.
- Baker, E. A. 2006. Lake Sturgeon Distribution and Status in Michigan, 1996–2005. Michigan Department of Natural Resources, Fisheries Technical Report 2006-4, Ann Arbor.
- Currie, S. L. and S. R. Gile. 2008. Lake Huron Commercial Fishing Summary for 2007. Ontario Ministry of Natural Resources, Upper Great Lakes Management Unit, Lake Huron, Report TR-LHA-2008-1. Owen Sound, Ontario.
- Ebert, E. S., N. W. Harrington, K. J. Boyle, J. W. Knight, and R. E. Keenan. 1993. Estimating consumption of freshwater fish among Maine anglers. *North American Journal of Fisheries Management* 13:737–745.
- Edison, T. W., D. H. Wahl, M. J. Diana, D. P. Philipp, and D. J. 2006. Angler opinion of potential bluegill regulations on Illinois lakes: Effects of angler demographics and bluegill population size structure. *North American Journal of Fisheries Management* 26:800–811.
- Frawley, B. J., and D. Etter. 2008. 2007 Bobcat hunter and trapper harvest in Michigan. Michigan Department of Natural Resources, Wildlife Division Report 3486. Lansing.
- Frawley, B. J., and B. A. Rudolph. 2008. 2006 Deer hunter opinion survey. Michigan Department of Natural Resources, Wildlife Division Report 3482. Lansing.
- Frawley, B. J. 2006a. 2004 Michigan furbearer harvest survey. Michigan Department of Natural Resources, Wildlife Division Report 3459. Lansing.
- Frawley, B. J. 2006b. 2006 Michigan spring turkey hunter survey. Michigan Department of Natural Resources, Wildlife Division Report 3464. Lansing.
- Hay-Chmielewski, E. M., and G. E. Whelan. 1997. Lake sturgeon rehabilitation strategy. Michigan Department of Natural Resources, Fisheries Special Report 18, Lansing.
- Kalton, G. 1983. Compensating for missing survey data. Institute for Social Research, University of Michigan, Ann Arbor.
- Margenau, T. L., and J. B. Petchenik. 2004. Social aspects of muskellunge management in Wisconsin. *North American Journal of Fisheries Management* 24:82–93.
- McLeod, C., L. Hildebrand, D. Radford. 1999. A synopsis of lake sturgeon management in Alberta, Canada. *Journal of Applied Ichthyology* 15:173–179.
- Morgan, M. 2008. Outlaw fishing in Missouri. *Fisheries* 33(4):165–171.
- Niesar, M., R. Arlinghaus, B. Rennert, and T. Mehner. 2004. Coupling insights from a carp, *Cyprinus carpio*, angler survey with feeding experiments to evaluate composition, quality, and phosphorus input of groundbait feeding in coarse fishing. *Fisheries Management and Ecology* 11:225-235.
- Quinn, S. P. 1992. Angler perspective on walleye management. *North American Journal of Fisheries Management* 12:367–378.

- Quinn, S. P. 1993. Description of a multiuse fishery for flathead catfish. *North American Journal of Fisheries Management* 13(3):594–599.
- Thomas, M. V., and R. C. Haas. 2002. Abundance, age structure, and spatial distribution of lake sturgeon, *Acipenser fulvescens*, in the St. Clair System. *Journal of Applied Ichthyology* 18:495-501.
- Thomas, M. V., and R. C. Haas. 2004. Abundance, age structure, and spatial distribution of lake sturgeon *Acipenser fulvescens* in the St. Clair System. Michigan Department of Natural Resources, Fisheries Research Report 2076. Ann Arbor.
- Thomas, M. V., and G. L. Towns. 2011. Summary of Creel Survey Results for the St. Clair River, Lake St. Clair, and the Detroit River, 2002–05. Michigan Department of Natural Resources, Fisheries Technical Report 2011-1, Ann Arbor.
- United States Department of the Interior, Fish and Wildlife Service and United States Department of Commerce, Bureau of Census. 2008. 2006 National survey of fishing, hunting and wildlife-associated recreation. United States Governmental Printing Office, Washington.
- Vondett, H. J. 1957. A questionnaire census of sturgeon spearing, January-February, 1956, on Black, Burt, and Mullett lakes, Cheboygan County. Michigan Department of Conservation, Fisheries Division, Fisheries Research Report 1529. Ann Arbor.

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Approved by Tammy J. Newcomb

Appendix A.–The questionnaire sent to people that obtained lake sturgeon harvest tags in Michigan for the 2006 and 2007 lake sturgeon fishing seasons in the St. Clair System area.



MICHIGAN DEPARTMENT OF NATURAL RESOURCES
FISHERIES DIVISION
LAKE ERIE MANAGEMENT UNIT
26000 W. Eight Mile Road, Southfield, MI 48034

St. Clair System Sturgeon Angler Survey

This information is requested under authority of Part 435, 1994 PA 451, M.C.L. 324.43539

ADDRESS HERE



Please restrict your answers to the Michigan waters of the St. Clair River and Lake St. Clair.

We need this information even if you did not fish for or catch a sturgeon!

Instructions: Please fill out this survey only for YOUR individual fishing activity. For example: If you are a boat captain, and you and your guests caught 20 sturgeon throughout the season – but YOU personally caught 5 of those fish – please report the information on only the 5 you caught. We will attempt to get information on the other catches from the others who were on your boat (we are sending these surveys to everyone who registered for a sturgeon tag).

1. Did you fish for sturgeon in 2006? Yes or No; in 2007? Yes or No

NOTE: if your answer is NO to both years – please skip down to Question 9.

2. How many sturgeon fishing trips did you make in 2007? _____

3. Do you mainly fish for sturgeon:
 during daylight hours
 during night time hours
 both during daylight and after dark

4. Do you usually fish for sturgeon from:
 a boat?
 from shore, a dock, or a pier?
 both?

5. How many sturgeon did you catch in 2006? _____; in 2007? _____

6. Did you catch a legal size (42 to 50 inches) sturgeon in 2007? Yes or No
If so, how many? _____

7. Approximately how long was the largest sturgeon you caught in 2007? _____ inches.
Approximately how long was the smallest sturgeon you caught in 2007? _____ inches.

Appendix B.–First letter mailed to lake sturgeon anglers from the St. Clair System area.



JENNIFER M. GRANHOLM
GOVERNOR

STATE OF MICHIGAN
DEPARTMENT OF NATURAL RESOURCES
LANSING



REBECCA A. HUMPHRIES
DIRECTOR

Fisheries Division
Lake Erie Management Unit
26000 W. Eight Mile Road
Southfield, MI 48034

January 23, 2008

Dear Sturgeon Angler:

To properly manage fish populations it is important for us to have knowledge of the annual harvest, and of how much fishing activity occurs for various species of fish. Using this information we can determine trends in fishing activity, the importance of certain fish species to the angling public, and to some extent, the population status of fish. We invite you to help with this first (ever) St. Clair River/Lake St. Clair sturgeon angler survey. **We need this information even if you did not fish for or catch a sturgeon.**

Since statewide sturgeon fishing regulations were revised in 1999, Lake St. Clair and the St. Clair River are the only Great Lakes and connecting waters in Michigan where sturgeon can be legally harvested. For these waters in Michigan, the harvest season was open from July 15 to September 30, with a legal harvest size range from 42" to 50", and a mandatory registration for sturgeon anglers and harvested fish. Under this system, all anglers fishing for lake sturgeon are first required to obtain a sturgeon tag from one of several bait shops or MDNR offices in Southeast Michigan. A tag is required even if you do not intend to harvest a sturgeon.

You have been selected to receive this survey because you registered for a lake sturgeon tag during 2006 and/or 2007. By completely and accurately filling out this form, you will be helping the Michigan Department of Natural Resources manage the unique lake sturgeon population found in the Great Lakes waters of southeast Michigan.

Please take a few minutes to complete this questionnaire and return it in the enclosed postage-paid envelope. Your information will be combined with information from over 450 other anglers who registered and picked up a sturgeon tag in 2006 and/or 2007. If you have questions regarding the survey, please contact either of us below.

Thank you for your participation in this survey.

Sincerely,

Gary Towns, LEMU Supervisor,
Southfield Operations Service Center
phone: 248-359-9046
email: Townsg@Michigan.gov

OR

Mike Thomas, Research Biologist
Lake St. Clair Fisheries Research Station
phone: 586-465-4771
email: Thomasmv@Michigan.gov

Enc

NATURAL RESOURCES COMMISSION
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Appendix C.–Second letter mailed to lake sturgeon anglers from the St. Clair System area who did not respond to the first letter.



JENNIFER M. GRANHOLM
GOVERNOR

STATE OF MICHIGAN

DEPARTMENT OF NATURAL RESOURCES

LANSING



REBECCA A. HUMPHRIES
DIRECTOR

Fisheries Division
Lake Erie Management Unit
26000 W. Eight Mile Road
Southfield, MI 48034

February 5, 2008

Dear Sturgeon Angler:

A few weeks ago we sent you a survey form and asked you to report the results of your sturgeon fishing over the past two years. If you have already returned your questionnaire, we appreciate your help. If not, please fill out and return the enclosed questionnaire today. Without your information, our study results will be less accurate than they could be, and we need the information to properly manage the sturgeon fishery. **We need this information even if you did not fish for, or catch a sturgeon.**

Since 1999, Lake St. Clair and the St. Clair River are the only Great Lakes waters in Michigan where sturgeon can be harvested. For these waters, the harvest season was open from July 15 to September 30, with a legal harvest size range from 42 to 50 inches, and a mandatory registration for sturgeon anglers and harvested fish. Under this system, all anglers fishing for lake sturgeon are first required to obtain a harvest tag from one of several bait shops or MDNR offices in Southeast Michigan. A tag is required even if you do not intend to harvest a sturgeon.

You have been selected to receive this survey because you registered for a lake sturgeon harvest tag during 2006 and/or 2007. By completely and accurately filling out this form, you will be helping the Michigan Department of Natural Resources manage the unique lake sturgeon population found in the Great Lakes waters of southeast Michigan.

Please take a few minutes to complete the questionnaire and return it in the enclosed postage-paid envelope. Your information will be combined with information from over 450 other anglers who picked up a sturgeon tag in 2006 and/or 2007.

We sincerely thank you for your participation in this survey. If you have questions regarding the survey, please contact either:

Mr. Gary Towns, LEMU Supervisor,
Southfield Operations Service Center,
Phone: 248-359-9046
email: Townsg@Michigan.gov

OR

Mike Thomas, Research Biologist
Lake St. Clair Fisheries Research Station
phone: 586-465-4771
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Appendix D.–Third and final letter mailed to lake sturgeon anglers from the St. Clair System area who did not respond to either of the previous letters.



JENNIFER M. GRANHOLM
GOVERNOR

STATE OF MICHIGAN

DEPARTMENT OF NATURAL RESOURCES

LANSING



REBECCA A. HUMPHRIES
DIRECTOR

February 25, 2008

Dear Sturgeon Angler:

Earlier this year, we sent you a survey form asking you to report the results of your 2006 and 2007 sturgeon fishing seasons. **We need information from you, even if you did not fish for, or catch a sturgeon.** Unfortunately, we have not received your completed survey. Without your information, our study results will be less accurate than they could be. Your information will help us to manage the sturgeon population and help maintain this fishery which we all enjoy. We have enclosed another survey form and ask that you help all your fellow sturgeon anglers by completing and mailing it today.

Anglers can be one of the best sources of information used to manage important fish species. Indeed, this information is considered so important that **Michigan lawmakers require anglers to report the number, kinds, and location of fish caught or harvested when requested by the Department of Natural Resources.**

Even if you did not fish or catch a sturgeon, your information is an important part of this year's survey. This information will give us an adequate understanding of all license buyers. You have been selected to receive this survey because you registered for a lake sturgeon harvest tag during 2006 and/or 2007. Your information will be combined with information from over 450 other anglers who picked up a sturgeon tag in one or both of these years.

Again, please take a few minutes to complete this short questionnaire and return it in the enclosed postage-paid envelope.

We sincerely thank you for your participation in this survey. If you have questions regarding the survey, please contact either:

Mr. Gary Towns, LEMU Supervisor,
Southfield Operations Service Center,
26000 W. Eight Mile Road
Southfield, MI 48034
Phone: 248-359-9046
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Enclosures

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