DEPARTMENT OF NATURAL RESOURCES

Status of the Fisheries in Michigan Waters of Lake Erie and Lake St. Clair, 2023

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A Mooneye captured from the Thames River, ON as part of an international research partnership with the Ontario Ministry of Natural Resources and Forestry

Lake St. Clair Fisheries Research Station
Website: https://www.michigan.gov/dnr/managing-resources/fisheries/research/lk-st-clair

FISHERIES DIVISION

Highlights for 2023

The purpose of this report is to provide an update on the status of the fisheries in the Great Lakes and connecting waters of Southeast Michigan. Sources of information used in compiling this report include creel surveys, charter boat reports, an angler diary program, the Michigan Department of Natural Resources (MDNR) Master Angler program, commercial fishery records, and fisheries survey results. Some of the highlights described in detail include:

- Recreational anglers spent an estimated 385,909 hours fishing Lake Erie in 2023, catching 839,270 fish.
- The Lake Erie Walleye fishery remained excellent in 2023 with a total of 143,750 Walleye harvested by non-charter recreational anglers.
- The non-charter recreational Yellow Perch fishery in Michigan's Lake Erie waters harvested 2.66 fish per hour exceeding the long-term mean for the first time since 2018.
- Forage fish catch rates in Michigan's Lake Erie bottom trawl survey remained below the 10-year average, though Ohio and Ontario trawl data indicated an increase in forage.
- Charter excursions on the St. Clair-Detroit River System continue to increase, up 10% from 2022.
- Smallmouth Bass size structure and mortality rates remained flat in 2023 compared to 2022.
- Master angler awards for Lake St. Clair Smallmouth Bass hit an all-time high in 2023.
- Charters targeting Lake Sturgeon had the highest reported effort and catch rate since monitoring began.

About the Lake St. Clair Fisheries Research Station

The Lake St. Clair Fisheries Research Station is a unit of the Research Section of the MDNR Fisheries Division. The station conducts research and stock assessment on fish populations of Lake Erie, the St. Clair-Detroit River System (the St. Clair River, Lake St. Clair, the Detroit River, and their tributaries), and Saginaw Bay. Results of this work are instrumental in fisheries management decisions affecting these waters. The station works closely with fisheries managers in the MDNR's Lake Erie Management Unit and routinely collaborates in joint projects with other state and federal partner agencies, local units of government, non-government organizations, academic institutions, and stakeholder groups. Federal Aid in Sport Fish Restoration (SFR) Act dollars provide support for most of the station's assessment activities. The SFR Program provides grant funds to restore and better manage America's fishery resources through excise taxes on the purchase of fishing equipment, motorboat and small engine fuels, import duties, and interest. More information on the SFR Program can be found at: https://www.fws.gov/program/sport-fish-restoration.

Methods Summary

The Lake St. Clair Fisheries Research Station collects data on the status of fisheries in Michigan waters of Lake Erie and the St. Clair-Detroit River System through a variety of methods. Information on angler catch rates and effort of Michigan's sport fisheries is collected with on-site angler surveys (creel surveys). In Southeast Michigan, on-site creel survey data are collected each year from the non-charter recreational fishery of Lake Erie. An on-site creel survey was also conducted on Lake St. Clair during 2023, however creel data from 2023 were not available at the publication date of this report for Lake St. Clair and are therefore excluded. The MDNR Master Angler program, established in 1973 to recognize anglers who catch unusually large fish, also provides information on trends in voluntary reports of "trophy" catches throughout the Great Lakes waters of Southeast Michigan. Charter boat harvest, release, and angling effort are also recorded by Lake Erie and St. Clair-Detroit River System charter operators, who are required to report this information to the MDNR monthly for their activities in the American waters of these systems. A volunteer angler diary program was started in 2022 specifically for anglers targeting Lake Sturgeon and provides additional information on Lake Sturgeon catch rates in the system. Anglers participating in the angler diary program also receive a passive integrated transponder (PIT) tag reader so that they can scan their captured fish for tags and provide information on recapture rates during time periods outside of MDNR survey work.

The MDNR conducts several annual assessments using a variety of gear types to target the diverse fish communities present in Lake Erie and the St. Clair-Detroit River System. Since 1978, the Lake St. Clair

Fisheries Research Station has fished variable mesh multi-filament gill nets at two fixed (index) locations in western Lake Erie each fall, as part of an interagency Walleye assessment program. Four randomly selected locations were also fished in 2023. We conduct a bottom trawl survey in Lake Erie each August to measure recruitment of important fish species and forage abundance. Trap nets have been deployed in Anchor Bay of Lake St. Clair each spring since 2002, except for 2016 and 2020, to sample adult fish populations. This survey came to an end at the completion of the 2023 field season. Juvenile and forage fish populations in Lake St. Clair have been assessed with bottom trawls each spring and fall since 1996, with the fall trawl survey ceasing after the 2023 field season. A micromesh gill net survey has been conducted in the fall on Lake St. Clair since 2021 and will replace the fall trawl survey going forward. A collaborative fish community survey between the MDNR, Ontario Ministry of Natural Resources and Forestry, and U.S. Fish and Wildlife Service began in 2021 and utilizes multiple survey gears on a rotational basis. A small-mesh fyke net survey was conducted in Lake St. Clair in 2021 and will be conducted every four years, a gill net survey was conducted in Lake St. Clair in 2022 and will be conducted every other year, a nearshore boat electrofishing survey in Lake St. Clair and Detroit River multi-gear survey were conducted in 2023 and will be conducted every 4 years, and a St. Clair River multi-gear survey will be completed in 2024 (along with the second rotation of the Lake St. Clair gill net survey). Small mesh fyke nets have additionally been used annually since 2021 to index Smallmouth Bass recruitment and nearshore fish abundance in Lake St. Clair. Likewise, micromesh gill nets were fished in Lake St. Clair to survey Yellow Perch recruitment. In 2016 MDNR added a nearshore electrofishing survey to its annual assessment efforts to better characterize fish communities in the nearshore areas of Michigan's Lake St. Clair waters where larger vessels cannot operate, which is separate from the collaborative survey effort mentioned above. A setline survey has been used to monitor the Lake Sturgeon population in the North Channel of the St. Clair River each June since 1997; beginning in 2013 the MDNR modified its bottom trawl to increase its success in capturing Lake Sturgeon in Lake St. Clair. Acoustic tagging and monitoring of tagged fish continues to be a growing component of the MDNR survey program. In 2023 we tagged Mooneye in the Thames River system of Lake St. Clair and Smallmouth Bass during the 2023 Bassmaster Elite Series Tournament at Brandenburg Park. Maintenance of the Lake St. Clair acoustic receiver grid was also performed.

Lake Erie

Sport Fishery Summary

Lake Erie's sport fishery is intense. While Lake Erie only accounted for 12% of the total non-charter, recreational boat angling effort spent on Michigan's Great Lakes waters during 2023, it accounted for one-third of the total catch. Further, the angling intensity in Michigan waters of Lake Erie during 2023 was 3,199 hours of angler effort per square mile of water, which is nearly 43 times higher than the angling intensity of Michigan waters of lakes Huron, Michigan, and Superior combined. Anglers who fished Michigan's Lake Erie waters during 2023 were rewarded with high catch rates. On average, Lake Erie anglers harvested 1.2 fish per hour of effort, which is 3.5 times higher than the harvest rates in Michigan waters of lakes Huron, Michigan, and Superior combined.

The annual creel survey conducted by the MDNR during 2023 produced a total effort estimate of 385,909 angler hours and a total catch estimate of 839,270 fish for Michigan's Lake Erie non-charter recreational boat fishery. While effort was lower than 2022, catch increased (2022 total effort: 401,186 hours, 2022 total catch: 762,549 fish). Angler effort and harvest in 2023 was driven by the Walleye and Yellow Perch fisheries; targeted Walleye effort totaled 265,789 angler hours and targeted Yellow Perch effort 97,889 angler hours (Figures 1 and 2). Total harvest for both species (143,750 Walleye and 260,502 Yellow Perch, Figures 1 and 2) accounted for 89% of the 453,458 fish non-charter, recreational boat fishery total harvest in Michigan waters. Other fish species accounted for 11% of total harvest.

In 2023, Michigan charter boat operators reported a total harvest of 32,649 fish of all species from Michigan waters of Lake Erie during 927 excursions, a 7% increase from 2022. Like the non-charter recreational boat fishery, Walleye and Yellow Perch comprised the greatest proportion of the total harvest in the charter fishery (51% and 48%, respectively). All other species harvested by charter anglers during 2022, accounted for just 1% of the total harvest.

Yellow Perch

Yellow Perch recruitment in the west and central basins of Lake Erie has been relatively low during the past several years, making for challenging recreational fishing. However, Yellow Perch fishing in Michigan's Lake Erie waters has improved since 2019 when the targeted harvest rate (0.84 fish per hour) in the non-charter recreational boat fishery was the 2nd lowest in the 1986-2022 time series. During 2023, the targeted harvest rate (2.66 fish per hour, Figure 3) rose above the long-term average of 2.12 fish per hour for the first time since 2018. The 2023 Yellow Perch charter total harvest rate remained 0.83 fish per hour (Figure 4), which is above the long-term mean of 0.69 fish per hour. The targeted Yellow Perch charter harvest rate was 5.43 fish per hour, a 9% increase from 2022 (4.97 fish per hour).

The total harvest of Yellow Perch in the Lake Erie non-charter recreational boat fishery was primarily comprised of age 2-4 fish from the 2019, 2020, and 2021 year classes, which contributed 88% of the total harvest by age. Age-5 fish from the 2018 year class accounted for 8% of the total harvest, with smaller contributions from age 6 plus (2017 year class and older) fish. Mean lengths of age 3-5 Yellow Perch in 2023 were higher than 2022 (Figure 5) and remain above long-term averages. Young-of-year Yellow Perch abundance, as evidenced by catch rates in the August bottom trawl survey, was slightly higher than 2022. During 2023 we captured an average of 173 age-0 Yellow Perch per 10-minute tow, below the average catch rate of 386 age-0 Yellow Perch per 10-minute tow observed since the survey began in 2014.

Walleye

The Lake Erie Walleye fishery remained excellent in 2023. A total of 265,789 angler hours were spent harvesting 143,750 Walleye; the targeted harvest rate of 0.54 Walleye per angler hour in 2023 (Figure 3) is the 85th percentile for the 1975-2023 time series. Harvest rates that compare to the past six years, which include the time series record of 0.67 Walleye per angler hour in 2018, have not been observed since the early 1980s and are well above the long-term means of 0.39 Walleye per angler hour for Michigan waters and 0.47 Walleye per angler hour for the western and central basins of Lake Erie.

Lake Erie charter captains reported a total harvest of 16,623 Walleyes, representing a total harvest rate of 0.87 fish per hour. This harvest rate is also above the long-term average of 0.76 fish per hour (Figure 4). The 2023 charter targeted harvest rate was 1.04 fish per hour, down 5% from 2022.

Gill nets were set at the two Lake Erie Walleye index stations in 2023 and 4 random locations as planned. The below-average total Walleye catch-per-unit-effort (CPUE) and yearling Walleye CPUE during the 2023 gill net survey (Figures 6 and 7) is believed to be due to unseasonably warm and calm weather during the October survey, leading to an overall lack of fish movement and catch. Indeed, bycatch of non-target species (42 fish per net lift) was also well below the average of 97 fish per net lift. Larger fish from older age classes are less likely to be captured in the gill nets, an artifact of the gear's size selectivity. The 2019 year class was the largest contributor to the fishery as indicated by fishery-dependent data from the creel survey, which showed that age-4 Walleye comprised 45% of the total harvest in the non-charter sport fishery. The 2018 year class (age-5, 22%) was the 2nd most frequently harvested age group, followed by fish from the 2020 year class. Age 6-8 fish from the 2017, 2016, and 2015 year classes accounted for just over 17% of the total non-charter recreational Walleye harvest. Average age-0 Walleye catch rates from the 2023 trawl survey (12 fish per 10-minute tow) were like those observed from 2020-2022 (12-14 fish per 10-minute tow) and remain above the relatively short time series average of 11 fish per 10-minute tow. Walleye catch rates from inter-agency surveys outside of Michigan waters also show continued strong walleye reproduction in Lake Erie's western basin, as age-0 abundance has been above average during the past six years, a period which includes the five highest trawl catch rates of young-of-year Walleye observed since the interagency survey began in 1988.

Forage fish

A total of 8,663 forage fish representing 18 different species were captured during 8 trawl tows in the August trawl survey, for an average CPUE of 1,091 fish per 10-minute tow. Young-of-year White Perch had the highest average CPUE (688 fish per 10-minute tow). Young-of-year Yellow Perch (173 fish per 10-minute

tow), Trout-perch (52 fish per 10-minute tow), Gizzard Shad (48 fish per 10-minute tow), and Mimic Shiners (15 fish per 10-minute tow) were also substantial contributors to the catch. One state endangered species, Channel Darter, and one state threatened species, Silver Chub, were also captured.

The 2023 forage catch rate was below the average forage CPUE observed since Michigan's modern-day bottom trawl survey began in 2014. Since this was only the 10th annual trawl survey in recent memory, it is difficult to put the catch rates that we observed into a broader context for the west basin of Lake Erie. Michigan's forage CPUE often parallels that of the decades-long Ontario and Ohio bottom trawl survey, which indicated increased forage catch rates in the western basin during 2023.

Commercial Fishery Summary

Since 1979 the commercial fishery in Michigan waters of Lake Erie has primarily harvested underused fish species using seines in the shallow bays along the shoreline, although a license to fish small mesh trap nets has also been active. Across all years, 25,456,033 pounds of fish have been harvested with the harvest comprised of Common Carp (45.6%) Gizzard Shad (15.3%), Buffalo (8.1%), Channel Catfish (7.3%), White Bass (5.8%), Freshwater Drum (5.2%), Quillback (4.7%), Goldfish (3.9%), White Perch (1.9%), Bullhead species (1.6%), Sucker species (0.4%), Lake Whitefish (0.2%), and Bowfin (<0.1%). In 2023, a total of three Michigan commercial fishing licenses, two for seines and one for small mesh trap nets, were active on Lake Erie. The 2023 commercial harvest included nine types of fish for a total of 90,292 pounds (Figure 8). In combination, Buffalo species (30%), Channel Catfish (25%), Common Carp (17%), and Quillback (14%) accounted for 86% of the total harvest by weight. The 2023 total harvest was 111,000 pounds lighter than the 2022 total harvest (201,763 total pounds) and below the long-term average commercial harvest of 606,096 pounds per year.

St. Clair River – Lake St. Clair

Sport Fishery Summary

Creel data were not yet available at the time of the writing of this report and are therefore not included.

For the St. Clair-Detroit River System (St. Clair River, Lake St. Clair, and Detroit River), charter boat anglers reported a total harvest of 47,602 fish of all species from the American waters of the system, essentially unchanged from 2022. Walleye accounted for (87%) of total charter harvest in 2023, primarily in the Detroit River, where nearly 35k Walleye were reported harvested.

In 2023, charter boat captains reported a total of 4,192 excursions on the American waters of the St. Clair-Detroit River System, a 10% increase from 2022, continuing an upward trend in charter boat excursions since 2009. A total 14,256 anglers spent 85,776 hours fishing the system demonstrating the importance of the St. Clair- Detroit River System as a source of recreation and an economic driver in the region.

Yellow Perch and Walleye

Charter anglers harvested a total of 41,581 Walleye from the American waters of the St. Clair-Detroit River system, essentially unchanged from 2022. Of these fish, the vast majority were taken by charters targeting Walleye, and 84% of total harvest occurred in the Detroit River. Total charter harvest rates for Walleye were 0.48 fish per hour, above the long-term average of 0.25 fish per hour and higher than charter harvest rates for Yellow Perch, which have declined since 2007 (Figure 9). The targeted charter catch rate of Walleye was 1.00 fish per hour, up slightly from 2022.

There are currently no Walleye-specific survey programs taking place in the St. Clair River and Lake St. Clair. However, Walleye continued to be captured at relatively high rates (5.92 per 24-hour set) in trap nets in Anchor Bay (Table 1), up 33% from 2022. Walleye catch rate in the trap net survey was also above the long-term average. Age-0 Walleye are rarely captured during the fall trawl survey, or other surveys targeting small fish, indicating low levels of reproduction from Lake St. Clair and its tributaries.

Yellow Perch reproductive success as indexed by age-0 catch rate in the fall trawl survey (Figure 10) increased by 526% from 2022 and was 91% higher than the long-term average. This marked the 2nd highest age-0 catch rate during the fall trawl survey since 2011. However, reproductive success doesn't necessarily correlate with recruitment to the adult population in Lake St. Clair. For example, the 2017 age-0 Yellow Perch catch rate in the fall trawls was the second highest since 2010; however, this did not translate to higher catch rates of age-1 fish in the spring 2018 trawls (Figure 11).

Growth of Yellow Perch in Lake St. Clair continues to be below the statewide average. Mean-length-at-age for Yellow Perch is below the statewide average for all ages observed during the 2023 spring trawls. Additionally, Yellow Perch growth is lower than it has been historically as demonstrated by mean-length-at-age estimates from pervious time periods (Figure 12).

Black Bass (Smallmouth Bass and Largemouth Bass)

Charters targeting Smallmouth Bass in the St. Clair-Detroit River System spent 20,187 hours targeting Smallmouth Bass (99% of effort occurring in Lake St. Clair), and captured and released 30,998 fish in 2023, up 9% from 2023. A total of 1,044 fish were harvested, resulting in a total release rate of about 97%. Harvest was up 6% from 2022. Targeted Smallmouth Bass catch rates were 1.59 fish per hour, virtually unchanged from 2022.

Statistics from the Master Angler program indicate that Lake St. Clair is the premier waterbody in the state for trophy Smallmouth Bass (Figure 13). A total of 55 fish were awarded a Master Angler award in 2023, the highest ever for Lake St. Clair. The 55 Smallmouth Bass Master Angler awards in 2023, represented 33% of the total Smallmouth Bass awards statewide, with a further 6 master angler Smallmouth Bass reported in the St. Clair River and one from the Detroit River. The continued strong representation of Lake St. Clair and adjoining waters in the Smallmouth Bass statewide Master Angler program is likely a reflection of an abundance of trophy-size Smallmouth Bass in the lake, a high degree of angler effort targeting the species, and widespread practice of catch-and-release among Smallmouth Bass anglers.

A total of 125 Smallmouth Bass were captured in the spring Anchor Bay trap net survey for a catch rate of 2.48 fish per 24-hour set, which was down from 2022 (3.03 fish per 24-hour set), and below the long-term average of 4.0 fish per 24-hour set (Table 1). Of these 125 captures, 117 individuals received jaw tags, with the remainder being too small to tag or being recaptures from previous years (n=4). Concurrent with the spring trap net survey, we sampled additional Smallmouth Bass by electrofishing near the "Mile Roads" area of Lake St. Clair, east of St. Clair Shores. An additional 98 Smallmouth Bass were sampled, of which 95 fish received jaw tags. As a result of these efforts, we handled a total of 223 Smallmouth Bass during the spring 2023 season. Valid age estimates were obtained for 215 individuals (pooled among the two collection sites). Analysis of age composition and annual mortality includes individuals from both trap netting and electrofishing efforts pooled together. The 2018 year-class (age-5, 22%) and the 2019 (age-4, 20%) were the two most abundant year classes in the 2023 sample. Generally, year-class contribution to Smallmouth Bass catch was relatively uniform; with additional steady contributions from the 2020, 2017, 2016, and 2013 year-classes (range 7-15% of the sample). Finally, a robust 7% of the catch was comprised of Smallmouth Bass age-11 years or older, demonstrating survival to ages capable of producing the large-sized fish prized by anglers. Smallmouth Bass total length averaged 16.5 inches in all sampling efforts with the smallest individual sampled measuring 10.6 inches and the largest 21.6 inches. We are only able to accurately weigh fish during the trap net survey; weights were obtained for all 125 individuals sampled with an average weight of 3.1 lbs. We estimated proportional size distributions for Smallmouth Bass, which can be thought of as the percent of the adult population (considered 8 inches in total length or larger for this exercise) that is larger than a given threshold. We calculated these values for fish 14, 17, and 20 inches and greater. In 2023, 92% of adult Smallmouth Bass we caught were 14 inches or larger, 39% were 17 inches or larger, and 5% were 20 inches or larger (Figure 14). The values for all three metrics increased slightly from 2022. The annual mortality rate was estimated using catch curve analysis which assumes that abundance of year classes in each sample is related to the population mortality rate. For 2023 the annual mortality rate was estimated at 26.2% down slightly from 2022 and maintaining an overall flat trend since 2002 (Figure 15). This suggests no change in Smallmouth Bass mortality has occurred across the time

series and is a good indicator that changes in regulations expanding the catch-and-release season have not negatively influenced population-level mortality rates.

Since 2002, a total of 6,204 Smallmouth Bass captured in survey trap nets in Anchor Bay have been tagged and released. Since 2016, a total of 1,120 Smallmouth Bass have been captured by electrofishing and tagged near 11 Mile Road. Smallmouth Bass movements appear rather localized, with nearly all the Smallmouth Bass tag recoveries reported to date coming from the Michigan waters of Lake St. Clair. Additionally, fish captured in Anchor Bay are rarely recaptured by anglers south of Metro Beach, and fish captured along the Mile Roads are rarely recaptured north of Metro Beach. Fish from both tagging locations are very rarely captured in Canadian waters of Lake St. Clair. The northernmost Smallmouth Bass tag recovery has been from the Port Huron area of the St. Clair River, and the southernmost recovery came from the Oak Harbor area in Ohio waters of Lake Erie. On average, recaptured Smallmouth Bass tagged during 2002-2019 traveled less than 6 mi from the Anchor Bay tagging site.

In 2023, Michigan tagged a total of 117 Smallmouth Bass with non-reward jaw tags in Anchor Bay of Lake St. Clair. A total of 14 non-reward tags placed on Smallmouth Bass in 2023 were recovered by anglers for a single season reporting rate of 11.9%, down slightly from last season (12.4% return). A total of 15 (of 95) non-reward tags placed on Smallmouth Bass tagged in the Mile Roads area during 2021 were recovered by anglers for a single season reporting rate of 15.7%, up slightly from last season (12.3%).

Recruitment of age-0 Smallmouth Bass as indexed by our August Lake St. Clair Trawl survey was 1.7 age-0 Smallmouth Bass per acre trawled, up slightly from 2022 (1.6 fish per acre; Figure 16). However, this value is well below the time series mean of 4.9 fish per acre. The average size of age-0 recruits, which is a critical indicator of overwinter survival, was also up slightly at 3.1 inches, right at the long-term average (1996-2022 average age-0 Smallmouth Bass length: 3.1 inches). In 2022, we established a new index survey meant to improve our estimates of Smallmouth Bass recruitment in Lake St. Clair. As such we set fyke nets for one night of sampling at 15 locations in 2023. These locations represented a subset of sites sampled for the nearshore fish community during 2021, and the same sites that were sampled in 2022. In total we captured 440 age-0 Smallmouth Bass with a range of 4-100 across sites, for an average catch of 29.3 per lift. These values were down 31% from 2022 (average 42.4 age-0 Smallmouth Bass; range 3-221).

During the fall nearshore electrofishing survey 372 Largemouth Bass of all sizes were captured (2 to 18 inches). Total catch rates of Largemouth Bass across all sites were 11.6 per 10-minutes of shocking, down slightly from 2022 (12.8 fish per 10-minutes of shocking). The size structure of Largemouth Bass indicated many large, catchable-sized individuals, and no apparent cropping at the legal harvest size. Indeed, 37% of all adult sized (greater than 8+ inch) individuals captured were at least 14-inches in total length. Moving forward the nearshore survey will provide a strong basis for evaluating the size structure and recruitment of Largemouth Bass in Lake St. Clair.

The 2023 nearshore fyke net survey also provided an opportunity to index Largemouth Bass recruitment. Across the 15 net sets, 2,177 age-0 Largemouth Bass were sampled (range: 5-482 per net) for an average of 145.1 per lift.

Muskellunge and Northern Pike

Two Muskellunge (one 50 inches and one 45 inches) were reported harvested out of Lake St. Clair in 2023. An additional fish was reported harvested out of the Detroit River (44-inch Tiger Muskellunge) and two fish were reported harvested out of the St. Clair River (46 and 48 inches). Combined, these five individuals represented 26% of all fish reported harvested statewide. Anglers are reminded to report harvested Muskellunge within 24 hours by visiting www.michigan.gov/registerfish, calling 1-844-345-3474 or using the DNR App.

Charter captains reported a total catch of 1,186 Muskellunge in 2023 throughout the American waters of the St. Clair – Detroit River System includes the St. Clair River, Lake St. Clair, and the Detroit River), with

zero fish reported harvested. Total catch was up 40% from 2022 (846 fish). Charter targeted catch rates were 0.06 fish per angler hour a 25% decline from 2022.

Lake St. Clair continued to dominate the statewide Master Angler entries for Muskellunge. A total of 11 Master Angler Muskies were reported for Lake St. Clair in 2023 (Figure 17) representing 47% of total entries statewide. Additionally, two Master Angler Muskies were reported each for the St. Clair River and the Detroit River.

No Muskellunge were captured during the 2023 Trap Net Survey. A total of five age-0 Muskellunge were captured during the fall nearshore electrofishing survey for a catch rate of 0.11 fish/10-min shocking. This value was down slightly from 2022 (0.14 fish/10-min shocking). The nearshore electrofishing survey continues to develop as a useful tool to index the recruitment of Muskellunge in Lake St. Clair.

We captured a total of 19 Northern Pike during the spring trap net survey in Anchor Bay resulting in a catch rate of 0.33 per 24-hour net set. This value is up 83% from 2022 but is still the third lowest catch-rate of Northern Pike observed since the modern trap net survey began in 2002. Valid age estimates were obtained for 18 of 19 individuals. The 2017-, 2018-, and 2020-year class were the most abundant (n=3 each). Among all individuals captured the average length was 29.7 inches; total length ranged from 24 inches to 35 inches.

Lake Sturgeon

Harvested Lake Sturgeon have been required to be registered with the MDNR since 1999. In 2023, 6 Lake Sturgeon were reported harvested. This is below the long-term average since 1999 (6.8 registered as harvested per year) and below the 10-year average (10.9 registered as harvested per year since 2013; Figure 18).

Charter captains reported 211 trips with a total of 602 anglers targeting Lake Sturgeon in the St. Clair-Detroit River System in 2023. Average catch rates of 3.3 Lake Sturgeon per trip and 0.2 Lake Sturgeon per angler hour were reported. All metrics of charter effort increased from 2022 and have increased year-over-year every year since tracking began in 2019. Charter catch rates also increased from 2022 and were the highest since tracking began in 2019.

Anglers participated in the Lake Sturgeon angler diary program for the 2nd year in 2023. There were eight participating anglers, up from seven in 2022, who took between 2 and 67 trips targeting Lake Sturgeon. Anglers reported catching 533 Lake Sturgeon ranging from 14.75 inches to 76.5 inches in length. Average catch rate by anglers declined from 0.15 to 0.10 fish per rod hour from 2022 to 2023 (ranged from 0.02 to 0.18 per rod hour in 2023). Recapture rate by anglers was 10.3%, down from 15.5% in 2022.

Anglers reported 94 Master Angler Lake Sturgeon from the St. Clair River and Lake St. Clair in 2023. These represent 99% of all Master Angler Lake Sturgeon reported statewide in 2023 and is the third highest ever reported behind 117 in 2021 and 106 in 2022. The 11.3% decline in Master Angler Lake Sturgeon reported in the St. Clair System from 2022 to 2023 was small despite the minimum entry requirements for a Master Angler Lake Sturgeon increasing 20% from 50 to 60 inches in 2023. In general, Master Angler Lake Sturgeon reports have been trending upwards for several years (Figure 19). Anglers reported catching 66 Lake Sturgeon that had previously been tagged with external tags (this does not include recaptures of fish with only internal Pit tags) by the MDNR, the third highest number of tagged Lake Sturgeon ever reported and just behind the 67 fish reported in 2021 and 71 fish in 2022. Angler recapture rates have been trending upwards (Figure 20).

A total of 73 Lake Sturgeon were collected during assessment surveys on Lake St. Clair and the St. Clair River in 2023. Captured Lake Sturgeon averaged 41.4 inches in total length, ranging from 23.1 inches to 70.1 inches. A total of 67 Lake Sturgeon were caught in the St. Clair River during the annual setline survey in June and 6 Lake Sturgeon were caught during the targeted Lake Sturgeon trawl survey in Lake St. Clair during August. Recaptured Lake Sturgeon from previous surveys made up 30% of the setline catch and 0% of the trawl catch. The length frequency for setline and trawl-captured Lake Sturgeon in 2023 and previous years

illustrates the higher proportion of large individuals in the trawl catch in the lake (Figure 21). It is unknown whether this difference represents an actual difference in size structure of Lake Sturgeon between the two locations or if it is a product of size bias of the two gear types. Ongoing acoustic telemetry research has found that many juvenile Lake Sturgeon utilize Lake St. Clair even though they are rare in the trawl catch (USFWS unpublished data). Survey setlines were modified in 2002 to include small hooks, providing a less biased sample of the Lake Sturgeon population in the St. Clair River. In addition to sampling Lake Sturgeon, each setline is also set with two minnow traps, one attached to each end. These traps target Northern Madtom, a small catfish species that is endangered in the State of Michigan and Province of Ontario. Each trap is baited with earthworms, which experimentation in past years has suggested as being the preferred bait. A total of 101 Northern Madtoms were caught in 2023. Northern Madtoms have very specific habitat and water quality requirements, making them a sensitive indicator of environmental quality. The high catch rate suggests high quality habitat conditions exist in the St. Clair River.

A total of 3,713 Lake Sturgeon have been tagged and released in the St. Clair River and Lake St. Clair since 1996. To date, 1,364 tagged Lake Sturgeon have been recaptured with survey gear or reported by fishermen. These recaptures represent 769 unique individuals, or 21% of all Lake Sturgeon tagged since 1996 (not including 28 recapture reports from anglers where an incorrect tag number was reported). A total of 299 Lake Sturgeon have been recaptured multiple times, including four that have been recaptured at least 10 times and one that was recaptured 12 times. A total of 649 tagged sturgeon have been recovered with survey setlines. One was recovered in a survey trap net in Anchor Bay, one in a survey gill net, and 21 have been recaptured in assessment trawls on Lake St. Clair. Sport anglers have reported 661 recoveries, most from the North Channel of the St. Clair River. Twenty-six recoveries have been reported from the Ontario commercial trap net fishery in southern Lake Huron, approximately 43.5 mi from the tag site. Seven recoveries have been made on Lake Sturgeon that were found dead from boat strikes or unknown causes.

Forage fish

Total catch in the Lake St. Clair spring trawl survey decreased from 2022, while total catch in the fall trawl survey increased. The total number of fish caught was the lowest, and the 6th lowest, since 2001 for the spring and fall trawl surveys, respectively. Only Rainbow Smelt, with the highest catch observed since 2014, had an above average catch rate in the spring trawls. The most common forage fish in the spring trawls were age-1 Yellow Perch (77.9 per acre trawled), Rainbow Smelt (45.5 per acre trawled), Spottail Shiner (25.0 per acre trawled), Logperch (7.9 per acre trawled), and Trout-perch (4.9 per acre trawled). During the fall trawl survey, the most common forage fish caught were age-0 Yellow Perch (153.0 per acre trawled), Trout-perch (68.7 per acre trawled), Round Goby (29.3 per acre trawled), and Logperch (4.3 per acre trawled).

The fall micromesh gill net survey, which will replace the fall trawl survey in Lake St. Clair going forward, was conducted for the second time in 2023. Effort was increased from four to six net sets to increase spatial coverage. Total catch rate (fish per net set) declined from 2022 (86.3 to 59.7 fish per net). The most common species caught during the micromesh gill net survey were Yellow Perch (28.2 per net), Logperch (12.3 per net), Rock Bass (6.7 per net), and Spottail Shiner (5.0 per net), which were the same species that were most common in 2022.

Brook Silversides returned to the most frequently captured (26.1 fish per 10-minute sample period) forage-sized fish during the fall nearshore electrofishing survey, followed by Spottail Shiner (25.7 per 10-minute sampling period) and Emerald Shiner (21.5 per 10-minute sampling period). Catch of these three species increased substantially from 2022. Brook Silverside were up 64% year over year, Spottail Shiner were up 71% year over year, and Emerald Shiner were up 36% year over year.

While still a relatively new surveys, the nearshore electrofishing survey and micromesh gill net survey provide important additional insight into the lake's forage fish community, which can in time be compared to traditional bottom trawl surveys to provide a more complete picture of the status and trends of Lake St. Clair forage species and their potential availability to sportfish.

Commercial Fishery Summary

No state-licensed commercial fishery exists in the Michigan waters of the St. Clair River or Lake St. Clair.

Scientific Publications Authored or Co-Authored by Station Staff 2023

Please contact us directly for a .pdf copy

Bopp, J. S., S. J. Herbst, T. O. Brenden, K. Wehrly, and **J.-M. Hessenauer**. 2023. Biotic and abiotic factors that influence Walleye recruitment in stocked lakes in Michigan. North American Journal of Fisheries Management 43: 1673-1686. DOI: 10.1002/nafm.10946.

Bowser, J., **A.S. Briggs**, P. Thompson, M. McLean, and A. Bowen. 2023. A geospatial approach to improving fish species detection in Maumee Bay, Lake Erie. Fishes 2023, 8, 3: 1-10. https://doi.org/10.3390/fishes8010003.

Chiotti, J.A., J.C. Boase, **A.S. Briggs**, C. Davis, R. Drouin, D.W. Hondorp, L. Mohr, E.F. Roseman, M.V. Thomas, and **T.C. Wills**. 2023. Lake Sturgeon population trends in the St. Clair-Detroit River System, 2001-2019. North American Journal of Fisheries Management 43(4): 1066-1080. https://doi.org/10.1002/nafm.10917

He, J.X., C.P. Madenjian, and **T.C. Wills**. 2023. A generalized application of the catch-curve regression with comparisons of adult mortality and year-class strength between hatchery-stocked and wild-reared Lake Trout in U.S. waters of Lake Huron. Canadian Journal of Fisheries and Aquatic Sciences. http://dx.doi.org/10.1139/cjfas-2022-0275

Hilling, C.D., M.L. Belore, J. Boase, J.A. Chiotti, R.L. DeBruyne, S.E. Doka, R. Drouin, C.M. Mayer, J.T. Tyson, **T. Wills**, and Edward F. Roseman. 2024. How well do existing surveys track fish community performance measures in the St. Clair-Detroit River System? Environmental Monitoring and Assessment 196: 129. https://doi.org/10.1007/s10661-023-11895-2

Utrup, B. E., J.-M. Hessenauer, A. S. Briggs, K.T. Scribner, J. Kanefsky, **T. C. Wills**. 2023. Biological investigation of the endangered Northern Madtom in the North Channel of the St. Clair River. North American Journal of Fisheries Management 43: 730-742. DOI: 10.1002/nafm.10886.

Zorn T., **T. Wills**, **J.-M. Hessenauer**, J. Lenz, E. Bissell, A. DePottey, D. Forsyth Kilijanczyk, A. Francis. 2023. Combining statewide surveys and classification to support management of streams. Fisheries 48: 157-167. DOI: 10.1002/fsh.10890.

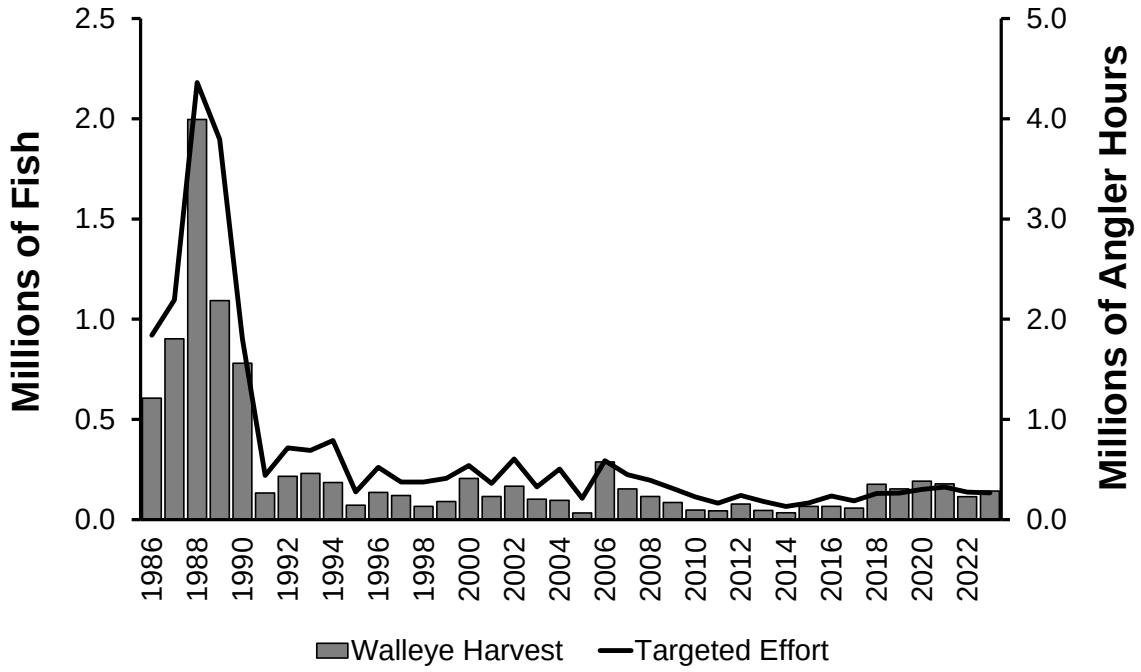

Figure 1. Estimated Walleye harvest and targeted angler effort for Michigan's Lake Erie non-charter recreational boat fishery, 1986-2023.

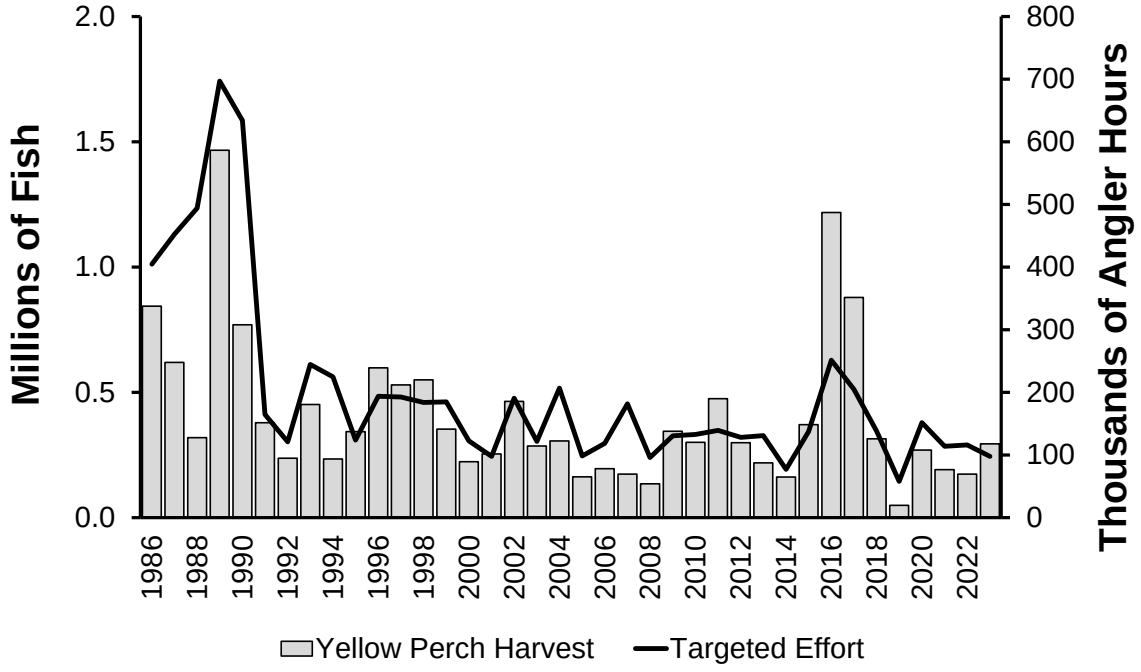

Figure 2. Estimated Yellow Perch harvest and targeted angler effort for Michigan's Lake Erie non-charter recreational boat fishery, 1986-2023.

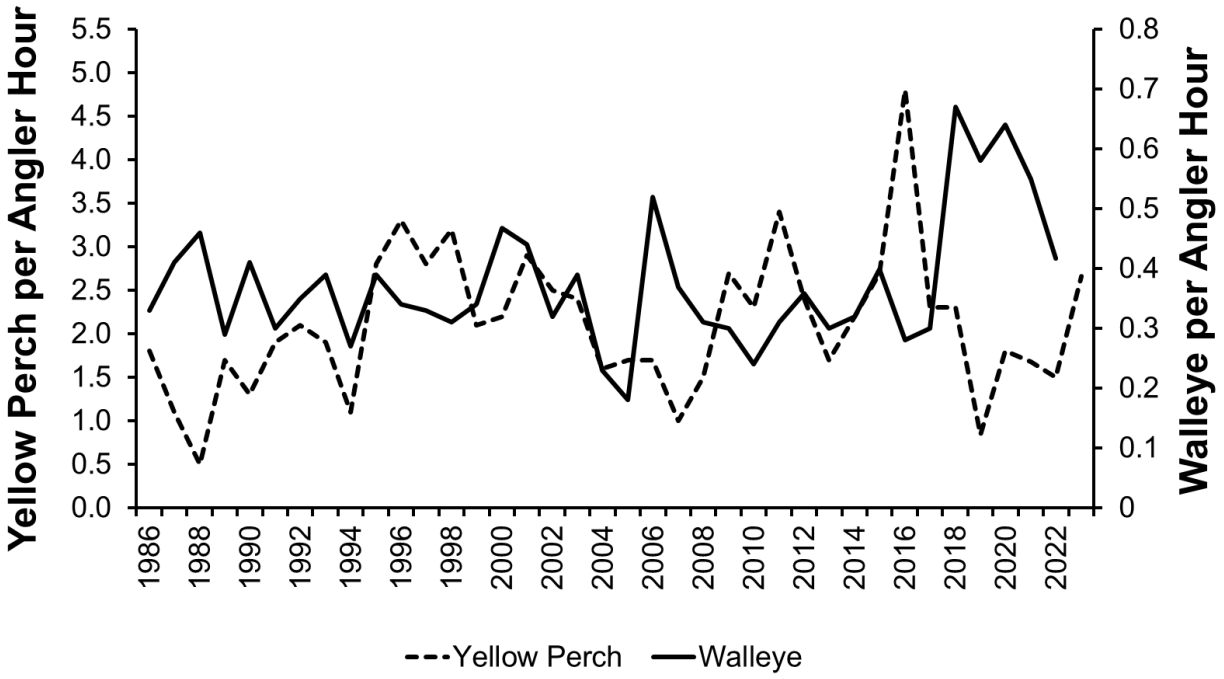

Figure 3. Walleye and Yellow Perch targeted harvest rates for Michigan's Lake Erie non-charter recreational boat fishery, 1986-2023.

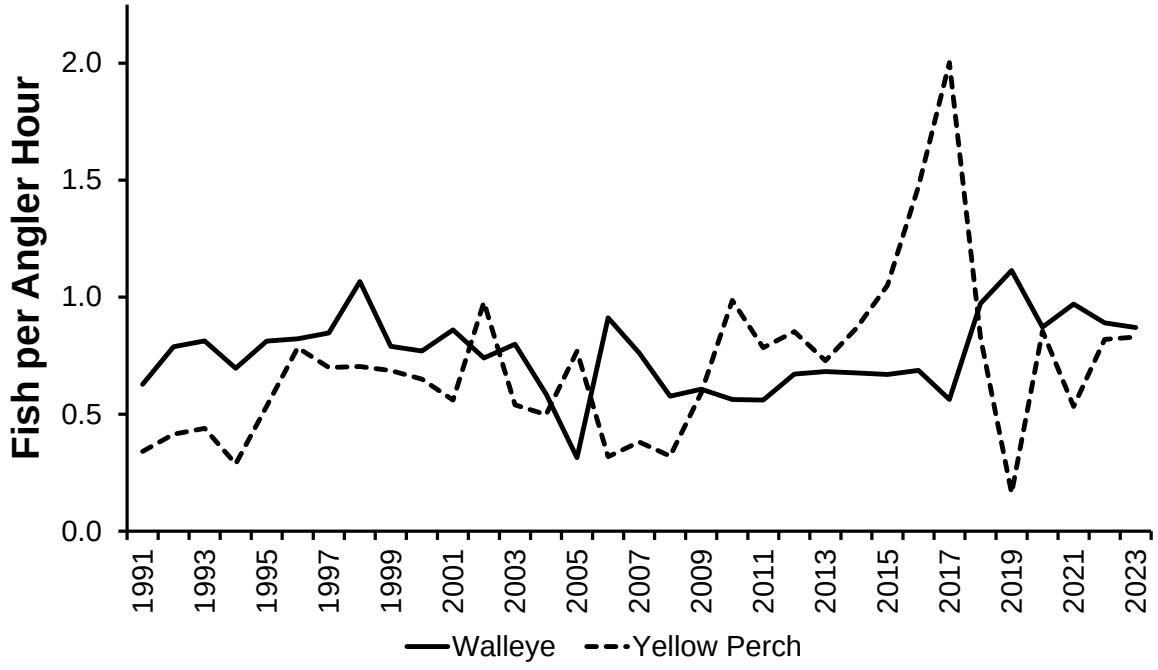

Figure 4. Harvest rates for Walleye and Yellow Perch in Michigan's Lake Erie charter boat fishery, 1991-2023.

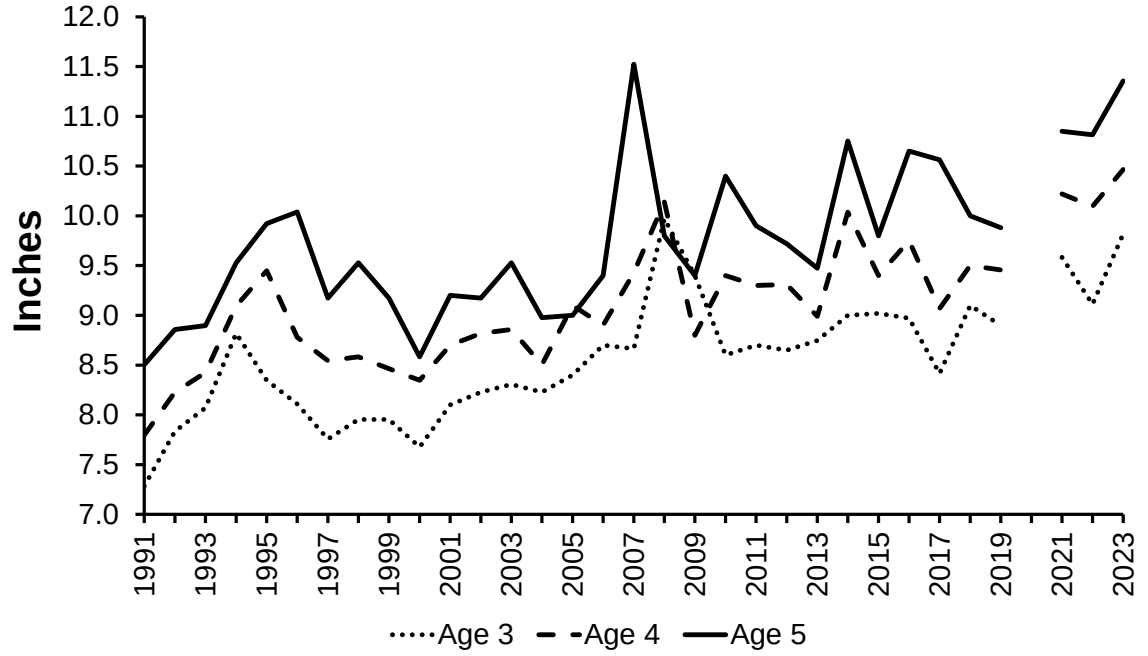

Figure 5. Mean length-at-age of Yellow Perch harvested from Michigan's Lake Erie non-charter recreational boat fishery, 1991-2023.

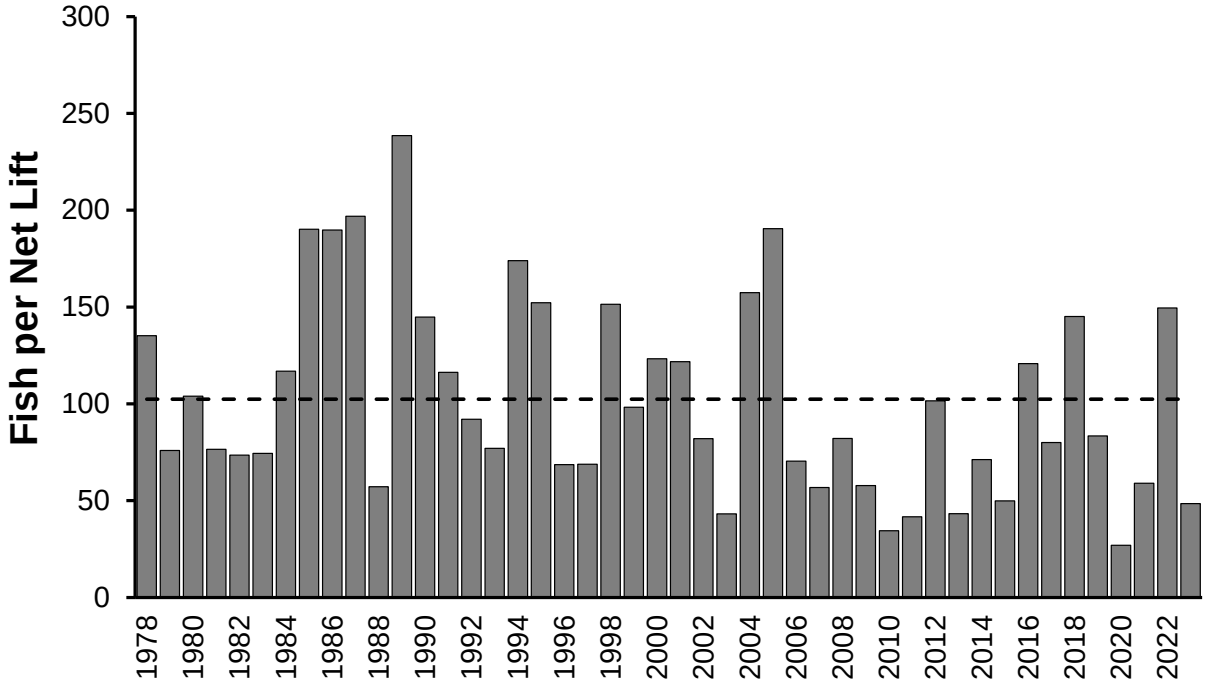

Figure 6. Average total Walleye catch per unit effort for Michigan Lake Erie index gill nets, 1978-2023. The horizontal dashed line represents the average for the time series.

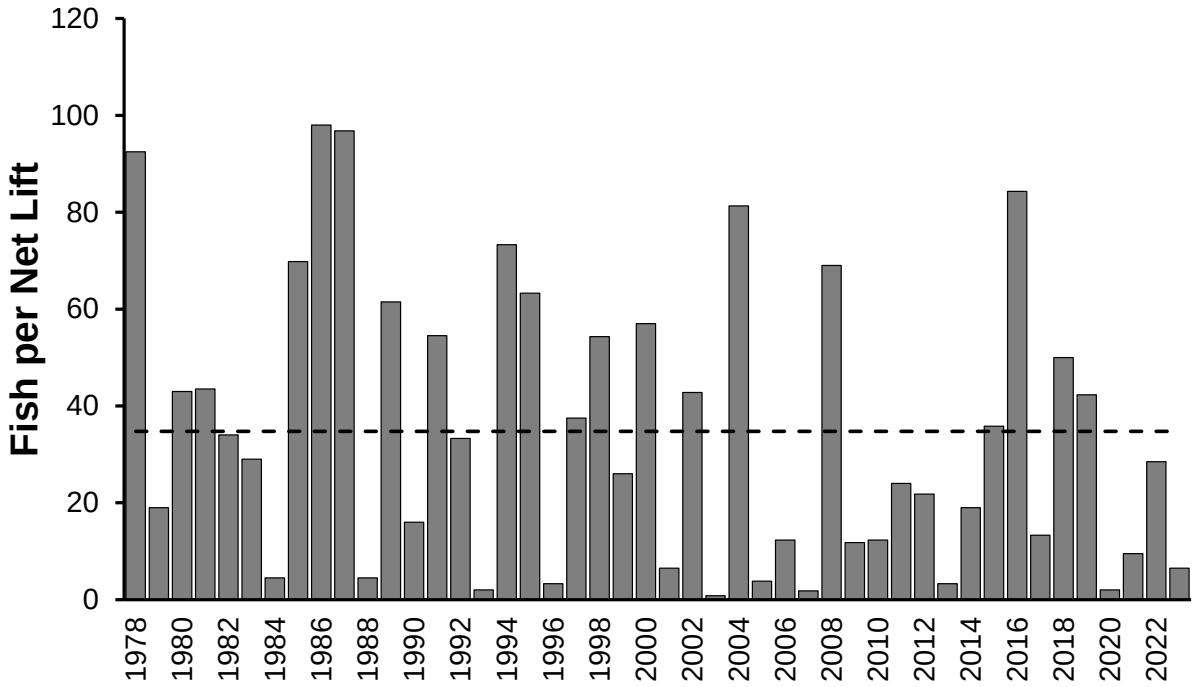

Figure 7. Average yearling Walleye catch per unit effort for Michigan Lake Erie index gill nets, 1978-2023. The horizontal line represents the average for the time series.

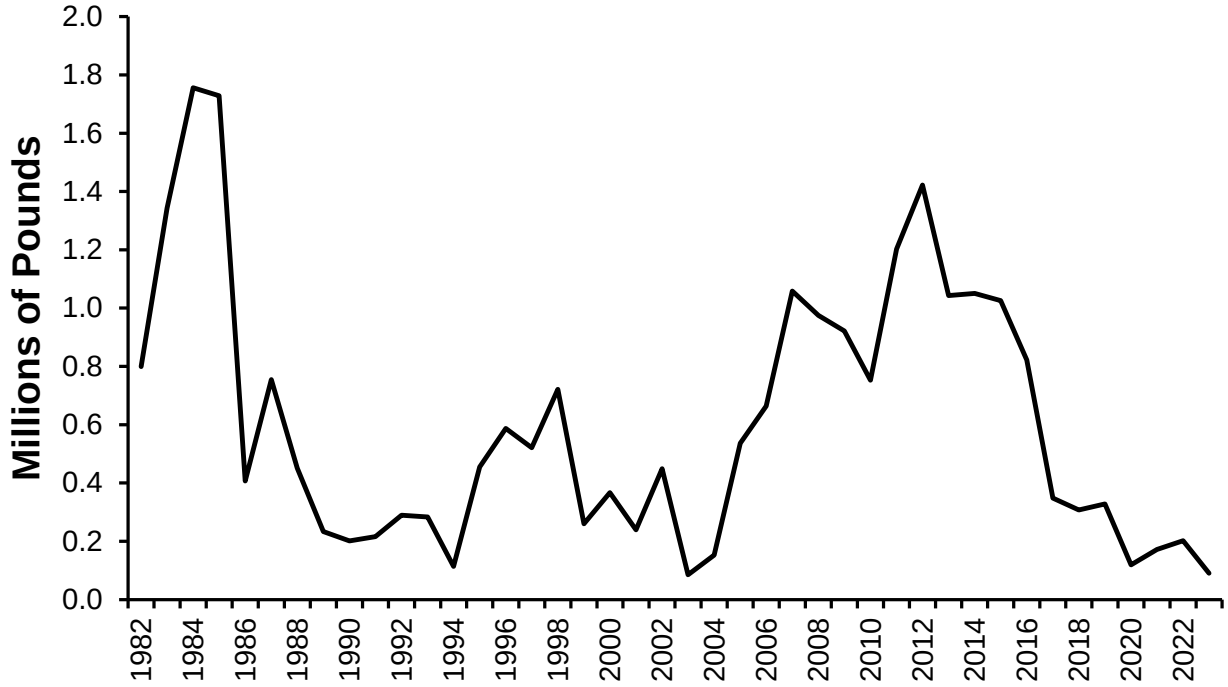

Figure 8. Total harvest of state-licensed commercial fishers in Michigan waters of Lake Erie, 1982-2023.

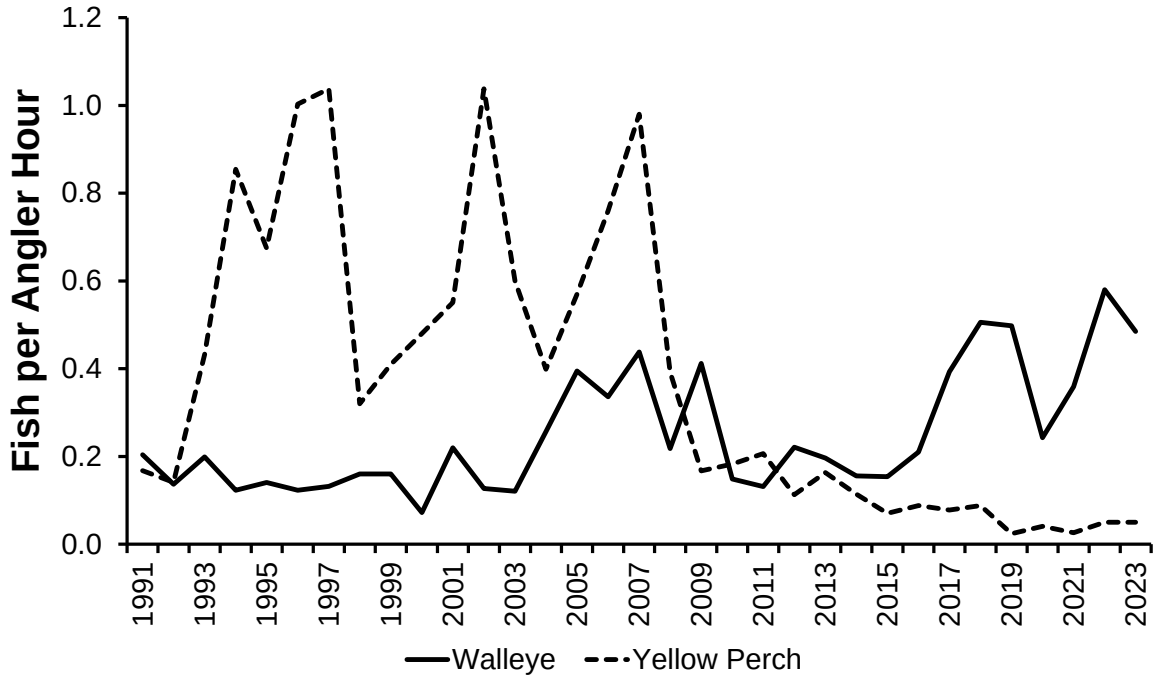

Figure 9. Harvest rates for Walleye and Yellow Perch in Michigan's St. Clair-Detroit River system charter boat fishery, 1991-2023.

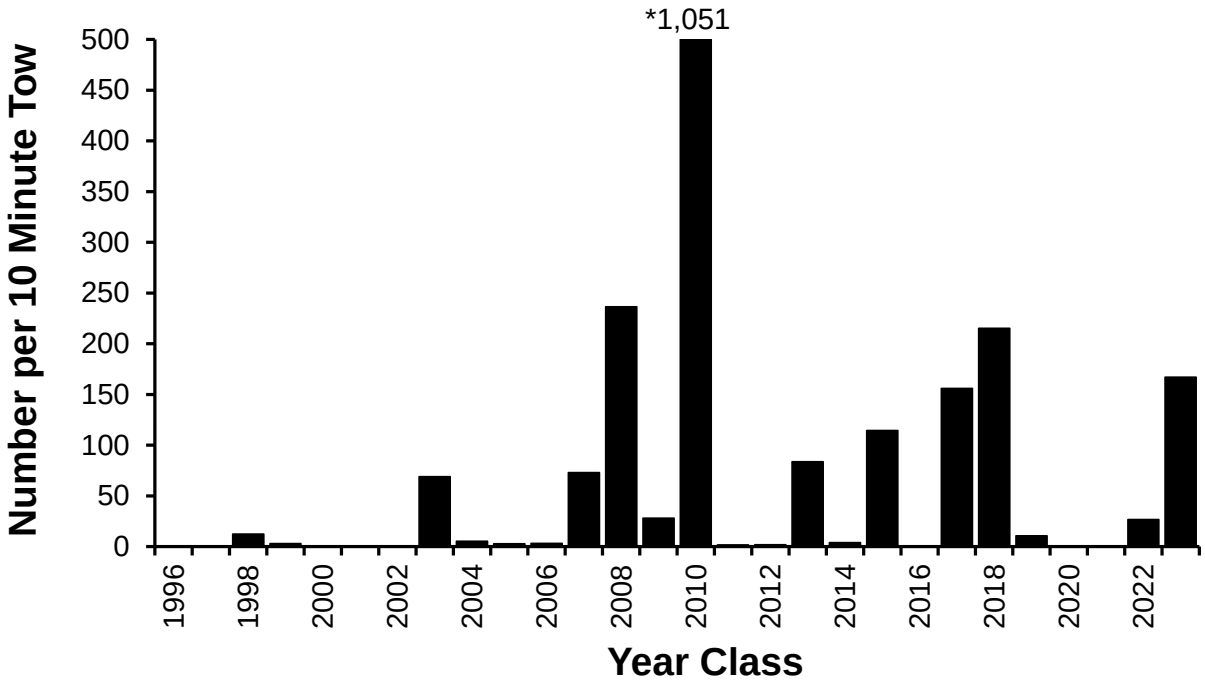

Figure 10. Year class strength for Yellow Perch in Lake St. Clair as indicated by age-0 catch rates in fall bottom trawls, 1996-2023. No trawling occurred in 2016 or 2020. Actual value for 2010 year class reported above the bar.

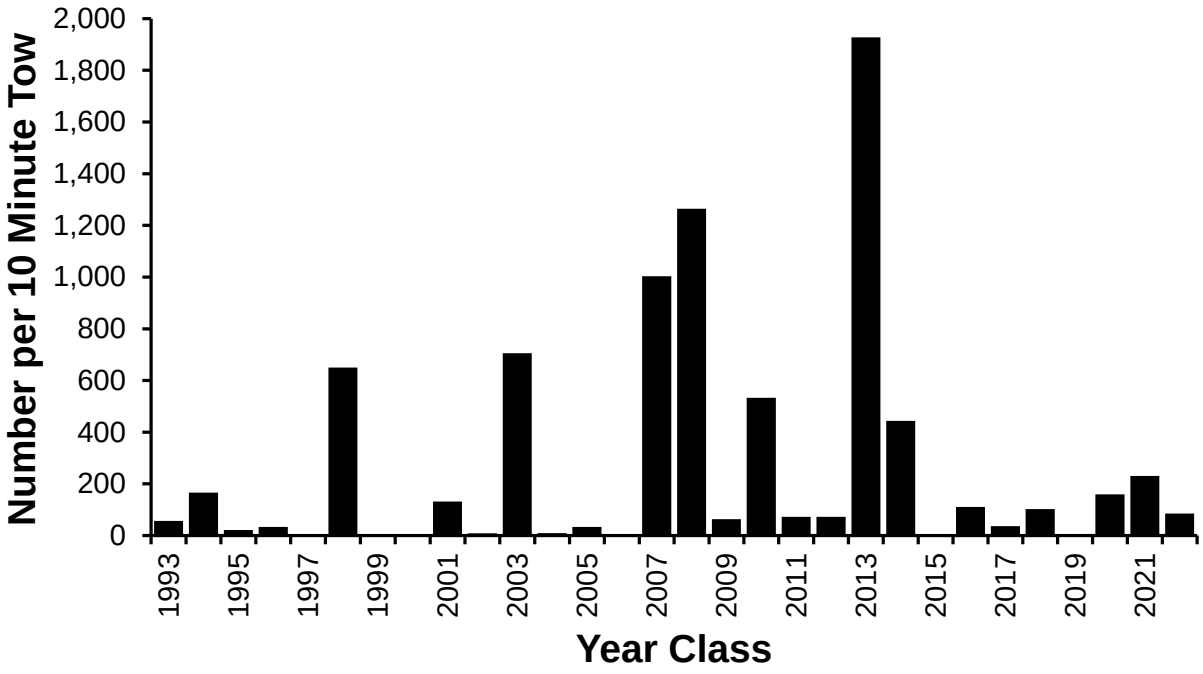

Figure 11. Year class strength for Yellow Perch in Lake St. Clair as assessed by spring bottom trawls, 1993-2023. Survey year is year class + 1; no trawling occurred in 2016 or 2020.

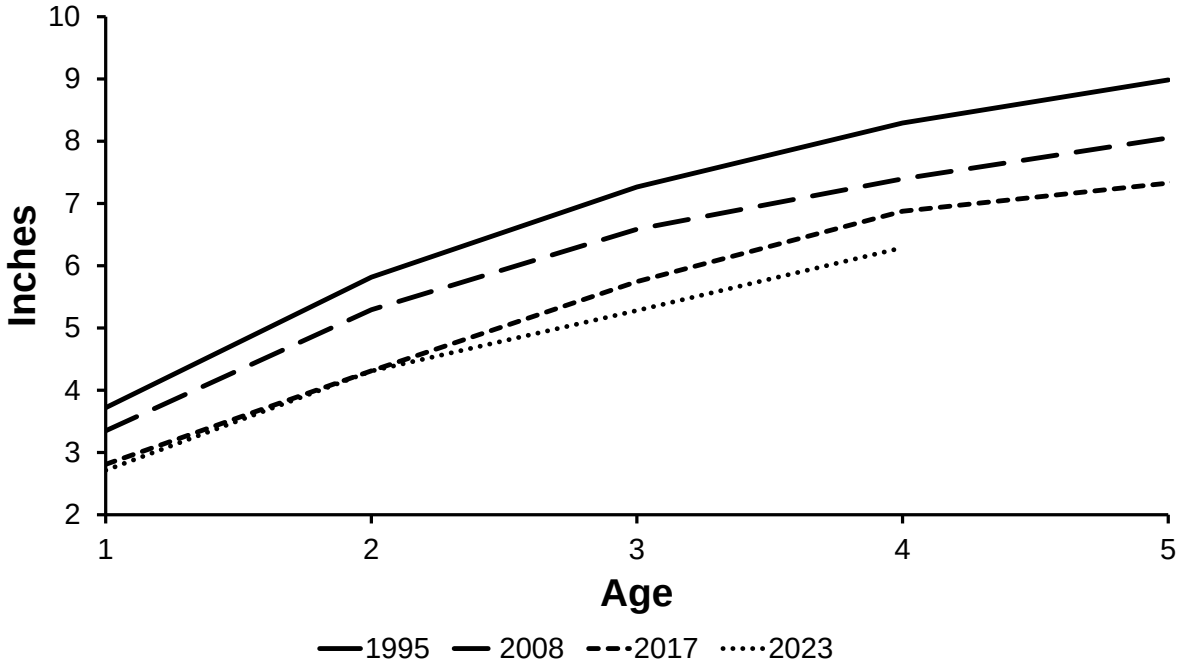

Figure 12. Mean length-at-age for Yellow Perch in Lake St. Clair caught during spring trawls in 1995, 2008, 2017, and 2023.

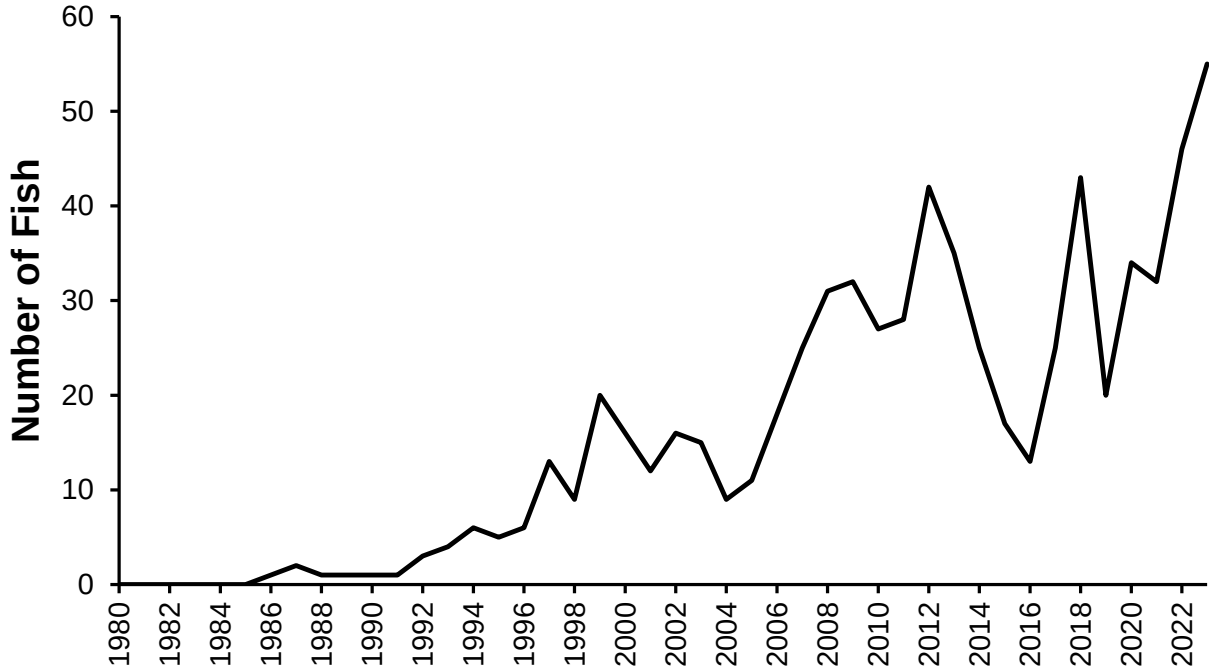

Figure 13. Smallmouth Bass caught by recreational anglers in Lake St. Clair and entered in the Michigan Department of Natural Resources Master Angler Program (21-inch minimum length required for qualification), 1986-2023.

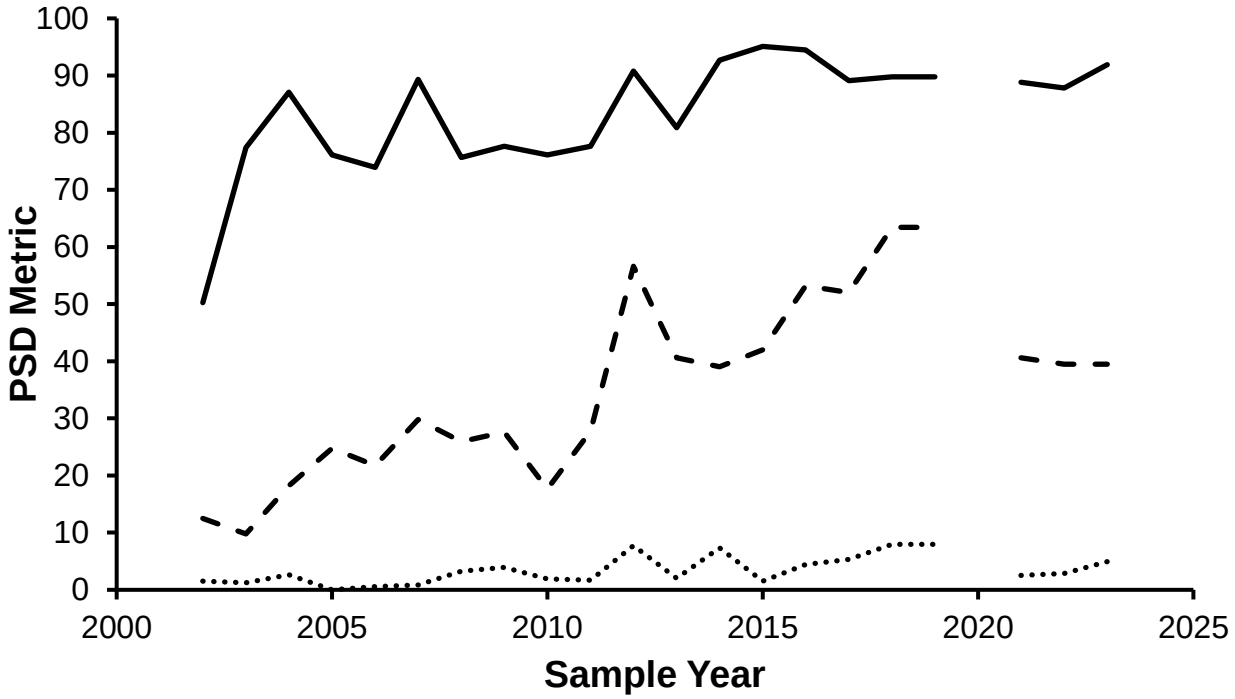

Figure 14. Proportional size distribution (PSD metric; the proportion of fish above a given length threshold) of adult Smallmouth Bass captured during Michigan Department of Natural Resources survey efforts in Lake St. Clair, 2002-2023. Lines represent fish 14-inches and larger (solid black line), 17-inches and larger (dashed line), and 20-inches and larger (dotted black line).

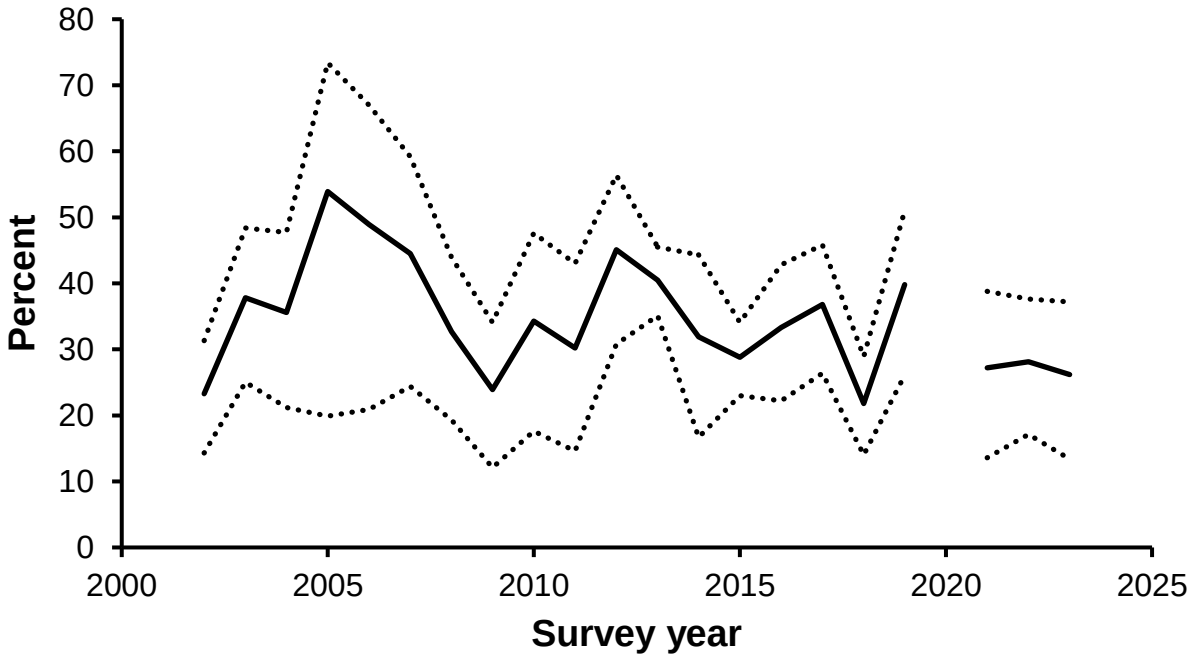

Figure 15. Annual mortality rates (black line) of Lake St. Clair Smallmouth bass, estimated from catch curve regression, 2002-2023. Dotted lines represent the upper and lower 95% confidence interval.

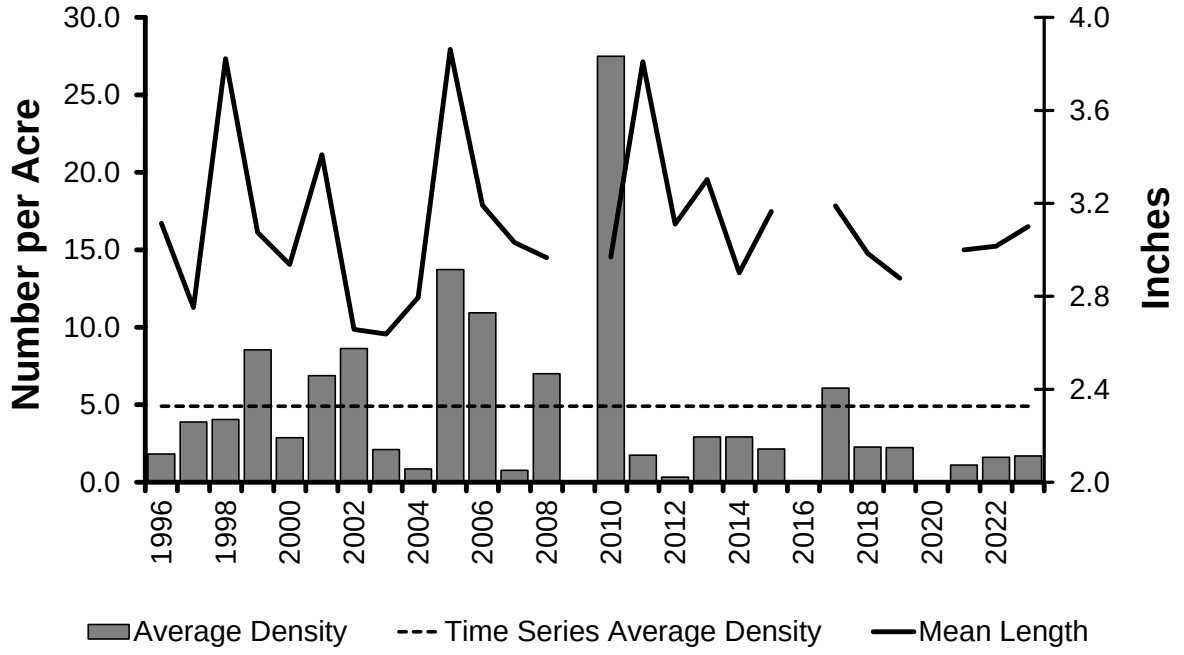

Figure 16. Year class strength and mean length for age-0 Smallmouth Bass in Lake St. Clair as assessed by fall bottom trawls, 1996-2023.

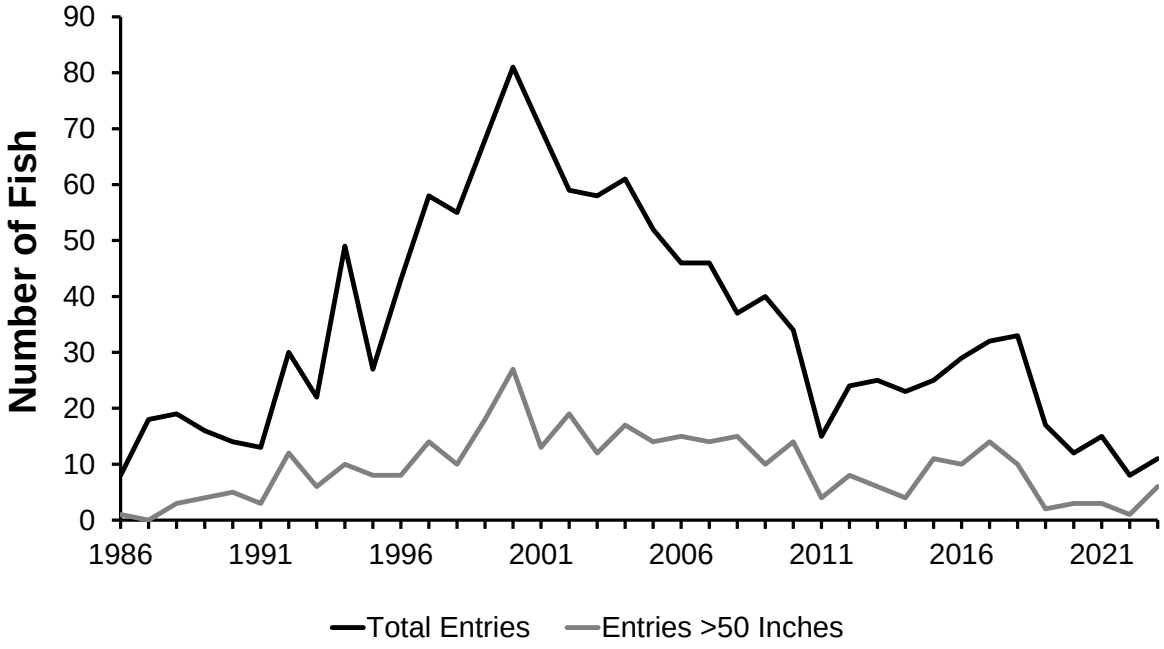

Figure 17. Muskellunge caught by recreational anglers in Lake St. Clair and entered in the Michigan Department of Natural Resources Master Angler Program (46-inch minimum length required for qualification, entries over 50 inches provided for comparison), 1986-2023.

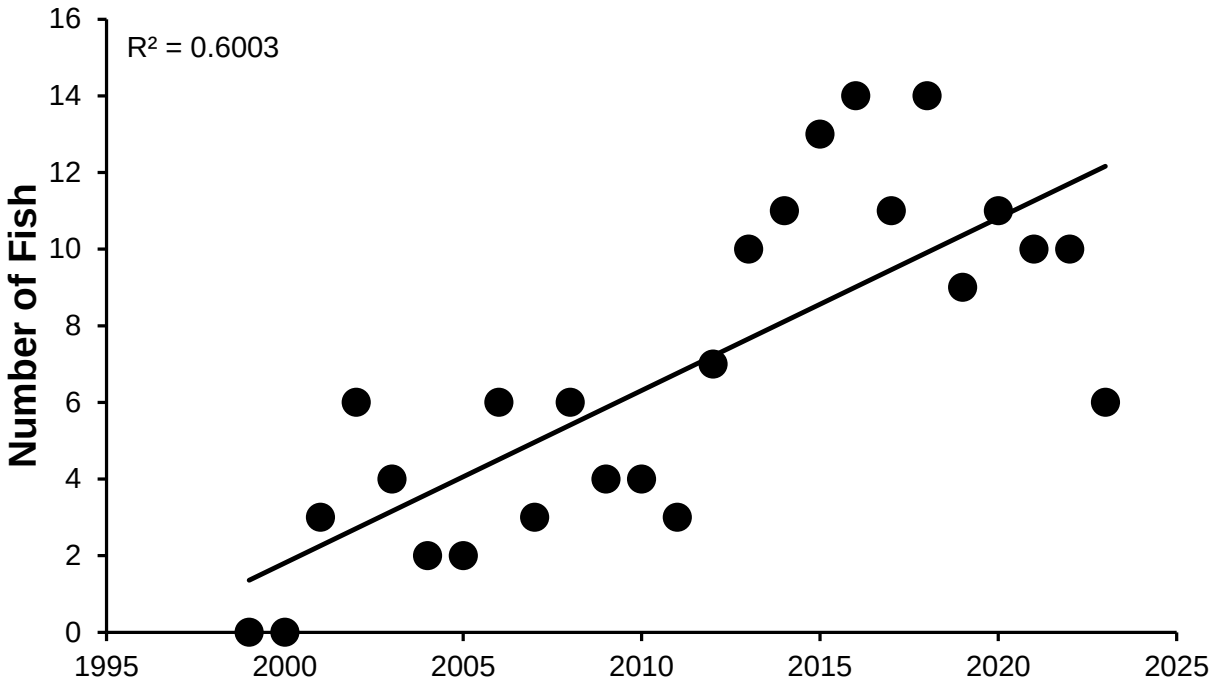

Figure 18. Number of Lake Sturgeon harvested by recreational anglers from the St. Clair River and Lake St. Clair, 1999-2023. Solid black line indicates a significant trend.

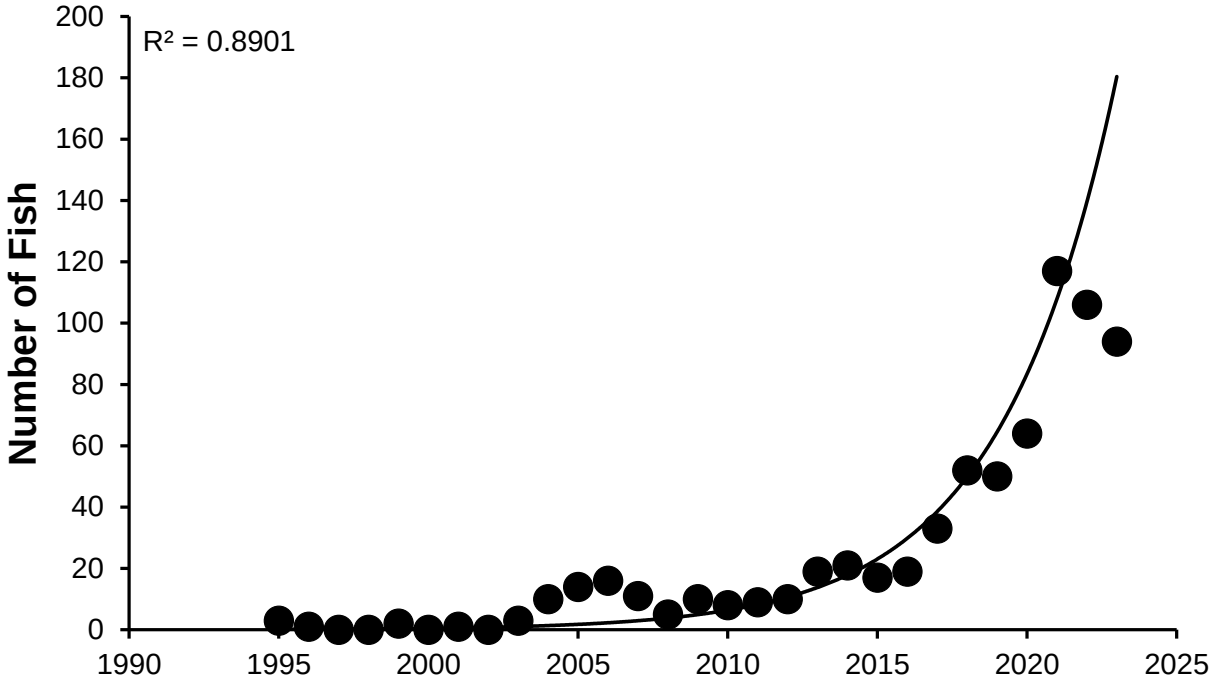

Figure 19. Lake Sturgeon caught in the St. Clair-Detroit River System and entered in the Michigan Department of Natural Resources Master Angler Program, 1995-2023. A 50-inch minimum length was required for qualification from 1995-2022, which increased to 60 inches in 2023. Solid black line indicates a significant trend.

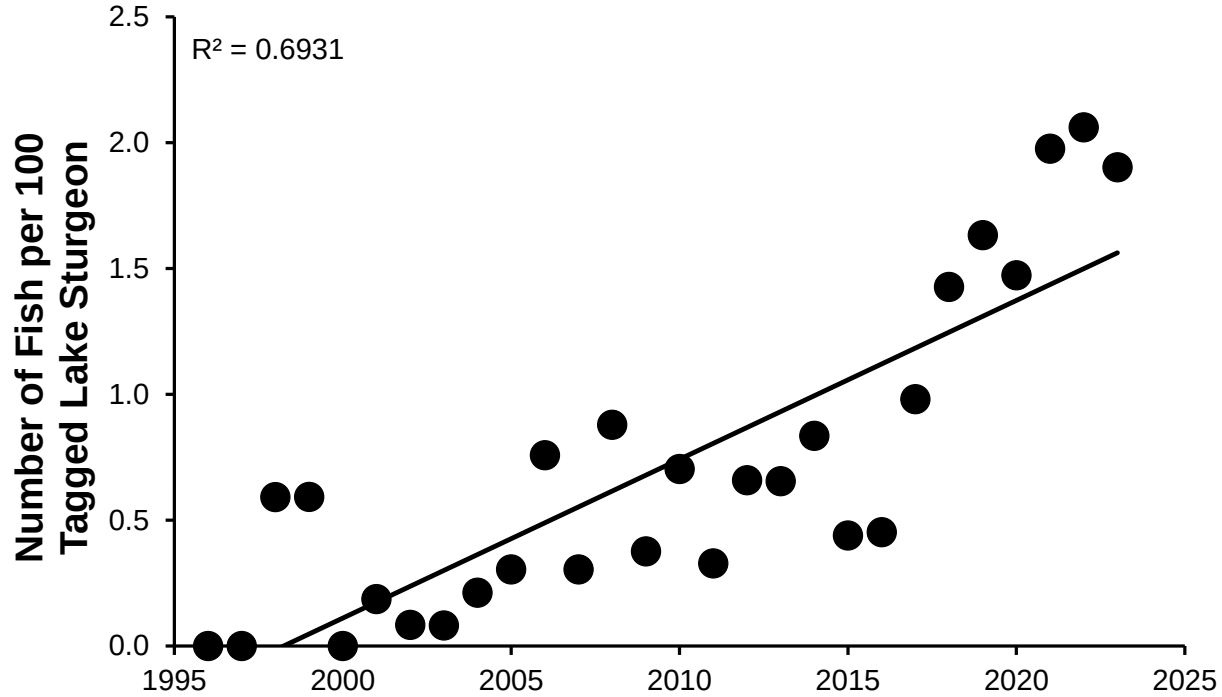

Figure 20. Reported angler recaptures of Lake Sturgeon tagged by the Michigan Department of Natural Resources in the St. Clair-Detroit River System, corrected for number of tagged Lake Sturgeon available to catch, 1996-2023. Solid black line indicates a significant trend.

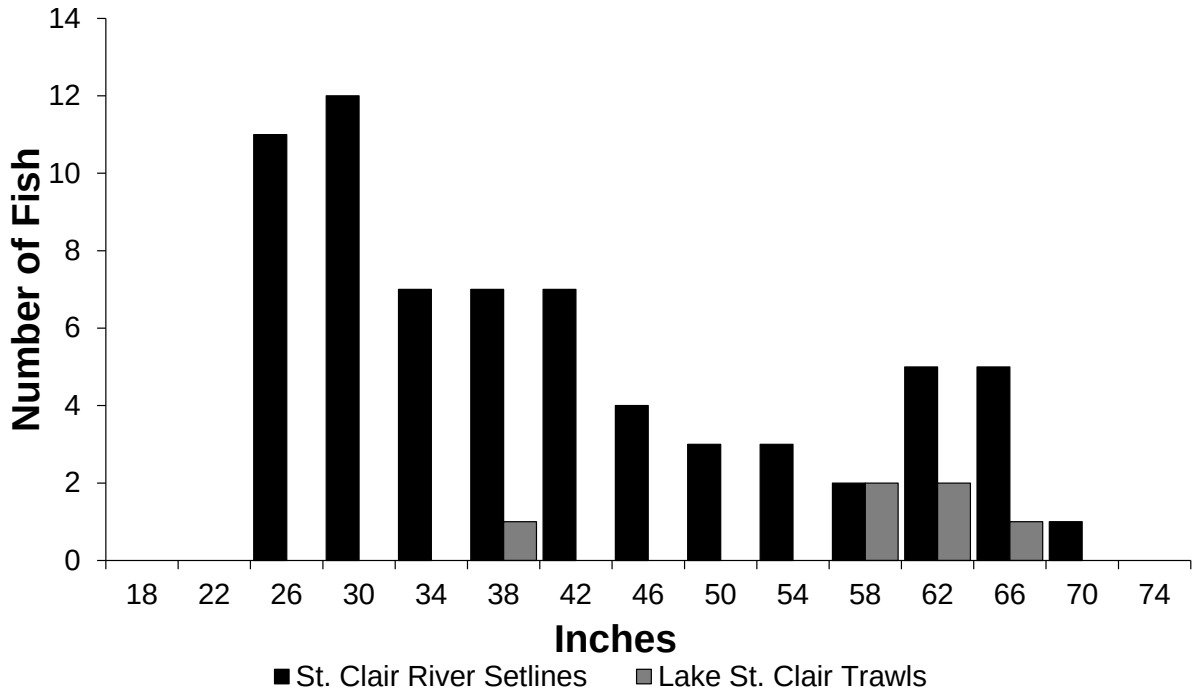

Figure 21. Length frequency distribution for Lake Sturgeon caught in 2023 with setlines in the St. Clair River and trawls in Lake St. Clair.

Table 1. Average number of fish caught per 24-hour soak for select species in Anchor Bay, Lake St. Clair spring trap net surveys, 2014-2023. No survey occurred in 2016 and 2020. Grand average includes all spring trap nets surveys from 2002-2023.

	Survey Year										Grand
Species	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	Average
Rock Bass	9.0	15.5	-	27.6	14.5	4.5	-	6.9	11.6	6.7	19.1
Smallmouth Bass	3.5	2.3	-	2.6	2.9	3.8	-	1.3	3.0	2.5	3.9
Walleye	1.5	1.3	-	7.2	5.5	3.0	-	4.6	4.4	5.9	2.7
Channel Catfish	3.9	1.6	-	2.1	1.0	5.1	-	5.1	4.1	4.2	2.6
Yellow Perch	0.9	1.4	-	3.2	3.6	0.9	-	2.0	1.0	0.5	1.5
Northern Pike	1.7	1.5	-	1.3	1.3	1.2	-	0.6	0.2	0.3	0.9
Freshwater Drum	0.2	0.2	-	0.4	0.3	0.3	-	0.6	0.5	0.5	0.8
Shorthead Redhorse	0.4	0.4	-	0.6	0.5	0.3	-	0.2	0.7	0.5	0.8
Silver Redhorse	0.7	0.4	-	1.1	0.4	0.4	-	0.2	0.7	0.3	0.7
Pumpkinseed	0.5	0.2	-	1.6	0.2	0.1	-	0.0	0.1	0.0	0.6
Other	1.5	0.7	-	1.5	1.1	1.1	-	0.4	0.8	0.8	1.5
Number of net lifts	40	36	-	36	36	28	-	28	32	20	40
Survey dates	Apr 24-May 19	Apr 27-May 18	- -	Apr 24-May 18	Apr 23-May 14	Apr 22-May 15	- -	Apr 26-May 12	Apr 25-May 16	Apr 26-May 12	
Water temperature range ^{o}C	8-13	8-14	-	11-13	7-12	7-9	-	7-9	5-13	6-13	