



Lakes Mitchell and Cadillac – 2022 Volunteer Walleye Creel Survey Report

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Introduction

Lakes Mitchell and Cadillac are natural lakes of glacial origin located in southeastern Wexford County, Michigan. Lake Mitchell is 2,580 acres in size, while Lake Cadillac is 1,150 acres. The two lakes are connected by a ¼ mile long dredged channel that is navigable by boats. Lake Cadillac lies entirely within the city limits of Cadillac. Both lakes are in the Muskegon River watershed, essentially forming the headwaters of the Clam River, which flows out of Lake Cadillac and eventually joins the Muskegon River. Both lakes are relatively shallow. The maximum depth of Lake Cadillac is 28 feet, with approximately 50% of the lake shallower than 15 feet (Tonello 2012a). The maximum depth of Lake Mitchell is 22 feet, with approximately 90% of the lake shallower than 15 feet (Tonello 2012b).

Lakes Mitchell and Cadillac both have long fisheries management histories, dating back to the late-1800s. Popular species on Lakes Mitchell and Cadillac include Walleye, Northern Pike, Bluegill, Pumpkinseed, Black Crappie, Yellow Perch, Largemouth Bass, and Smallmouth Bass. For many years, Walleye stocking was not required in Lakes Cadillac and Mitchell, as the Walleye sustained themselves through natural reproduction (Tonello 2012a and 2012b). However, this changed in the late 1990s and early 2000s, necessitating the commencement of Walleye stocking programs for both lakes. Therefore, since 2004, both lakes have seen regular stockings of Walleye (Tables 1 and 2). In recent years, the prescription for Lake Mitchell has been to stock 130,000 (50/acre) spring fingerling Walleye on an every-other year basis, while Lake Cadillac has been prescribed for 60,000 (52/acre) spring fingerling Walleye on an every-other year basis. Recent stockings have taken place in 2018 (full complement for both lakes), 2019 (51k surplus Walleye fingerlings stocked into Lake Mitchell), and 2022 (reduced complement for both lakes). The pandemic prevented Walleye rearing in 2020, and 2021 was a very poor production year for MDNR Walleye ponds statewide. For that reason, more lakes were stocked in 2022 with reduced numbers of spring fingerlings to help make up for lost pond production. Angler reports in the past few years regarding the Walleye fisheries on both lakes have been very positive.

2022 Volunteer Walleye Creel Survey-Materials and Methods

The most recent MDNR netting/electrofishing surveys of Lakes Mitchell and Cadillac were conducted in 2012 (Tonello 2012a and 2012b). While it would have been more desirable to repeat those surveys in 2022, reduced staffing levels of field MDNR Fisheries personnel have made this impossible. Instead, volunteer anglers were recruited to collect dorsal spine samples for age/growth analysis by MDNR Fisheries Technicians. The volunteers were instructed on how to properly measure the Walleye and on how to remove the dorsal spines. Some spines were also collected by MDNR personnel from anglers at times when anglers were concentrated, and Walleye were being caught. The spines were placed into scale envelopes, dried, and then analyzed by MDNR Fisheries Technicians. The goals of the Walleye spine collection efforts were to verify the survival of Walleye in years when they were stocked, and also to assess the contribution of naturally reproduced Walleye from unstocked years to the populations.

Lake Mitchell Results

A total of 133 dorsal spine samples were collected and aged for Walleye caught from Lake Mitchell (Table 3). Walleye caught from Lake Mitchell ranged from 11.9 to 24.0 inches in length. Ten different year classes were present in the catch, including ages 2 through 8, 10, 12, and 16.



Lake Cadillac Results

A total of 16 dorsal spine samples were collected and aged for Walleye caught from Lake Cadillac (Table 4). Walleye caught from Lake Cadillac ranged from 15.0 to 22.5 inches in length. Three different year classes were present in the catch, including ages 4, 5, and 6.

Discussion

Collecting spine samples proved to be easier from Lake Mitchell than from Lake Cadillac (133 spine samples collected on Lake Mitchell vs. 16 on Lake Cadillac). Lake Mitchell has one location (the canal mouth at Mitchell State Park) where shore anglers routinely fish and catch Walleye, and many samples were taken there. Also, the volunteer anglers who participated in the study seemed to fish Lake Mitchell more frequently than Lake Cadillac.

Approximately 84% of the Walleye sampled from Lake Mitchell came from year classes in which stocking took place. A similar ratio occurred on Lake Cadillac, albeit with a much smaller sample size. In Lake Mitchell, the two most well-represented year classes were 2018 and 2016 (Table 3). The 2018-year class was the most well-represented cohort for Lake Cadillac (Table 4). These results indicate that stocked Walleye are surviving, growing well, and contributing to the fisheries on both lakes.

While the majority of the Walleye sampled from both lakes came from stocked years, there were fish present from unstocked years as well (Tables 3 and 4). The 2017-year class from Lake Mitchell was the most abundant, with 15 individuals (and another two individuals from Lake Cadillac). This provides evidence that natural reproduction continues to occur on the lakes and contribute to the fishery, although not at levels that would support the fishery desired by the public.

Growth analysis from the Walleye sampled in 2022 revealed that they were growing well (Tables 3 and 4). Some differential growth was observed. For example, age-4 Walleye from Lake Mitchell ranged from 13.0 to 19.6 inches, while age-5 Walleye ranged from 13.8 to 21.8 inches. This is not uncommon in Walleye, as males and females tend to grow at different rates. Also, male maximum length tends to be approximately 80% of female maximum length (Bozek et al. 2011). Therefore, the larger Walleye caught from Lakes Mitchell and Cadillac tend to be females. Male and female Walleye mature at different ages, also leading to differential growth. Males mature at ages 2-4 and as small as 11 inches, although the average length of maturity for males is around 14 inches. Females tend to mature later, at ages 3-6 and around 18 inches (Barton and Barry 2011; Bozek et al. 2011). Walleye from the 2022 survey from both lakes had growth rates that were near the state average for most year classes (Tables 3 and 4). Also, length-at-age for Walleye from the 2022 surveys were not much different from the results of the 2012 fisheries surveys of Lakes Mitchell and Cadillac (Tonello 2012a and 2012b).

While the largest Walleye caught in the 2022 survey were 24.0 inches (both from Lake Mitchell), larger Walleye have been recorded. A Walleye in the 27-inch class was caught in the 2012 netting survey of Lake Mitchell, and four Master Angler Walleye (larger than 29 inches in length) have been recorded from Lake Mitchell (one in 2017 and three in 2018).

Management Direction:

The 2022 volunteer Walleye survey of Lakes Mitchell and Cadillac was successful in that it provided crucial information on Walleye year-class strength in those lakes. When matched with Walleye stocking data, strong Walleye year classes on both lakes coincided with stocking years. This leads to the conclusion that stocking is supporting the very popular Walleye fisheries on these lakes, and that it should



continue. Therefore, Walleye should continue to be stocked into Lakes Mitchell and Cadillac at a rate of 50/acre, on an every-other-year basis. If Walleye stocking were to cease in Lakes Mitchell and Cadillac, the Walleye fishery would likely diminish greatly, leading to angler dissatisfaction and lost fishing opportunity.

The robust growth rates seen in the 2022 data indicate that more Walleye could be stocked into Lakes Mitchell and Cadillac if they were available. While not a common scenario due to the large number of lakes stocked with Walleye in any given year by MDNR and the reduction in field staff available to raise Walleye, it is a possibility (this did occur in 2019; Table 1). If surplus Walleye do become available, stocking should be done in Lake Mitchell first. This is because a tagging study conducted in the 1990s documented Walleye movement from Lake Mitchell downstream to Lake Cadillac, but not from Lake Cadillac upstream to Lake Mitchell (Tonello 2012a and 2012b). Therefore, Walleye stocked into Lake Mitchell could eventually enhance the Lake Cadillac fishery, but probably not the opposite.

While it did provide valuable information for Walleye management, the 2022 volunteer survey of Lakes Mitchell and Cadillac has obvious limitations and should not take the place of more traditional fisheries survey methods, including netting, electrofishing, and creel census. The 2022 effort did not provide any information on the other popular fish species in Lakes Mitchell and Cadillac. Both lakes see very heavy angling effort for multiple other species, in addition to Walleye. Therefore, more traditional fisheries surveys of both lakes should be conducted as soon as staffing levels allow. It has now been more than ten years since the previous fisheries surveys were conducted. Both lakes are fished quite heavily and contribute to the local tourism economy by attracting anglers from all over Michigan in addition to several other states. A previous creel census study conducted in 2006 by MDNR showed that the lakes received over 120,000 angler-hours of effort in that year.

Other issues worthy of discussion on Lakes Mitchell and Cadillac include aquatic plant management and shoreline management. Both lakes have extensive treatment histories with a myriad of chemicals being used for controlling both native and non-native aquatic plants. Due to the shallow nature of the lakes, aquatic plants are a critical component of the ecosystems and fisheries. Therefore, we recommend only treating invasive plant species when recreational use is disrupted or threatened. Native plants should not be treated.

All remaining riparian wetlands adjacent to Lakes Mitchell and Cadillac should be protected and considered critical habitat to the continued health of the lake's aquatic community. The shorelines of both lakes are already more developed than most other lakes in Michigan. Future unwise riparian development and wetland loss may result in further deterioration of the water quality and aquatic habitat. Healthy biological communities in inland lakes require suitable natural habitat. Human development within the watershed, along the shoreline, and in the lake basin, tends to change and diminish natural habitat. Attempts should be made to reclaim areas of natural shoreline by removing seawalls and riprap and restoring natural shoreline characteristics. The Michigan Natural Shoreline Partnership, an organization dedicated to promoting natural shoreline landscaping to protect Michigan's inland lakes (shorelinepartnership.org), can provide guidance and training on how best to manage the land/water interface for the benefit of Lakes Mitchell and Cadillac.

References:

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Tonello, M. A. 2012a. Status of the Fishery Report 2012-149: Lake Cadillac, Wexford County. Michigan Department of Natural Resources, Lansing.

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Table 1. Fish stocked in Lake Mitchell, Wexford County, 2004-2022.

Year	Species	Number	Size/age	Strain
2004	Walleye	94,431	spring fingerlings	Muskegon
2006	Walleye	5.3 million	fry	Muskegon
	Walleye	10,751	fall fingerlings	Muskegon
2008	Walleye	60,787	fall fingerlings	Muskegon
2011	Walleye	17,092	spring fingerlings	Muskegon
2012	Walleye	143,730	spring fingerlings	Muskegon
2014	Walleye	200,000	spring fingerlings	Muskegon
2016	Walleye	143,150	spring fingerlings	Muskegon
2018	Walleye	133,854	spring fingerlings	Muskegon
2019	Walleye	50,881	spring fingerlings	Muskegon
2022	Walleye	116,864	spring fingerlings	Muskegon

Table 2. Fish stocked in Lake Cadillac, Wexford County, 2004-2022.

Year	Species	Number	Size/age	Strain
2004	Walleye	67,549	spring fingerlings	Muskegon
2006	Walleye	2,300,000	fry	Muskegon
	Walleye	16,416	fall fingerlings	Muskegon
2008	Walleye	28,629	spring fingerlings	Muskegon
2011	Walleye	14,867	spring fingerlings	Muskegon
2012	Walleye	71,834	spring fingerlings	Muskegon
2014	Walleye	123,899	spring fingerlings	Muskegon
2016	Walleye	60,007	spring fingerlings	Muskegon
2018	Walleye	70,495	spring fingerlings	Muskegon
2022	Walleye	52,699	spring fingerlings	Muskegon



Table 3. Age distribution of Walleye caught by anglers from Lake Mitchell during the spring and early summer of 2022.

Year Class	Age	No. Aged	Length range (in.)	Ave. length	State Ave. length
2020	II	1	11.9-11.9	11.9	10.4
2019*	III	2	13.0-15.0	14.0	13.9
2018*	IV	47	13.0-19.6	15.7	15.8
2017	V	15	13.8-21.8	17.7	17.6
2016*	VI	49	15.3-24.0	19.1	19.2
2015	VII	5	18.3-22.8	20.4	20.6
2014*	VIII	5	17.8-23.3	20.9	21.6
2012*	X	7	17.1-24.0	21.2	23.1
2010	XII	1	22.5-22.5	22.5	
2006*	XVI	1	21.8-21.8	21.8	

*Indicates Walleye were stocked in that year.

Table 4. Age distribution of Walleye caught by anglers from Lake Cadillac during the spring and early summer of 2022.

Year Class	Age	No. Aged	Length range (in.)	Ave. length	State Ave. length
2018*	IV	11	15.0-19.1	16.8	15.8
2017	V	2	19.8-22.5	21.2	17.6
2016*	VI	3	17.2-20.9	19.5	19.2

*Indicates Walleye were stocked in that year.