

# Holloway Reservoir – 2022 Fall Walleye Survey

*2022 Discretionary Survey Report*

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*On the cover: Walleye. Credit: United States Fish and Wildlife Service*

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## Introduction

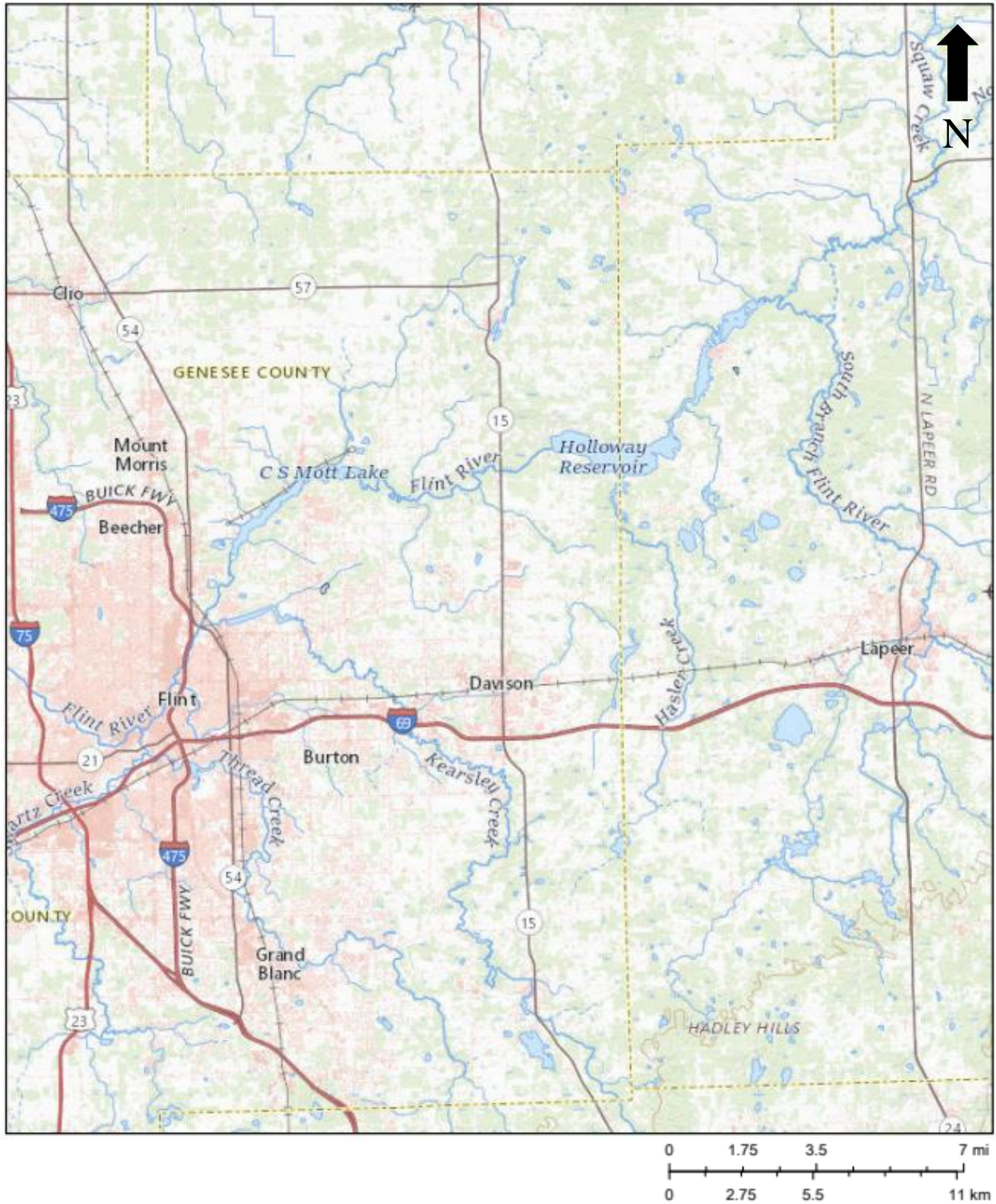
Walleye were stocked into Holloway Reservoir starting in the late 1970s, but stocking stopped in 1992 due to sufficient natural reproduction. Holloway Reservoir now supports a self-sustaining Walleye population that does not rely on supplemental stocking, which is uncommon for inland lakes in southeast Michigan. Anglers are drawn to the fishery because of the abundant Walleye and good access for a variety of sizes of fishing boats. Typically, anglers use large boats or charters to target Walleye on the Great Lakes. Holloway Reservoir is long, and narrow providing some protection for smaller boats and still allows anglers to fish during unfavorable conditions (i.e. wind) for other larger bodies of water. Relative abundance estimates of age-0 Walleye are consistently high in Holloway Reservoir. This system represents a productive, turbid reservoir with high growth rates of young Walleye. In contrast, many successful northern Michigan Walleye fisheries are found in large, deep, clear lakes. This goes to show how a Walleye population can thrive in two vastly different environments if the proper forage and habitat are present.

Holloway Reservoir is a productive waterbody, likely due to runoff from agriculture fields in the surrounding watershed. The turbidity of Holloway Reservoir is typical of a river impoundment and the reservoir supports both cool- and warmwater species. The two most recent general fish community surveys on Holloway Reservoir were completed in 2009 and 2016 and found that Common Carp, Channel Catfish, Walleye, and Black Crappie were consistently abundant. Gizzard Shad, Brook Silverside, and Round Gobies made up most of the forage fish community and likely supported the abundant predators (Leonardi 2009).

The Fisheries Division began monitoring the Walleye recruitment in Holloway Reservoir in 2011 on an annual basis. For this survey our objectives were to 1) estimate year-class strength for age-0 and age-1 Walleye, 2) determine the weighted mean total length (TL) of age-0 and age-1 Walleye, and 3) determine the mean growth index for Walleye in Holloway Reservoir.

## Study Area

Holloway Reservoir is a 1,973-acre impoundment of the Flint River. The reservoir is located northeast of Flint on the border of Genesee and Lapeer counties and about 8.5 mi upstream of Mott Reservoir (Figure 1). It is formed by Holloway Dam on the west side and is approximately 7.25 mi long. Holloway Reservoir was created in 1955 to be a water source for the city of Flint but is no longer used for this purpose. Since 1967, secondary water supply, flow augmentation, and recreational use have been the primary objectives of the reservoir since the City of Flint began purchasing potable water from Detroit via their Lake Huron pipeline. General operating procedures for the dam strive to achieve a spring elevation of 755 feet (above mean sea level) by May 1 of each year. This elevation is maintained throughout summer. During the first two weeks of November, the reservoir is drawn down to a winter elevation of 751 feet to prevent structural damage to the dam from freezing. The reservoir has two sections connected by a channel. The lower portion is about 3.5 mi long and 0.75 mi across at the widest point (Figure 2). The upper portion is shorter (2.5 mi long) and narrower (0.4 mi wide; Figure 2). The connecting channel is approximately 1.25 mi long.



**Figure 1.** Holloway Reservoir in Lapeer and Genesee County, Michigan.

## Methods

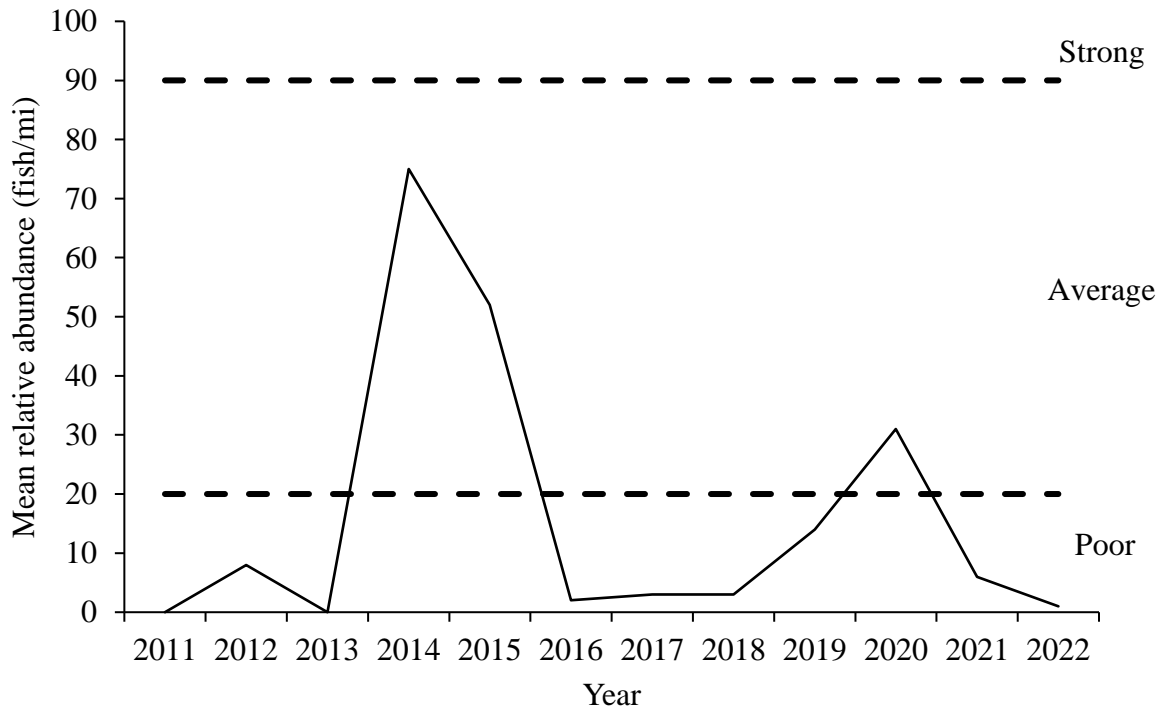
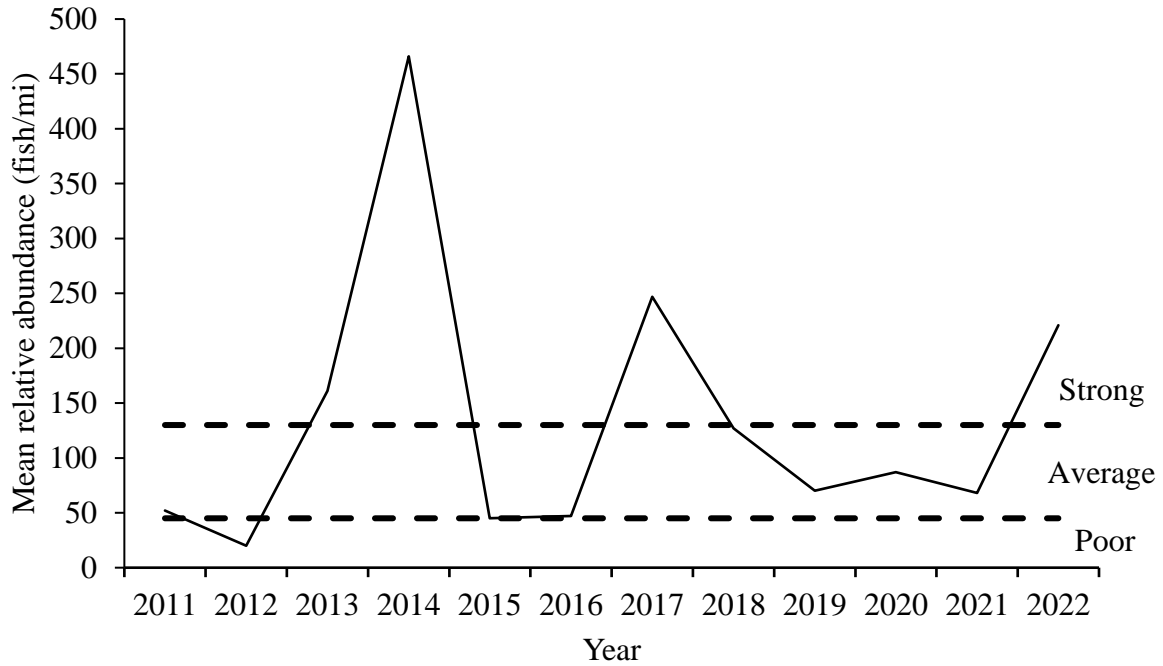
Nighttime boat electrofishing was used to collect Walleye at eight index locations on October 10, 2022. Electrofishing power settings were set at a pulse rate of 60/second, 40% duty cycle, and 6 amps with pulsed direct current to target young (age-0 and age-1) Walleye. Each index site was sampled for ten minutes along the shoreline. Total shock time was 1.3 hours and total shocking distance was 2.5 mi. Relative abundance was estimated for age-0 and age-1 Walleye as fish/mi. Year-class strength was estimated using thresholds developed by Serns (1982). Total length (inch group) was recorded for all Walleye collected. Up to ten aging structures (dorsal spines for Walleye  $\geq 10$  in TL; scales for Walleye  $< 10$  in TL) were collected per inch group for age estimation and growth analysis. For estimating age from dorsal spines, a thin cross section of the dorsal spine was cut using a Dremel grinding and cutting tool. Mineral oil was added to the section for clarity and age estimation occurred under a microscope. To estimate age from scales, four-to-six scales were pressed onto acetate film. Scale impressions were viewed under a microscope. Walleye mean growth index was calculated using only those age groups represented by five or more fish. Surface water temperature was measured with a handheld temperature probe.

## Results

There were an estimated 565 age-0 Walleye collected during the survey with a mean relative abundance of 221 fish/mi (standard error [SE] = 35; Figure 2). Year-class strength for this cohort was estimated to be “strong” (Table 1). The weighted mean length for age-0 Walleye was 6.1 in TL (SE = 0.19). There was only one age-1 Walleye collected during the survey (TL = 10.4). Mean relative abundance of age-1 Walleye was 0.8 fish/mi (SE = 0.8; Figure 2) and year-class strength was estimated to be “poor” for this cohort (Table 1). The overall mean growth index for Walleye was 0.8 and the oldest individual captured was estimated to be seven years old.

**Table 1.** Survey metrics including mean catch-per-effort (CPE), year-class strength, and mean total length (TL; in) for age-0 and age-1 Walleye and mean growth index for all Walleye captured via fall nighttime electrofishing in Holloway Reservoir, Genesee and Lapeer Counties, Michigan from 2011-2022.

Year	Metric						
	Mean age-0 CPE	Year-class strength	Mean age-0 TL	Mean age-1 CPE	Year-class strength	Mean age-1 TL	Mean growth index
2011	52	Average	9.0	0	Poor	-	1.7
2012	20	Poor	9.2	8	Poor	10.6	-
2013	161	Strong	6.4	0	Poor	-	-0.8
2014	466	Strong	6.4	75	Average	9.8	-1.2
2015	45	Average	6.7	52	Average	9.1	-1.4
2016	47	Average	6.0	2	Poor	9.6	-1.1
2017	247	Strong	7.3	3	Poor	12.7	1.1
2018	127	Strong	7.3	3	Poor	13.3	1.5
2019	70	Average	6.4	14	Poor	9.8	0.6
2020	87	Average	7.6	31	Average	13.0	1.7
2021	68	Average	8.8	6	Poor	12.8	0.9
2022	221	Strong	6.1	<1	Poor	-	0.8



**Figure 2.** Mean relative abundance (fish/mi) of age-0 (top) and age-1 (bottom) Walleye in Holloway Reservoir, Genesee and Lapeer counties, Michigan from 2011-2022 and thresholds for year-class strength from Serns (1982).

## Conclusions

Walleye recruitment has been monitored at Holloway Reservoir with an established protocol since 2011. During this time age-0 and age-1 Walleye relative abundances have been variable. Relative abundance variability is typical of natural Walleye populations which do not require stocking to persist. However, estimates of year-class strength for each cohort during the first two years of life (e.g., age-0 and age-1) have consistently been different. Year-class strength has been estimated as “average” or “strong” using age-0 Walleye relative abundance in all years except 2012. Conversely, year-class strength estimates for those same cohorts as age-1 fish have been “poor” during eight survey years and “average” during the other three survey years. It is assumed year-class strength is set by the first fall for age-0 Walleye in Holloway Reservoir, so it is unclear why there is a lack of agreement between the two estimates.

Year-class strength estimated from age-1 Walleye relative abundance suggests Holloway Reservoir struggles to recruit new cohorts and produce a reliable Walleye fishery. In reality, Holloway Reservoir represents one of the strongest inland Walleye fisheries in southeast Michigan. While fall electrofishing is not the preferred sampling method to estimate population dynamics of the adult Walleye population, adult fish are consistently captured in the survey and aged. Moreover, age-0 to age-5 and older Walleye are routinely represented in the age data which suggests it is a healthy population with several year-classes present. Additionally, anecdotal reports from anglers further support this idea and anglers are satisfied with the numbers and size of Walleye they catch.

Future management at Holloway Reservoir will continue to focus on the Walleye population. Age-0 Walleye relative abundance will serve as the primary indicator for the current and future status of the Walleye population until an adult population estimate can be completed.

## References

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