



## FREMONT LAKE – 2018 FISHERIES SURVEY REPORT

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### **Introduction**

Fremont Lake is a natural lake of glacial origin located in the southern portion of Newaygo County. The City of Fremont is located just to the northwest of the lake. Fremont Lake has a surface area of 790 acres and a shoreline length of approximately 5.1 miles (O'Neal 2009). The maximum depth of Fremont Lake is 86 feet. Fremont Lake lies in the Muskegon River Watershed and its outflow forms the headwaters of Brooks Creek. Fremont Lake is fed by several small tributaries, the most significant of which is Daisy (also sometimes known as Darling) Creek. There are two boat launches on Fremont Lake. One is Fremont Lake Park, located along the north shore within the City of Fremont, and the other is Sheridan Park, located along the south shore and administered by Sheridan Township.

Fremont Lake has a long fisheries management history, dating back to the late 1800s. The original fish community included cisco, which have since been extirpated (O'Neal 2009). The lake struggled with pollution issues for much of the 20<sup>th</sup> century (Trimberger 1982) and became overrun with invasive Common Carp. The fish population was killed off by the Michigan Department of Natural Resources (MDNR) with rotenone in 1982. Since then, Fremont Lake has been intensively managed for Walleye (O'Neal 2009; Table 1), with Walleye being stocked frequently since 1983 by MDNR. In recent years, the management plan has been to stock Fremont Lake every other year with 39,500 spring fingerling Walleye (a rate of about 50/acre). Since the population was re-established after the 1983 fish kill, Fremont Lake has been very popular with Walleye anglers.

The most recent comprehensive fishery survey of Fremont Lake was conducted in 2009 (O'Neal 2009), and that survey showed excellent Walleye catch rates and growth. The 2009 survey also showed that Fremont Lake had a well-balanced fish community. The most recent fall electrofishing survey targeting Walleye was conducted in September 2005 (O'Neal 2005). Both surveys revealed good numbers of Walleye from multiple year classes, both stocked and unstocked. Walleye growth rates from both surveys were well above the State average.

In August of 2018 there was a fish kill on Fremont Lake in which anglers reported dozens of dead adult Walleye of various sizes. While the primary purpose of the October 2018 survey was to assess the success of the 2018 stocking effort, a secondary purpose was to see if any adult Walleye remained alive. While fall electrofishing surveys typically do not target adult Walleye, they are often caught.

### **Materials and Methods**

On October 18, 2018, a stocking evaluation survey of Fremont Lake was conducted. This survey was a one-night electrofishing effort aimed at assessing the 2018 and 2017 Walleye year classes. The survey was conducted according to protocols outlined by Ziegler and Schneider (2000), and by Serns (1982 and 1983). In the survey, an electrofishing boat was used to survey the perimeter (5.96 miles) of the Fremont Lake shoreline. The duration of the survey was 2 hours, 4 minutes.

### **Results**

A total of 162 Walleye were captured in the October 18, 2018 effort, ranging from 5-27 inches in length. Of those, 111 were age-0 Walleye from 5.0 to 10.7 inches in length. The catch rate for the age-0 Walleye was 21.8/mile of shoreline sampled, or 53.6 Walleye/hr of sampling (Table 2). The remaining 51 Walleye



represented five different year classes, including 2017, 2015, 2014, 2013, and 2004. While the age-0 Walleye were 0.2 inches larger than the State average, the remaining year classes were growing much faster, at a combined 2.2 inches faster than the State average.

### **Discussion**

The presence of 111 age-0 Walleye in the 2018 survey is an encouraging sign for the Fremont Lake Walleye fishery. More age-0 Walleye were caught in the 2018 survey than were caught in a similar survey of Fremont Lake conducted in 2005 (Table 3). Although the 2018 fall Walleye sampling effort resulted in a "poor" year class according to Ziegler and Schneider (2000), it is likely that the index doesn't fit northwestern Lower Peninsula lakes. A poor year class according to Ziegler and Schneider (2000) may be a good year class on Fremont Lake. The catch rate of 21.8 age-0 Walleye per mile of shoreline sampled is one of the highest catch rates seen in a Central Lake Michigan Management Unit lake in the last 20 years.

### **Management Direction:**

The 2018 fall survey of Fremont Lake showed a strong 2018 Walleye year class, likely due to the stocking effort from the summer of 2018. Other strong year classes represented in the survey included 2017, 2015, and 2014. Of those, only the 2014- year class was stocked. Therefore, it is highly likely that natural reproduction is contributing to the Fremont Lake Walleye fishery. Both the 2005 (O'Neal 2005) and 2009 (O'Neal 2009) surveys also documented unstocked and presumably wild year classes of Walleye in Fremont Lake. The presence of older, adult Walleye in the 2018 survey was encouraging, particularly after the reported Walleye fish kill in the summer of 2018. Clearly the event was only a partial kill, with many adult Walleye surviving.

Though natural reproduction contributes Walleye to the Fremont Lake fishery, stocking clearly plays a strong role in the fishery. Therefore, Walleye stocking should continue in Fremont Lake. A total of 39,500 spring fingerling Walleye (50/acre) should be stocked on an every-other year basis, with the next stocking effort occurring in 2020.

### **References:**

O'Neal, R. P. 2005. Fremont Lake Fisheries Survey Report. Michigan Department of Natural Resources, Cadillac.

O'Neal, R. P. 2009. Fremont Lake Fisheries Survey Report. Michigan Department of Natural Resources, Cadillac.

Serns, S. L. 1982. Relationship of Walleye fingerling density and electrofishing catch per effort in northern Wisconsin lakes. *North American Journal of Fisheries Management* 2:38-44.

Serns, S. L. 1983. Relationship between electrofishing catch per effort and density of Walleye yearlings. *North American Journal of Fisheries Management* 3:45 1-452.

Trimberger, E. J. 1982. A Fisheries Management Plan for Fremont Lake, Newaygo County. Michigan Department of Natural Resources, Cadillac.

Ziegler, W., and J. C. Schneider. 2000. Guidelines for evaluating Walleye and muskie recruitment. Chapter 23 *in* Schneider, James C. (ed.) 2000. *Manual of fisheries survey methods II: with periodic updates*. Michigan Department of Natural Resources, Fisheries Special Report 25, Ann Arbor.



Table 1. Walleye stocked by MDNR into Fremont Lake, Newaygo County, 1983-2018.

Year	Species	Number	Size	Strain
1983	Walleye	2,965,000	fry	Muskegon
	Walleye	700	fall fingerlings	Muskegon
1984	Walleye	14,056	spring fingerlings	Muskegon
	Walleye	7,325	fall fingerlings	Muskegon
	Walleye	107	adults	Muskegon
1985	Walleye	3,273	fall fingerlings	Muskegon
1986	Walleye	51,000	spring fingerlings	Muskegon
	Walleye	684	fall fingerlings	Muskegon
1987	Walleye	24,600	spring fingerlings	Muskegon
1988	Walleye	1,276	fall fingerlings	Muskegon
1989	Walleye	30,814	spring fingerlings	Muskegon
1991	Walleye	60,803	spring fingerlings	Muskegon
1992	Walleye	93,597	spring fingerlings	Muskegon
1994	Walleye	83,088	spring fingerlings	Muskegon
1996	Walleye	82,131	spring fingerlings	Muskegon
1997	Walleye	72,787	spring fingerlings	Muskegon
1999	Walleye	81,068	spring fingerlings	Muskegon
2001	Walleye	101,319	spring fingerlings	Muskegon
2003	Walleye	79,098	spring fingerlings	Muskegon
2005	Walleye	79,384	spring fingerlings	Muskegon
2008	Walleye	39,444	spring fingerlings	Muskegon
2010	Walleye	41,343	spring fingerlings	Muskegon
2012	Walleye	41,862	spring fingerlings	Muskegon
2014	Walleye	51,646	spring fingerlings	Muskegon
2016	Walleye	39,300	spring fingerlings	Muskegon
2018	Walleye	39,500	spring fingerlings	Muskegon



Table 2. 2018 Fremont Lake fall electrofishing walleye survey results. The survey was conducted on October 18, 2018.

Miles of shoreline sampled:	5.1
Fife Lake acreage:	790
Serns Age-0 constant:	0.234
Serns Age-1 constant:	0.194

Year Class	Age	# walleye captured	Catch Rate (# walleye/mile of shoreline sampled)	Year Class strength estimate	Serns Index (# walleye/surface acre)
2018*	0	111	21.76	4023.4	5.093
2017	1	9	1.76	270.5	0.342
2015	3	20	3.92	**	**
2014*	4	18	3.53	**	**
2013	5	3	0.59	**	**
2004	14	1	0.20	**	**

\*Indicates a year in which walleye were stocked.

\*\*No Serns constant exists for ages older than 2.

Table 3. The number of age-0 and age-1 Walleye caught in MDNR fall electrofishing surveys of Fremont Lake, Newaygo County, MI in 2005 and 2018. Catch rates are expressed as the number of Walleye captured per mile of sampling.

		# Walleye captured	Catch Rate
2005	Age-0	12	4.2
	Age-1	0	0
2018	Age-0	111	21.8
	Age-1	9	1.8