

### **West Twin Lake**

Montmorency County, T29N R01E Sec. 29  
North Branch Au Sable River watershed, last surveyed 2015

**Neal Godby, Fisheries Biologist**

#### **Environment**

West Twin Lake is a 1,307-acre lake located in the extreme southwest corner of Montmorency County near the town of Lewiston (Figure 1). It is a relatively shallow lake, with a maximum depth of 28 feet, with most of the lake less than 10 feet deep (Figure 2). The substrate is mainly sand and marl with isolated pockets of gravel, while the surficial geology of the contributing watershed is made up mostly (90%) of ice contact/outwash landforms. The lake drains to the Au Sable River via Middle Branch Big Creek, which flows out of south side of the lake. Vegetation has traditionally been limited to the southwest part of lake, and is mostly bulrushes, chara, cattails, and lilies. A 2014 aquatic vegetation survey of West Twin Lake funded by the Twin Lakes Property Owners Association documented 21 aquatic plant species, including the presence of Eurasian Watermilfoil (EWM). EWM is an aquatic invasive species, and covered 13 acres (Progressive AE, 2014).

#### **History**

The fisheries management history for West Twin Lake through 2000 was summarized well by Cwalinski (2002) in a writeup for a survey that year:

"An extensive amount of fish management practices have occurred on West Twin Lake dating as far back as 1925 when early fish examinations documented the presence of species such as rock bass, largemouth and smallmouth bass, minnows, perch, darters and bullheads. From 1953-1954, 150-200 brush shelters were installed in the lake while another 130 were added for fish structure in 1978.

"Varying amounts of fish sampling effort were used throughout the 1960's to further assess the fish population at West Twin Lake. Species composition included the addition of species such as northern pike, white sucker and pumpkinseed. Chemical rehabilitation of part of the lake was attempted in the early 1970's to control species such as white sucker and yellow perch. MDNR fisheries division personnel stocked West Twin Lake with 4,000,000 walleye fry from 1971-1972. Subsequent surveys occurred in 1972 to determine walleye survival and yellow perch growth yet no walleye were collected.

"From 1974-1990, both northern and tiger (most) muskellunge fall fingerlings were stocked in West Twin Lake in alternate years at rates ranging from 2-9/acre [Table 1]. By 1980, a netting survey had documented good survival of tiger muskellunge and a good bluegill fishery. Additional fish surveys were conducted in 1990 and as recently as 1997 to assess tiger muskellunge survival. The stocking program for this fish was discontinued due to the inability to obtain muskellunge fingerlings for stocking.

"Good numbers of largemouth bass, pumpkinseeds and bluegill were found in 1997. Northern pike were present in moderate numbers, possibly filling the niche left behind after the termination of

muskellunge stockings. Pike size distribution was skewed toward legal sized fish. Other species comprising a significant part of the fish community in 1997 included yellow perch, rock and smallmouth bass, and white suckers. It was suggested that selective harvest and heavy fishing pressure primarily for yellow perch were a factor at West Twin Lake by 1997.

"A walleye stocking program was again initiated in the late 1990's at West Twin Lake [Table 1]. From 1998-2000, small fingerling walleye (1.0-1.7 inches) were stocked on an annual basis. In 1998, 86,000 (66/acre) were planted. Another 66,000 (51/acre) were stocked in 1999 while 132,230 (101/acre) were stocked in 2000. Most of these fish were marked with oxytetracycline [OTC] in order to potentially document future walleye natural reproduction.

"In early September 1998, a stocking evaluation was completed on West Twin Lake to quantify survival of walleye stocked in May. Utilizing a Smith Root boom shocker boat at night, approximately half of the lake shoreline was surveyed for a total effort of 1.5 hours. Five young-of-the-year (YOY) walleye averaging 8.1 inches in length were collected at a low catch rate of 3.3/hour. In addition, two yearling walleye were collected averaging 13.2 inches at a catch rate of 1.3/hour. Though few walleye were collected, growth of these young fish was good. It is believed the yearling walleye were migrants from nearby East Twin Lake, which has a more extensive walleye stocking program, including 1997.

"In early September 1999, a second stocking evaluation was completed at West Twin Lake with effort consisting of 2.0 hours night electrofishing and half the shoreline surveyed. A total of 20 walleye ranging from 7-14 inches were collected. Based on length-frequency analysis, this included 16 YOY (8/hour) and 4 yearling fish (0.5/hour). Sixteen of the total 1999 walleye catch (20) were analyzed for oxytetracycline of which 100% tested positive. Thus, it appears that maintenance stocking is essential in providing a walleye fishery at West Twin Lake. This is, however, based on one sample.

"In early September 2000, an additional walleye stocking evaluation was completed on the lake utilizing a Smith Root boom shocker boat at night with effort consisting of 1.5 hours. A total of 15 walleye ranging from 5-15 inches were collected. Based on length-frequency analysis, the walleye collected included 12 YOY (8/hour), 2 yearling walleye (1.3/hour) and one age-2 legal size fish.

"Although walleye catch rates may be considered low from 1998-2000, it is a positive sign that some stocked walleye do survive in West Twin Lake. This lake has extensive shallow sand/marl shoals which can pose a challenge to capturing walleye with electrofishing gear, thus possibly lowering catch rates."

No walleye were stocked in West Twin Lake from 2007-10 because of statewide restriction on walleye rearing and stocking because of viral hemorrhagic septicemia (VHS) being discovered in the wild brood source. Stocking resumed in West Twin Lake in 2011.

Additional fall walleye evaluations were done in 2001, 2004, and 2011 to evaluate stocking success (Table 2). Catch rates for age-0 walleye trended upwards, with exceptional catch rates reported during the 2011 survey.

A Status and Trends survey was done in 2009. That survey used a variety of gear types and captured 19 species of fish. It showed the panfish community was comprised of Yellow Perch, Bluegill, and

Pumpkinseed, all of which were growing at about the state average. The predator community was diverse, made up of Largemouth Bass, Smallmouth Bass, Northern Pike, and Walleye. All predator species were growing slower than statewide average growth rates.

### **Current Status**

Surveys were done in 2015 to estimate the number of walleye in West Twin Lake and evaluate the fishery. Walleye were captured by netting and electrofishing in mid-April, with each legal Walleye receiving a jaw tag and subsequently released. Effort consisted of 12 large mesh fyke net lifts, 19 large mesh trap net lifts, and 3.08 hours of total boomshocking time. Two different estimates of the Walleye population were done. The estimate of adult (mature) walleye was 2,576 (2.0/acre), and was calculated using the protocol for waters within the 1836 treaty-ceded territory. That method used the netting effort as the marking phase and the electrofishing effort as the recapture phase. The estimate of legal ( $\geq 15$  inches) was 2,120 Walleye (1.7/acre). That estimate was done using the netting and boomshocking as the marking phase and the creel survey as the recapture phase. The creel survey used a roving (instantaneous) design and was conducted from May 1- August 31, 2015, to document angler effort and harvest. A total of 1,750 fish representing nine species were collected during the spring survey (Table 3).

The netting survey was conducted earlier than a typical fish community survey, as the target species was Walleye. Walleye are spring spawners and congregate at that time, making them easier to net. Walleye were the dominant predators in the catch. A total of 623 Walleye were captured, ranging from 5-26 inches in total length (Table 4, Figure 3). Walleye were from ages 2 to 10 and were growing at about the state average growth rate (Table 5). The estimate of adult Walleyes in West Twin Lake in 2015 was 2,576 or approximately 2.0/acre. Data were pooled for this estimate because a minimum number of recaptures were not obtained in various strata (sex and length intervals).

Northern Pike were another predator encountered during the survey, with 66 pike captured during the spring effort. The Northern Pike ranged from 11-37 inches in total length, distributed well across different sizes (Table 4). Eight age groups from Age-1 to Age-10 were represented (Table 5). The Northern Pike were growing well, with average lengths almost 3 inches larger than the statewide average lengths at age for that species.

The creel survey estimated that 701 walleye were harvested by anglers from May 1 through August 31 in 2015 (Table 6) (MDNR Statewide Angler Survey Program 2017). Fishing effort over that time period was 10,558 angler hours (Table 6), with almost 71% of that effort targeted for Walleye. Bluegill and Yellow Perch were also important in angler harvest based on the creel survey.

### **Analysis and Discussion**

Michigan DNR Fisheries is developing a regression model to predict Walleye abundance in Michigan lakes, and the Walleye population estimate for West Twin Lake will help in the development of that predictive model. The estimate will also help populate the Walleye table in the inland consent decree. That table lists all Walleye lakes in the 1836 treaty area, classifies those lakes based on source of recruitment (stocked or natural), and lists the estimated Walleye population in that lake, based either on an actual estimate or one predicted using a regression model. The estimates in the table are used to set harvest limits for tribal subsistence fishing.

West Twin Lake has a reputation as an outstanding Walleye fishing lake. The estimated number of Walleye per acre (1.7) is good, but is likely indicative of a "down" year in terms of Walleye numbers based on the lake's reputation. This also may be a result of the lake still recovering from the hiatus in stocking from 2007-2010. The density of Walleye in West Twin Lake (1.7/acre) is in line with other large lakes sampled throughout the state of Michigan (Hanchin 2017). Of the 23 large lakes (>1000 acres) surveyed from 2001-2010, the densities of legal Walleye ranged from 0.1 to 6.0 per acre, with a mean of 1.9 (Table 7). Growth of Walleye in West Twin Lake also compared favorably with the large lakes in that study; mean growth index for Walleye in the 23 lakes in that study was -0.5, while mean growth index in West Twin Lake was -0.2 (Table 7).

Our assumption has always been that there is limited, if any, natural reproduction of Walleye in this lake. Walleye ages II through IX were all present in the catch. Of the age-classes represented in this survey, only walleye ages II, IV, and IX are from years that West Twin Lake was stocked (2013, 2011, and 2006). Given the consistent recruitment even in non-stocked years based on walleye ages, we should mark future walleye stocks with OTC so that the level of natural reproduction can be determined.

### **Management Direction**

1. Continue alternate year walleye stocking to maintain the outstanding walleye fishery.
2. Maintain statewide fishing regulations.
3. Mark walleye with OTC so that level of natural reproduction can be determined.

### **References**

- Cwalinski, T. 2002. West Twin Lake 2000 survey analysis. Michigan Department of Natural Resources, Northern Lake Huron Management Unit files.
- Hanchin, P.A. 2017. A summary and analysis of the Large Lakes Survey Program in Michigan in 2001-2010. Michigan Department of Natural Resources, Fisheries Report 25, Lansing.
- MDNR Statewide Angler Survey Program, 2017. Open water creel survey report for East Twin Lake and West Twin Lake, Montmorency County, 2015. Available: [http://www.michigan.gov/documents/dnr/TwinLakes-CreelReport-2015\\_532650\\_7.pdf](http://www.michigan.gov/documents/dnr/TwinLakes-CreelReport-2015_532650_7.pdf). (November 2017).
- Progressive AE. 2014. Twin Lakes aquatic plant survey. Report to Twin Lakes Property Owner's Association. Grand Rapids, Michigan.

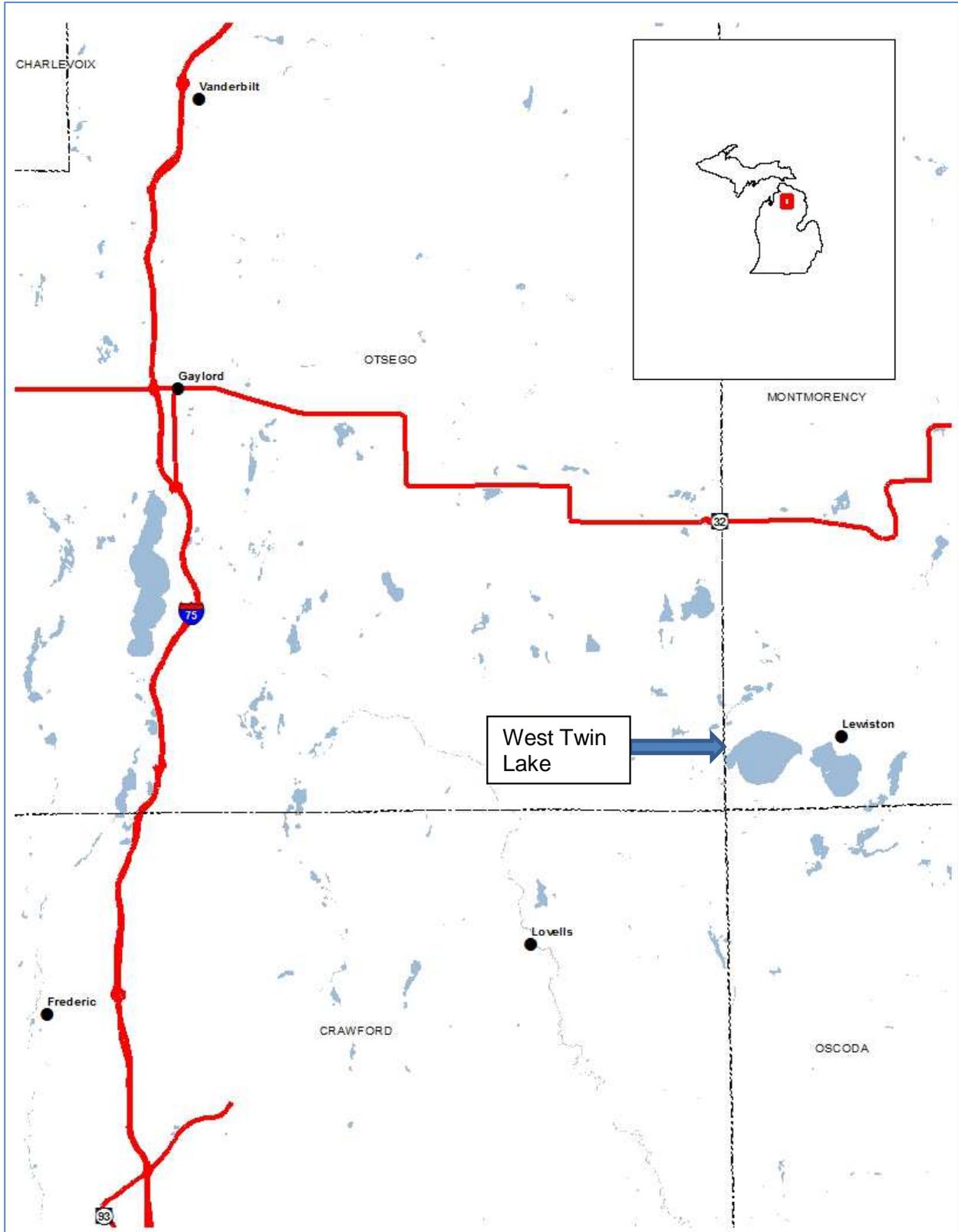


Figure 1. Locator map for West Twin Lake, Montmorency County.

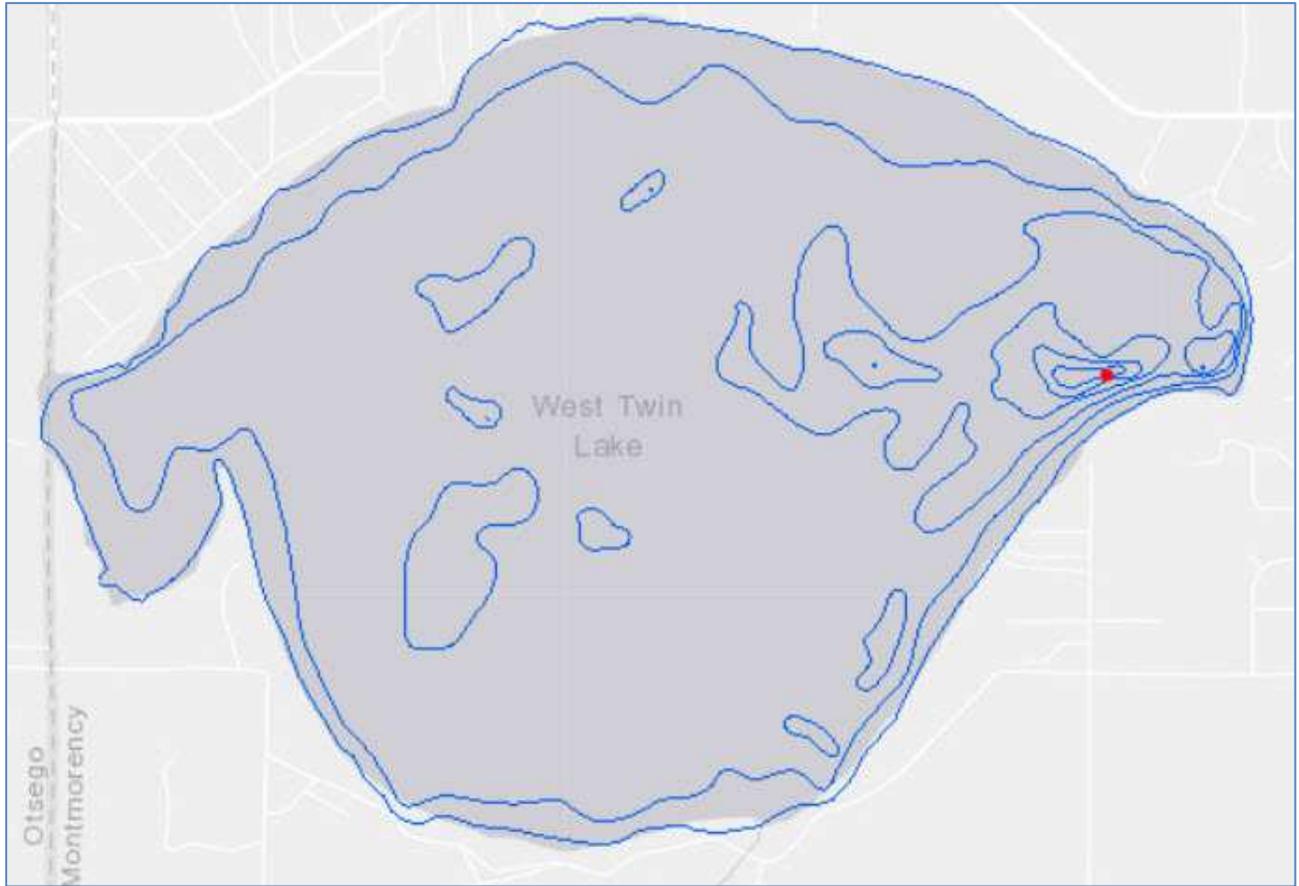


Figure 2. Depth contour map for West Twin Lake, Montmorency County. Contour lines are at five foot depth intervals.

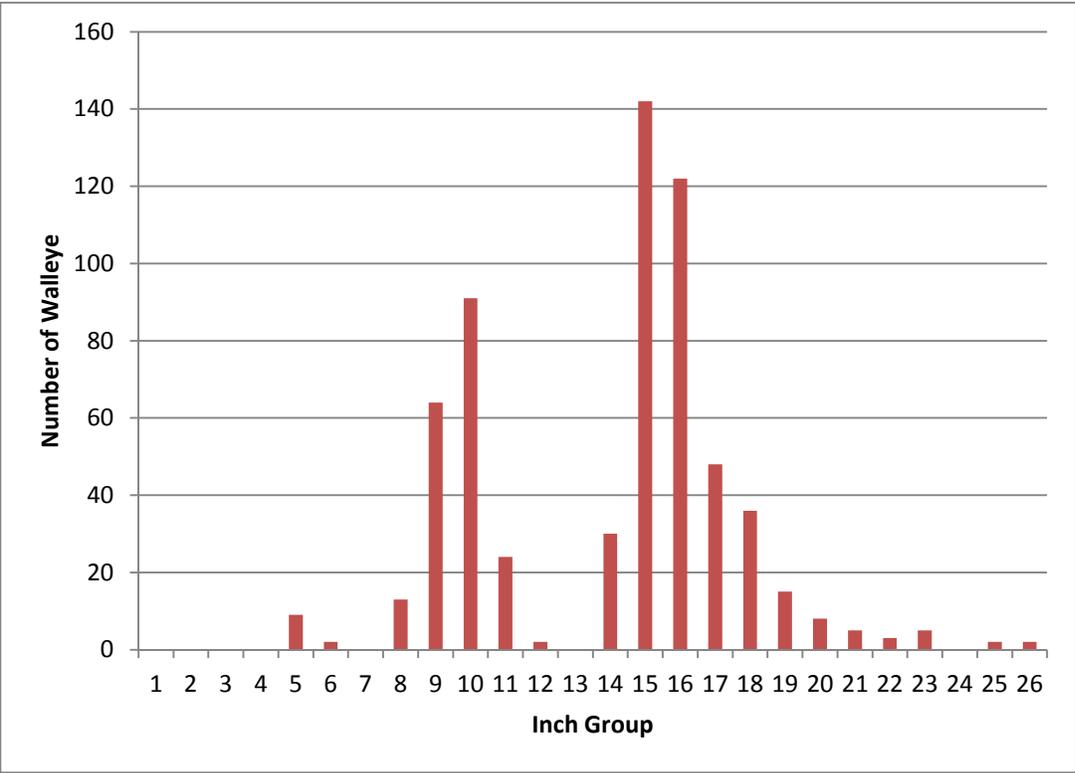


Figure 3. Catch of walleye by inch group in West Twin Lake, Montmorency County

Tables

Table 1. Fish stocking history for West Twin Lake from 1980 to 2015.

<b>Year</b>	<b>Species</b>	<b>Strain</b>	<b>Number</b>	<b>Number/Acre</b>	<b>Avg Length</b>
1980	Tiger Muskellunge	--	4,000	3	7.5"
1982	Tiger Muskellunge	--	4,000	3	5.8"
1984	Tiger Muskellunge	--	4,000	3	6.9"
1986	Tiger Muskellunge	--	4,000	3	7.6"
1988	Tiger Muskellunge	--	527	0.4	9.5"
1990	Tiger Muskellunge	--	4,000	3	9.6"
1998	Walleye	Tittabawassee/Bay De Noc	86,000	65	1.4"
1999	Walleye	Muskegon	66,000	50	1.7"
2000	Walleye	Tittabawassee	132,230	100	1.4"
2002	Walleye	Tittabawassee	61,370	46	1.2"
2003	Walleye	Muskegon	55,590	42	1.4"
2004	Walleye	Bay De Noc	60,350	45	1.3"
2006	Walleye	Tittabawassee	67,002	51	2.0"
2011	Walleye	Muskegon	98,057	75	1.7"
2013	Walleye	Muskegon	98,640	75	1.6"
2014	Walleye	Muskegon	68,929	53	1.6"

Table 2. Fall Walleye evaluations for West Twin Lake (Montmorency County).

<b>Date</b>	<b>Miles Shocked</b>	<b>Hours Shocked</b>	<b>No. Age-0 Walleye</b>	<b>Catch per Mile</b>	<b>Catch per Hour</b>
September 1998	--	1.5	5	--	3.3
September 1999	--	2.0	16	--	8
September 2000	--	1.5	12	--	1.3
August 2001	--	2.25	0	0	0
August 2004	3.84	2.07	43	11.2	21
October 2011	1.5	1.5	60	40	40

Table 3. Number, weight, and length range by species captured in the April 2015 survey of West Twin Lake (Montmorency County). Growth index refers to the average difference between observed growth and statewide length at ages for those species.

<b>Species</b>	<b>Number</b>	<b>Percent by Number</b>	<b>Weight (lbs)</b>	<b>Length Range (in)</b>	<b>Growth Index</b>
White Sucker	966	55.2	--	12-20	--
Walleye	623	35.6	734.4	5-26	-0.2
Northern Pike	66	3.8	201.2	11-37	+2.9
Rock Bass	60	3.4	27.3	5-10	--
Largemouth Bass	14	0.8	39.9	13-20	--
Bluegill	13	0.7	6.0	7-9	--
Pumpkinseed	5	0.3	2.1	7-8	--
Smallmouth Bass	2	0.1	1.2	10-10	--
Brown Bullhead	1	0.1	0.0	--	--

Table 4. Catch by inch group for sport fish caught during the April 2015 survey of West Twin Lake (Montmorency County).

<b>Inch Group</b>	<b>Bluegill</b>	<b>Largemouth Bass</b>	<b>Northern Pike</b>	<b>Pumpkinseed</b>	<b>Smallmouth Bass</b>	<b>Walleye</b>
1						
2						
3						
4						
5						9
6						2
7	2			3		
8	8			2		13
9	3					64
10					2	91
11			7			24
12			10			2
13		1	1			
14		2				30
15		2				142
16		1	2			122
17		2	2			48
18		2	2			36
19		3	3			15
20		1	2			8
21			3			5
22			4			3
23			2			5
24			4			
25			4			2
26			4			2
27			3			
28			3			
29			3			
30			1			
31			1			
33			2			
36			2			
37			1			

Table 5. Comparison of mean length (inches) at age for Walleye and Northern Pike in West Twin Lake in 2009 and 2015. The number in parentheses represents the number of fish aged. Growth comparison was across all ages.

<b>Species</b>	<b>Age Group</b>	<b>2009</b>	<b>2015</b>	<b>2015 growth compared to state average</b>
Walleye	II	--	10.3 (20)	-0.2
	III	--	15.1 (6)	
	IV	15.5 (5)	16.1 (66)	
	V	15.8 (12)	16.6 (16)	
	VI	16.7 (17)	18.6 (12)	
	VII	17.9 (15)	18.9 (25)	
	VIII	20.4 (1)	22.3 (14)	
	IX	21.5 (5)	20.1 (2)	
	X	--	19.6 (3)	
Northern Pike	I	--	12.2 (6)	+2.9
	II	--	19.9 (14)	
	III	--	24.6 (12)	
	IV		28.3 (8)	
	V	24.3 (2)	29.7 (3)	
	VI	25.7 (1)	27.7 (1)	
	VII	27.8 (1)	--	
	IX	--	36.0 (2)	
	X	--	37.6 (1)	

Table 6.–Total combined estimated harvest, catch per hour, and fishing pressure for West Twin Lake. Two standard errors are given below the estimates. Table is from MDNR Statewide Angler Survey Program (2017).

Species	C/H	May	June	July	August	Season
<b>HARVEST</b>						
Walleye	0.0664	284	189	216	12	701
	0.0292	221	138	129	25	291
Largemouth Bass	0.0052	35	–	20	–	55
	0.0077	70	–	39	–	80
Smallmouth Bass	0.0034	–	13	22	–	36
	0.0036	–	19	32	–	37
Yellow Perch	0.1132	–	408	383	405	1,195
	0.0746	–	358	370	570	768
Bluegill	0.0949	–	–	496	505	1,002
	0.0705	–	–	452	574	730
Rock Bass	0.0107	–	–	45	68	113
	0.0155	–	–	91	136	163
<b>TOTAL HARVEST</b>	0.2938	319	610	1,182	990	3,102
	0.1139	231	384	607	820	1,115
<b>RELEASED</b>						
Walleye	0.0429	22	71	63	297	453
	0.0380	36	96	61	377	395
Northern pike	0.0067	41	16	–	13	70
	0.0074	67	28	–	27	77
Largemouth bass	0.0309	31	–	264	32	327
	0.0290	62	–	289	64	303
Smallmouth bass	0.1206	173	413	358	330	1,273
	0.1331	168	354	223	NAN	1,393
Yellow Perch	0.1385	–	240	956	265	1,462
	0.1253	–	278	708	NAN	1,306
Bluegill	0.1770	26	238	318	1,287	1,869
	0.5034	38	252	NAN	NAN	5,308
Pumpkinseed	0.0025	–	–	–	27	27
	0.0051	–	–	–	53	53
Rock bass	0.7441	209	444	2,590	4,613	7,856
	0.3357	390	452	1,701	2,831	3,356
<b>TOTAL RELEASED</b>	1.2633	502	1,423	4,549	6,864	13,338
	3.1260	437	693	NAN	NAN	32,948
<b>TOTAL CATCH</b>	1.5570	821	2,033	5,731	7,854	16,439
	3.1306	495	792	NAN	NAN	32,967
<b>ANGLER HOURS</b>		1,523	2,258	4,189	2,588	10,558
		699	537	858	915	1,533
<b>ANGLER TRIPS</b>		627	851	1,655	1,166	4,299
		386	394	552	471	911

Table 7. Walleye population parameters from lakes surveyed in the Large Lakes Program from 2001-2010. Adapted from Hanchin (2017)

<b>Lake</b>	<b>Legal-sized Walleyes</b>	<b>Legal-sized density (number/acre)</b>	<b>Mean growth index</b>
Houghton Lake	58,854	2.9	-1.8
Michigamme Reservoir	9,540	1.5	-2.8
Crooked-Pickerel lakes	7,049	2.1	-2.9
Burt Lake	32,295	1.9	-0.5
Muskegon River system	37,851	4.6	4.0
South Lake Leelanau	34,154	6.0	-2.4
North Lake Leelanau	1,798	0.6	-0.6
Cisco Lake chain	12,558	3.0	-2.1
South Manistique Lake	6,473	1.6	-0.3
Big Manistique Lake	11,350	1.1	0.6
North Manistique Lake	1,576	0.9	1.1
Bond Falls Flowage	7,015	3.3	-2.7
Grand Lake	3,308	0.6	-1.4
Long Lake	3,649	0.7	-0.4
Peavy Pond	4,082	1.5	-2.4
Black Lake	13,943	1.4	-0.9
Lake Gogebic	41,402	3.2	-1.9
Lake Michigamme	8,241	1.9	-3.1
Lake Charlevoix	9,844	0.6	3.0
Portage-Torch lakes	41,795	3.2	1.9
Elk-Skegemog lakes	600	0.1	4.1
Mullett Lake	2,640	0.2	0.9
Indian Lake	6,033	0.7	-0.4
<b>Mean</b>	<b>15,480</b>	<b>1.9</b>	<b>-0.5</b>
<b>Median</b>	<b>8,241</b>	<b>1.5</b>	<b>-0.6</b>