

Long Lake, Cheboygan County  
Michigan DNR Report  
Background

Long Lake is a 400-acre natural lake located in northeastern Michigan, southeast of the town of Cheboygan. The lake has three somewhat distinct basins, with each basin having a minimum depth of at least 30 feet. Maximum depth of the lake is 61 feet, located in the eastern, largest basin. Most of the entire lake is 15 feet or deeper and sharp in-lake dropoffs are common. Long Lake has a relatively small drainage basin. A small control structure exists on the eastern end of the lake which forms Long Lake Creek. The bottom type of Long Lake consists of sand, gravel, and marl. The lakes shoreline is highly developed with houses and cottages. A public access site with a gravel-surfaced ramp is provided along the north shore. This ramp provides parking for 10 trailers. Standard State of Michigan fishing regulations apply at Long Lake.

Walleye have been stocked in Long Lake on various occasions (Table 1). An adjacent rearing pond was used to raise young walleye through part of two decades until its use was discontinued around 1988. The local lake association operated the rearing pond when in use. In other years, the lake association purchased walleye from an outside source with their own funds. It was around 1989 that MDNR biologists recommended stocking small fingerling walleye in Long Lake on a three year rotation basis. This did not occur though until 1994 when the first walleye stocking by the State of Michigan was made at the lake (Table 1). In 1998, the DNR entered into an agreement with the lake association to continue stocking walleye in Long Lake. This agreement was a result of the success of the earlier fall fingerling stocking efforts. Attempts would then be made during later fisheries surveys to determine the status of the Long Lake game fish after years of walleye stocking.

Year	Strain	Number	Number/Acre	Avg Length
1978	--	1,200	3	Fall fingerlings
1979	--	5,000	13	Spring fingerlings
1980	--	1,000	3	Spring fingerlings
1981	--	7,000	18	Spring fingerlings
1982	--	7,300	18	Fry/Spring fingerlings
1983	--	150	1	Fall fingerlings
1984	--	2,000	5	Spring fingerlings
1985	--	2,000	5	Spring fingerlings
1986	--	2,000	5	Spring fingerlings
1989	--	4,000	10	Fall fingerlings
1990	--	3,320	8	Fall fingerlings
1991	--	4,000	10	Fall fingerlings
1992	--	4,000	10	Fall fingerlings
1993	--	4,000	10	Fall fingerlings
1994	--	28,200	71	Spring fingerlings
1996	--	28,200	71	Spring fingerlings
1998	--	50,000	125	Spring fingerlings
2000	Bay De Noc	200,000	500	Fry
2001	Tittabawassee	35,000	88	Spring fingerlings
2003	Bay De Noc	200,000	500	Fry

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Early attempts to assess the Long Lake fish community date back to 1950. Very little information was gained from this survey due to a lack of adequate sampling effort. A second attempt was made in 1961. Seining was used to assess the abundance of young game fish in the lake. Eleven species were collected including a variety of panfish and predators.

A more intensive fish community survey was made at Long Lake in October of 1962. Trap netting was the gear of choice at this time for the Michigan Department of Conservation (MDOC). Panfish such as bluegill and pumpkinseed were scarce while rock bass were abundant. Smallmouth bass were abundant while growth of this species was average to slightly below the statewide average. Walleye were present with many fish from 15-20 inches available. Northern pike were present but not collected in high numbers. Non game fish such as bowfin, bullheads, and white suckers were common.

A follow-up survey was made at Long Lake in August 1973 by MDOC. Water chemistry sampling found that the lake stratified thermally, and dissolved oxygen significantly declined below 35 feet deep. Gill nets and trap nets were used to sample the fish community. Pike were found to be abundant, yet slow growing. Six year classes of walleye were present in Long Lake, and growth was average. It is not known whether these fish were stocked or naturally occurring. Both largemouth and small mouth bass were present. Good sizes and numbers of bluegill, pumpkinseed, and rock bass were present.

Following the 1973 survey, riparian property owners along Long Lake formed a lake association with the goal of establishing a fisheries management plan for the lake. They purchased and stocked walleye fingerlings in Long Lake by 1978, and successfully operated the walleye rearing pond by 1979. In order to give fisheries guidance to the lake association, MDOC conducted another fish community survey at Long Lake in 1980. Smallmouth bass were still abundant but slow growing. Largemouth bass were less common, but exhibited good growth. Northern pike were common while walleye were present in lower numbers. Many sizes and ages of panfish could be found in Long Lake but growth for these species was slow.

A 1994 fish community survey was made in order to examine the contribution of stocked fall fingerling walleye to the fishery. The Long Lake Association had stocked fall fingerling walleye in previous years in attempts of controlling the perceived overabundant white sucker population. These walleye were marked with a fin clip in various stocking years. This mark would allow fisheries managers to decipher the relative contribution of stocked versus wild walleye to the fishery. The survey took place in May of 1994 with sampling gear consisting mainly of large mesh trap nets. Water temperature hovered near 50°F during the survey.

Walleye were considered abundant based on netting collections in May 1994. Seven year classes were represented in the catch, with most fish ranging from 12-24 inches. Many of the walleye were from stocked year classes however older fish were also captured and were believed to be wild fish. Despite their abundance, walleye growth was excellent. Northern pike were considered as abundant based on survey results, with many fish 24 inches or larger. Largemouth bass between 13 and 16 inches were common, and growth was average for this species. Seven year classes of smallmouth bass were present while growth was average (compared to below average in past years). Fair numbers and sizes of bluegill and rock bass were present, while growth for these species was average. White suckers were collected in large numbers.

In 1998, a walleye management plan was created for Long Lake by MDNR Fisheries Division. It was recommended that 25,000 (63/acre) spring fingerling walleye would be stocked in the lake in alternate years. These could be (and would be) replaced in a given year with walleye fry stockings. Based on

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previous fall fingerling stockings, it was believed that stocked walleye contributed significantly to the fishery. However, it was still unknown to what extent natural reproduction of walleye is occurring in Long Lake. Thus, future fish community surveys would be essential.

### Current Fish Community

The recent fish community survey was made in mid-May with effort consisting of 10 large mesh fyke net lifts, 11 large mesh trap net lifts, 3 maxi-mini fyke net lifts, and 8 experimental gill net lifts. A total of 1,246 fish were collected during the 2004 survey at Long Lake (Table 2). Predator fish such as smallmouth bass, largemouth bass, northern pike, walleye, and bowfin were well represented in the catch and comprised 45% of the total catch by weight. Panfish were not captured in high numbers during the 2004 survey. This may be a result of: a lack of abundant panfish in the lake; unequal vulnerability of pan fish to the sampling gear; or the lack of vulnerability of panfish to the gear due to cold water temperatures.

Panfish collected during the survey consisted of yellow perch, bluegill, pumpkinseed sunfish, and rock bass. Growth of perch and rock bass is slightly below statewide average for each species (Table 2). Four year classes of yellow perch were found with no fish older than age-5 collected. Only two year classes of bluegill (2 and 3) were collected in the survey. Rock bass, despite slow growth, can reach large sizes in Long Lake based on longevity. Rock bass through age-11 were collected.

Smallmouth bass were the most abundant large game fish collected in the survey. Growth of this species is average compared to small mouth bass populations statewide (Table 2). Eighty-three percent of the small mouth bass catch were legal size (14-inches and larger). Age 2-11 fish were represented in the catch

Table 2. Species and relative abundance of fishes collected at Long Lake, May 10-14, 2004.

Common Name	Number	Percent By Number	Length Range (inches)	Weight* (lbs)	Percent By Weight	Growth**
Common shiner	730	59	--	--	--	
White sucker	191	15	16-25	644	49	
Smallmouth bass	104	8	9-20	284	22	+0.1
Northern pike	41	3	2-26	96	7	-1.3
Largemouth bass	34.	3	14-20	87	7	0.0
Yellow perch	28	2	2-8	2	--	-0.6
Walleye	24	2	7-25	49	4	-0.3
Bowfin	22	2	13-28	119	9	
Brown bullhead	22	2	10-15	28	2	
Bluegill	17	1	1-4	0	--	
Rock bass	15	1	1-11	2	--	-0.8
Pumpkinseed	10	1	1-9	2	--	
Iowa darter	5	1	1	0	--	
Johnny darter	3	--	2	0	--	
TOTAL	1,246			1,313		
*Weights were calculated, not actual measurements						
* *Growth is compared to the statewide average for that species						

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indicating good numbers of year classes present. Largemouth bass are also fairly common in Long Lake as indicated by their overall catch (Table 2). Largemouth bass up to 20 inches in length were collected (Table 3). Growth was average for this species.

Northern pike are another popular predator game fish that are common in Long Lake. Four year classes of pike were collected with age-5 fish ranging from 21-27 inches the most abundant year class. Long Lake pike grow slightly slower than the statewide average for this species (Table 2). Twenty-eight percent of the larger size pike catch were legal size (24-inches and larger).

Age 2 and age 4-9 walleye were present in varying numbers in Long Lake in 2004. This species was stocked in 2003, 2001, 2000, 1998 and 1996 (Table 1). Based on the 2004 catch of walleye, some natural reproduction of walleye is occurring at Long Lake. For example, a fair number of age-5 walleye were collected in the recent survey, and this year class was from a non-stocking year (1999). Walleye growth is

Table 3. Length-frequency distribution of important game fishes collected during the May 2004 netting survey at Long Lake.

Length (in)	Largemouth bass	Northern Pike	Smallmouth bass	Walleye
1				
2		4		
3				
4				
5				
6				
7				1
8				1
9			1	
10				
11			1	
12			7	3
13			7	
14	3		2	1
15	12		3	1
16	9		11	2
17	4		31	2
18	1		23	4
19	2	2	14	3
20	3	6	4	3
21		7		
22		7		
23		4		1
24		7		1
25		3		1
26		1		
27				
28				
>29				

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average to slightly below statewide average.

Non game species of fish such as white sucker, bowfin, and brown bullhead are common in Long Lake. These species increase competition among large game fish, but also act as a forage source (particularly white suckers) at other stages of their life. These species have evolved as part of the Long Lake fish community and will continue to do so.

In addition to the 2004 fish survey, limnological parameters were measured in Long Lake on August 7, 2004. Profiles were taken in 54 feet of water (Table 4). Water temperature ranged from 74°F at the top to 51°F at the bottom, indicating that the lake stratifies thermally. Dissolved oxygen was suitable to most fish ( $\geq$  6ppm) down to 35 feet deep. Secchi disk reading was 24 feet, indicating high water clarity.

Various other parameters such as nitrogen, phosphorus, and alkalinity were also collected in 2004 at Long Lake (Table 5). The lake a moderate alkalinity value and a corresponding pH which was slightly basic and varied little throughout the water column (Table 5). Total phosphorus levels in Long Lake were very low, indicating low nutrient status in the lake. High secchi disk readings and low total phosphorus levels indicate that Long Lake is slightly oligotrophic.

### Management Direction

Long Lake is a rather sterile, somewhat unproductive northern Michigan lake. Although many species can be found within the lake, fish populations tend to grow slow. According to a recent fish community survey, large game fish abound in Long Lake. Walleye are stocked, while some unknown level of natural reproduction is occurring. Northern pike are abundant in Long Lake and efforts should be made to protect peripheral wetland habitat that offers suitable spawning habitat for this species. Largemouth and smallmouth bass are also common in Long Lake and add diversity to the fishery.

Recently, angler complaints of low panfish numbers and poor size structures have surfaced for Long Lake. A heavy infestation of zebra mussels are now established in this waterbody, and may be competing with panfish and other important game fish at early life stages. Along with this, an abundance of predators may also be inhibiting the panfish population from reaching its potential.

Walleye stocking efforts for the past decade have produced a quality population at Long Lake. Walleye growth is average and this species has the potential to reach large sizes based on catch at size analysis. Past stocking efforts were a result of a previous agreement between the MDNR and the lake association. Previous surveys in the 1990's showed little evidence of walleye natural reproduction in Long Lake, thus stocking efforts and rates were increased. Natural reproduction may be increasing in Long Lake based on catch at age of walleye in 2004. This may have resulted from 'an increase in walleye broodstock. However, the amount of natural reproduction is still unknown.

Walleye should continue to be stocked in Long Lake by MDNR, yet stocking rates should be slightly decreased based on other factors already mentioned in this section. Stocking rates will decrease from a once established goal of 63 small fingerlings/acre to 40 small fingerlings/acre. It is hoped that a slight decrease in stocking rates may improve growth rates of remaining game fish and allow for better growth and survival of panfish. In addition, the surplus walleye may be stocked in other northeast Michigan lakes where warranted.

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Table 4. Water temperature, dissolved oxygen, and pH profile for Long Lake, August 7, 2004.

Depth (ft)	Temperature	Dissolved Oxygen (ppm)	pH
Surface	74	8.7	8.3
3	73	8.5	8.3
6	73	8.4	8.3
9	73	8.4	8.3
12	73	8.6	8.3
15	73	8.4	8.3
18	72	8.4	8.3
21	73	8.6	8.3
24	73	8.5	8.3
27	69	7.5	8.1
28	68	7.2	8.1
29	66	7.2	8.0
30	65	7.1	8.0
31	62	6.9	8.0
32	61	6.9	7.9
33	60	6.8	7.8
34	59	6.6	7.8
35	58	6.2	7.8
36	57	3.1	7.7
37	57	2.7	7.7
38	56	2.4	7.6
39	56	1.8	7.6
40	55	1.6	7.6
41	55	1.5	7.6
42	54	1.4	7.6
43	54	1.4	7.5
44	54	1.4	7.5
45	53	1.3	7.5
48	52	0.6	7.5
51	51	0.2	7.4
54	51	0.1	7.2

Table 5. Additional water chemistry results for Long Lake, Cheboygan County

Parameter	Units	Value
Alkalinity, Total	mg/L	96
Phosphorus, Total	mg/L	<0.0039
Nitrogen, Total Kjeldahl	mg/L	0.374
Nitrogen, Ammonia	mg/L	<0.0065
Nitrogen, Nitrate + Nitrite	mg/L	<0.0031
Secchi Depth	feet	24