

LONG LAKE

*Kalamazoo County (T3S, R11W, Sections 24, 25)
and (T3S, R10W, Sections 17, 18, 19, 30)
Surveyed May 8, 9, 10, and 14, 1991*

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Environment

Long Lake is a large natural lake located in central Kalamazoo County. It lies within the boundaries of the City of Portage.

Long Lake is located in a glacial outwash plain that contains mostly loamy sands that are well drained. The 4.46 miles of watershed contain agricultural land (60%), forests (21%), wetland (6%), urban area (5%), open land, and other water bodies (8%). The topography is mostly level to slightly rolling hills.

At 575 acres in size, Long Lake is the fourth largest lake in the county. There are no direct inlets into the lake, but there is an outlet at the southwestern corner that drains directly to Austin Lake. According to the 1953 map by the Institute for Fisheries Research, there is a single basin, 57-foot deep. Structure in the basin is good, with several point bars, drop offs, and flats present to concentrate fish. The shoal areas of Long Lake cover over 85% of the total surface area.

The south half of the lake bottom is composed primarily of sand and marl, and is interspersed with gravel. The north half of the lake bottom is characterized by organic deposits. Almost the entire north end is less than 5-foot deep and can be characterized as an emergent marsh. Aquatic vegetation is sparse in the south half of the lake, and abundant in the north half.

Long Lake is eutrophic in nature, and water quality can be classified as fair. Based on water quality parameters measured over the last 40 years, there is a trend toward poorer quality. Table 1 presents parameters measured during the summers of 1953, 1960, and 1991. Dissolved oxygen levels have decreased in each sampling period, as has Secchi disk readings. This may be due to increased levels of blue-green algae (Cronk et al. 1978). In 1991 water temperatures in late August ranged from 75°F at the surface to 51°F at 45 feet. A split thermocline was present from 16-19 feet and 21-24 feet. Alkalinities ranged from 88 (moderate) on the surface to 134 (hard) on the bottom and pH readings were alkaline (9.0). These values are similar to past surveys.

Residential development surrounds all but the north end of Long Lake. A State-owned public access exists at the south end, with enough parking for 24 vehicles with trailers.

Fishery Resource

Long Lake has been managed by the State since 1888. The newly organized Michigan Fish Commission conducted a gill net survey in Long Lake that year and collected 735 fish, of which 85% were yellow perch. Almost 50 years passed before further work was done on the lake. Between 1933 and 1945 largemouth bass were stocked six different years and perch were stocked

in 2 years. The next survey of the lake was conducted in 1943 using a 25 x 150-foot straight seine. A typical warmwater fish community was noted in the catch record.

The most complete historical survey occurred in 1953 (Taube 1953). Using experimental gill nets, common sense and bag seines, this survey also showed a typical warmwater fish community that included yellow perch, northern pike, bluegill, largemouth bass, rock bass, bullheads, and sunfish. Various species of minnows and darters were also collected. Growth of game fish at that time was considered average, and most residents of the lake were satisfied with the fishery. The 1953 survey may have been conducted due to a controversy over lake water level and some proposed drainage ditches. Apparently the previous 4 years were rather dry and the lake level had fallen considerably. By 1953, however, it had risen to normal levels. A legal lake level of 856 feet (elevation above sea level) was established in 1939. Taube concluded from the 1953 survey that the makeup of the fish population was the same as in 1888, and that "no new management practices seem necessary for Long Lake".

Austin and West Lakes were also surveyed with Long Lake in 1953, because the lakes connect. Taube (1953) concluded that Austin and West had poor fisheries (characterized by below average growth) while Long was good. No alternative for management of Austin and West Lakes were offered in 1953.

Sometime between 1953 and 1960 it was determined that the fisheries on Austin and West should be renovated. It appears from the sketchy records that Long Lake was included in this proposal by default because of its connection to Austin Lake. The proposal was approved at a public meeting with only some objection from property owners on Long Lake. In the early winter of 1960, Austin and West Lakes were treated with toxaphene, while Long Lake was treated with rotenone. It appears that rotenone was used at Long Lake so that desirable fish could be picked up and eaten, since the fish population there was in good shape. Restocking of Long Lake occurred in 1960 and 1961 and included northern pike, rainbow trout (for an interim fishery), largemouth bass, bluegill, and yellow perch.

Follow-up surveys of Long lake were conducted in 1961, 1962, and 1964. The rainbow trout that were planted to provide an interim fishery did very poorly, and few reports of trout catches were made. Stocked warmwater species exhibited good growth and survival, and by 1963 fishing on the lake was very good for pike, perch, and largemouth bass. By 1964 eight additional species of fish that were not stocked in the lake were present.

A 1977 boomshocking survey of Long Lake showed the same species composition as the 1964 survey. No carp were observed but it was referenced that they did inhabit the lake. The fishery at this time was described as good in general. Yellow perch exhibited very good growth, and bluegills and bass had slightly depressed growth rates compared to the State average.

At the time this survey was conducted, a petition was received from the Long Lake Association to institute a spearing ban on pike. This was presumably requested because of over-harvest concerns. A spearing ban on pike, plus a 30-inch minimum size limit, were instituted starting in 1984. However, for some undocumented reason in 1985, the ban was taken off, and the size limit was returned to 20 inches. There must have been some type of public outcry over the closure to force such a quick reversal.

The fish community present today is no different from that of 40 or 100 years ago. The most recent survey, in 1991, used experimental gill nets, full size trap nets, mini-maxi fyke nets, and the D.C. boomshocking boat. Bluegill were the most abundant fish collected by number, and were the fourth most abundant by weight (Table 2). Mirror carp, bowfin, and bullheads were the most abundant species by weight in that order.

Bluegill from 2 to 9 inches long were collected. Almost 33% were acceptable size (6 inches or

larger). Schneider (1990) developed five criteria for ranking bluegill populations from survey catches in Michigan. Using the criteria, Long Lake bluegills rank 4.5 (good) on a scale of 1-7, using trap net data. Electroshocking data for bluegills collected in 1991 and 1977 compare very well, exhibiting little change. In 1991 bluegills as old as 10 years were found. Overall growth was at the State average (Table 3). The estimated age frequency of bluegills (Table 4) shows there may have been recruitment problems (or sampling bias) for age groups I and II.

Largemouth bass were collected from 2 to 17 inches in length. About 12% were legal size (12+ inches). Growth rates of largemouth bass were at the State average (Table 3). The estimated age frequency shows a severe recruitment problem with the 1989 and 1990 year classes (Table 4). I believe this is an accurate reflection of the bass population.

A total of 32 northern pike were collected that ranged from 16 to 32 inches. Ninety four percent of the pike were collected in gill nets (catch per effort of 5.0). Almost 70% of the pike collected were legal size (exceeded 20 inches). Growth rates of northern pike were average (Table 3). The estimated age frequency appears normal, given that ages I and II were probably undersampled.

The yellow perch population in Long Lake is very good. A total of 191 perch were collected that ranged from 2 to 12 inches. Most of the perch were collected with the electroshocker. Thirty-four percent of the perch were over 7 inches long. Growth was above the State average rate (Table 3). Their estimated age frequency appears fairly normal, with the exception of poor recruitment or sampling bias of age I perch and fairly high mortality among ages III and IV. This is most likely due to angler harvest.

Sixty one black crappie were collected that ranged from 3 to 13 inches and over 65% were of acceptable size (7+ inches). Growth of crappie was above the State average (Table 3). The estimated age frequency for crappie is normal, except for age I fish, which show poor recruitment.

Rock bass, pumpkinseeds, and bullheads also provide ample targets for anglers at Long Lake. Bullheads are available up to 14 inches, pumpkinseeds to 8 inches, and rock bass to 9 inches.

Carp do not appear overly abundant in Long Lake, although those that were captured were very large. All carp collected were "mirror carp", which is not a different species of carp but one with scales enlarged and scattered over the body.

Long Lake presently provides an excellent fishery. Forage species are abundant (bluntnose minnows, brook silversides, and mayflies) as determined by this survey. Most game fish captured were in very good condition and heavy bodied. Anglers commented that they were very happy with the fishery. This lake compares very well with other local warmwater fisheries such as Austin, Gourdneck, Hogsett, and Sugarloaf lakes. This is very fortunate as these lakes contain public access and are located within a half hour of downtown Kalamazoo.

Management Direction

No management activities need to be undertaken at this time. Long Lake should continue to provide an excellent fishery for years. Our goals into the next century should be to maintain the present status of the fishery. Obstacles to attaining this goal include increased pressure to develop the wetland areas on the north end of the lake and decreased water quality conditions due to increased use of the lake and fertilizers used in the watershed. Also there are potential water level impacts due to groundwater withdrawals by the Upjohn Company. At present only the state's stringent wetland laws protect the lake's wetlands. Long Lake should not have to be surveyed again for at least 10 years.

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References

Cronk et al. (21 Authors). 1978. Kalamazoo County. Geology and the environment. Western Michigan University. Kalamazoo.

Taube, C.M. 1953. Inventory results and historical notes on Austin, West, Long and Gourdneck Lakes, Kalamazoo County. Michigan Department of Natural Resources, Fisheries Research Report 1380. Ann Arbor.

Schneider, J.C. 1990. Classifying bluegill populations from lake survey data. Michigan Department of Natural Resources, Fisheries Technical Report 90-10. Ann Arbor.

Table 1.-Water quality parameters as measured by the DNR at Long Lake, Kalamazoo County.

Month and year	Dissolved oxygen below 2 ppm	Secchi disk transparency	Alkalinity (ppm)	pH
August 1991	20 feet	6 feet	134	9.0
August 1960	25 feet	12 feet	128	-
July 1953	30 feet	13.5 feet	145	8.7

Table 2.-Number, weight, and length (inches) of fish collected from Long Lake with all gear, on May 8-10, and 14, 1991.

Species	Number	Percent by number	Weight (pounds)	Percent by weight	Length range (inches) ¹	Average length	Percent legal size ²
Bluegill	848	48.3	107.4	12.2	2-9	5.2	32.6 (6)
Largemouth bass	153	8.7	64.2	7.3	2-7	9.1	11.6 (12)
Northern pike	32	1.8	80	9.1	16-32	22.9	68.8 (20)
Yellow perch	191	10.9	26.2	3.0	2-12	6.2	34.0 (7)
Black crappie	61	3.5	21.3	2.4	3-13	8.2	65.6 (7)
Rock bass	63	3.6	12.3	1.4	2-9	6.2	49.2 (6)
Pumpkinseed	106	6.0	23.9	2.7	2-8	6.1	59.4 (6)
Bullhead	129	7.4	115.7	13.1	7-14	11.5	100.0 (7)
Warmouth	86	4.9	18.9	2.1	3-7	6.3	64.0 (6)
Bowfin	33	1.9	159.5	18.1	19-30	25.2	-
Mirror carp	15	0.9	200.7	22.8	20-35	30.4	-
Shortnose gar	28	1.6	49.8	5.7	17-28	22.9	-
Golden shiner	4	0.2	0.7	0.1	6-7	7.3	-

Lake chubsucker	2	0.1	0.5	0.1	7-8	8	-
Total	1751	99.8	881.2	100.0			

¹Note some fish were measured to 0.1 inch, others to inch group: e.g. "5" = 5.0 to 5.9 inches, "12" = 12.0 to 12.9 inches; etc.

²Percent legal size or acceptable size for angling. Legal size or acceptable size for angling is given in parentheses.

Table 3.-Average total length (inches) at age, and growth relative to the state average, for fish sampled from Long Lake with all gear, May 8-10, and 14, 1991. Number of fish aged is given in parentheses. The upper row is the weighted average, while the lower row is unweighted.

Species	Age										Mean growth index ¹
	I	II	III	IV	V	VI	VII	VIII	IX	X	
Bluegill	1.7	3.3	4.9	6.5	7.2	7.9	9.0	8.5	-	-	-
	(11)	(22)	(17)	(13)	(16)	(3)	(1)	(2)	(1)	(1)	0.0
Largemouth bass	1.7	3.0	4.9	6.6	7.6	8.1	9.0	8.7	9.0	9.1	-
	(10)	(8)	(45)	(13)	(5)	-	-	-	-	-	-0.7
Yellow perch	2.9	6.3	8.9	11.4	12.5	-	-	-	-	-	-
	(17)	(20)	(30)	(13)	(6)	(2)	-	-	-	-	+0.8
Northern pike	3.4	5.2	7.7	9.2	9.5	11.4	-	-	-	-	-
	(2)	(21)	(13)	(5)	(7)	(2)	(2)	-	-	-	+0.8
Black crappie	4.8	6.3	8.4	9.4	10.5	11.0	11.3	-	-	-	-
	(2)	(21)	(13)	(5)	(7)	(2)	(2)	-	-	-	+0.8

¹Mean growth index is the average deviation from the state average length at age.

Table 4.-Estimated age frequency (percent) of fish caught from Long Lake with all gear, May 8-10, and 14, 1991.

Species	Age										Number caught
	I	II	III	IV	V	VI	VII	VIII	IX	X	
Bluegill	2.5	24.6	35.3	19.5	15.1	1.9	0.2	0.5	0.2	0.2	848
Largemouth bass	8.0	8.6	63.9	15.4	4.1	-	-	-	-	-	153
Yellow perch	18.2	39.2	29.3	8.2	3.6	1.0	0.5	-	-	-	191
Northern pike	-	6.5	44.6	20.6	8.1	10.5	9.7	-	-	-	32
Black crappie	3.8	37.9	28.5	11.5	10.0	3.3	3.3	-	1.7	-	61

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