

Thumb (Louise) Lake
Charlevoix County, T32N, R04W
Last surveyed May 2008

Neal Godby

Environment

Thumb Lake, also known as Lake Louise, is a 510-acre natural lake in eastern Charlevoix County, located approximately six miles east of Boyne Falls. Thumb Lake has a maximum depth of 152 feet (Figure 1). Thumb Lake, which has no surface-water outlet, is located in the West Branch Sturgeon River watershed, within the Cheboygan River basin. The Cheboygan River drains to Lake Huron.

Thumb Lake has three main basins of approximately equal area: the eastern basin (maximum depth of 152 feet), the central basin (maximum depth of 88 feet), and the western basin (maximum depth of about 60 feet) (Figure 1). The basins are separated by shallower areas of 5-10 and 10-20 feet. Based on calculations done in 1974, the lake has a volume of 15,333 acre-feet and a mean depth of 31.6 feet.

A public boating access site, administered by the MDNR Parks and Recreation Division, is located on the south shore of Thumb Lake. The access site has a hard-surfaced ramp and parking for 10 vehicles. There is also a public swimming beach on the east end of the lake. Thumb Lake is managed as a Type B trout lake, with a 12-inch minimum size limit for brown trout, rainbow trout, and splake, and a daily possession limit of 5 fish, with no more than 3 fish 15 inches or larger. More details of the Type B trout lake regulations can be found in the Michigan Fishing Guide.

History

Fisheries management in Thumb Lake dates back to 1922, when rainbow trout were first stocked in the lake. Thumb Lake was stocked with a variety of species, including rainbow trout, brook trout, smallmouth and largemouth bass, walleye, perch, and bluegills, until about 1948. From 1949 to 1975, the primary species stocked in Thumb Lake was rainbow trout. Since 1976, Thumb Lake has been stocked on a consistent basis with splake, a cross between lake trout and brook trout. There were three years, from 1978-1980, when lake trout were stocked instead (Table 1).

In the winter of 1935-36, a field crew from the Institute for Fisheries Research used surveying equipment to map the lake shoreline. They also made measurements through holes drilled in the ice to collect data on depth and bottom type for the lake map. Several years later, the locations of different aquatic vegetation types were mapped during the first biological survey of the lake in 1941. Good spawning habitat for yellow perch and bass was noted during that survey, as was the paucity of habitat for northern pike. The survey found a fish community comprised of smallmouth and largemouth bass, bluegill, yellow perch, pumpkinseed, rock bass, northern pike, white suckers, and several minnow species. A bass tapeworm infestation in smallmouth bass was noted as severe. Yellow perch fishing

was said to be excellent. The potential for stocking trout was suggested, as was the continued planting of adult smallmouth bass. The survey of August 1941 also included sampling macroinvertebrates and temperature profiles.

A stocking program of 3,000 yearling brook trout, 3,000 yearling rainbow trout, and 5,000 marked smallmouth bass fingerlings was initiated in 1942.

A hook-and-line survey was done in 1944. Rainbow trout, brook trout, perch, smallmouth and largemouth bass, bluegill, pumpkinseed, rock bass, and white suckers of varying lengths were collected.

Another survey of Thumb Lake was done in 1950, consisting of gill nets, seines, and trap nets. A fish community similar to that from previous surveys was found, with the exception that trout were not collected during the 1950 survey.

A heavy infestation of bass tapeworm was again noted in smallmouth bass samples examined in 1956.

A conservation officer observed 60 boats and 200 anglers fishing the lake on opening day of 1959 trout season.

A survey using trap nets, gill nets, and seines was done in 1962. A good population of warm water fish was present at the time, with all fish growing at or above state average. It was noted that trout fishing was holding up well with fish of good size being caught. A large population of suckers was also noted, and a sucker control project was recommended to prevent a downward trend in trout fishing.

A minor fish die-off was reported in July 1972, when a total of 8 fish (rainbow trout, rock bass, yellow perch, and bluegill) of various sizes were collected from a quarter-mile stretch of beach. A survey followed this report in August of 1972. In that survey, rainbow trout were growing well above state average, with largemouth bass and smelt also growing above average. Yellow perch and smallmouth bass were growing below state average. Dissolved oxygen concentrations dropped from 9 ppm to 4 ppm between 39 and 63 feet in depth in one basin, while they dropped from 7 ppm to 2 ppm between 63 and 95 feet in depth in another basin. The most severe readings were in the west basin, where dissolved oxygen levels dropped from 8 ppm at 31 feet to 3 ppm at 35 feet to 0 ppm at 40 feet in depth.

The lake was surveyed in November of 1974 to check on rainbow trout growth. Trout were growing well at the time, with rainbow trout an average of 1.7 inches longer at age than state average. Other species collected were also growing above state average, including northern pike, rock bass, and yellow perch.

Thumb Lake was next surveyed in 1983 to evaluate the splake population. Good numbers of splake were captured, along with northern pike, largemouth and smallmouth bass, rock bass, and yellow perch. Northern pike continued to grow well in this lake, although in low numbers.

A fish kill occurred on Thumb Lake in October 1984, consisting primarily of yellow perch 2-3 inches in length. The fish kill was reportedly fairly heavy, but was suspected to be related to fall turnover. A

temperature and dissolved oxygen profile were done on the lake a couple days later, and nothing was abnormal.

A general netting survey was conducted in June 1986. Overall fish populations were reportedly good, especially bluegills, largemouth bass, smallmouth bass, and pike. Only five splake were caught, but it was acknowledged that the nets were meant more for warmwater fish species. Growth for most species had declined to just below state average length at age.

Due to reports of overharvest of splake in Thumb Lake during their first year, the minimum size limit for the species was changed to 14 inches in 1988. By delaying harvest until the splake reached a larger size, it was predicted that angler satisfaction would be increased. A 1993 prescription for the waterbody indicated that the 14" size limit on splake appeared to be effective, and recommended continuing that size limit.

A survey to assess the splake population was done in November 1993, and found 21% of the splake netted to be above the legal size limit of 14 inches, compared to 53% above 14" in 1983. A significant splake fishery had developed, and results indicate the population was cropped off substantially near the size limit. Catch per unit effort for perch was down but the size distribution remained the same. Excellent bass fishing was reported. The survey data also showed that the mean length of age-2 splake at the end of the second year's growth was 13.4 inches, leading to high hooking mortality on sub-legal fish and excessive poaching. For these reasons, anglers were not happy with the 14" minimum size limit. A compromise size limit of 12" was agreed upon, which would protect splake through age-1 and meet the needs of Thumb Lake anglers.

United States Geological Survey (USGS) measured various limnological parameters in April and August 2005 (Tables 2-4). The results are discussed below.

A creel survey was conducted on Thumb Lake during the open-water (April 28-September 30) period of 2007 (Table 5). The survey showed that the lake provides a substantial amount of fishing opportunity. An estimated 6,793 angler hours were spent on the lake in 2007 during 2,821 angler trips. Yellow perch and smallmouth bass were caught most frequently, but still at low harvest levels. Splake were a surprisingly small component of the catch, with only an estimated 124 splake caught during the survey period, suggesting low targeted effort. It should be emphasized that the survey was only conducted during the open-water fishing season, and did not incorporate the winter ice fishery. Angler reports indicate that the majority of fishing effort and catch of splake on this lake takes place through the ice.

Fishery management prescriptions for the waterbody in 2001 and 2008 recommended continuing the annual stocking of 20,000 yearling splake, or 41 per acre, in Thumb Lake. The 2008 prescription recommended a survey of the lake be done in 2008.

Current Status

A general survey of Thumb Lake was conducted during May 19-22, 2008. The purposes were to assess the fish community in general and the splake population in particular. A total of 1,942 fish were

captured, representing 18 different species (Table 6). Total survey effort consisted of 6 inland gill-net lifts, 9 large-mesh trap net lifts, 6 large-mesh fyke net lifts, 4 small-mesh fyke net lifts, and 4 mini-fyke net lifts.

The catch was dominated by small yellow perch, rock bass, bullheads, bluntnose minnows, and white suckers. These five species comprised 86% of the catch by number. White suckers comprised over 53% of the catch by weight, indicating there is a substantial forage base of soft-rayed prey fish. Almost all the white suckers captured were 15 inches or greater in length.

A good number of splake were captured during this survey, indicating that the stocked fish are surviving well. These fish are growing just above state average growth rates, and appeared to be healthy. Also captured were a number of 4-9 inch rainbow trout (Table 7). These fish are likely holdovers from a number of fall fingerlings that were stocked in the lake the previous fall. They should provide a good fishery in 2009, as these rainbows will be of legal size. There were also three small rainbows captured that had left pectoral fin clips, indicating they were Eagle Lake strain. These were extra fish from a study comparing steelhead and Eagle Lake strain rainbow trout stocked in inland lakes. Stocking records indicate the LP-clipped fish were stocked during the week of the survey.

Analysis and Discussion

The major change in the fish community of Thumb Lake through time has been from the stocking of various trout species. The current fish community can be described as having the following: 1) a healthy two-story fishery, comprised of both cold- and cool-water fish species; 2) an average to slow growing pan fish community dominated by yellow perch; 3) a coldwater fishery comprised of stocked splake and rainbow trout; and 4) coolwater predators that are low in abundance but reach large sizes, particularly northern pike.

Temperature and dissolved oxygen (DO) readings indicate there is only a narrow band of suitable habitat for coldwater fish species in late summer, particularly in the central and west basins (Tables 2-4). The thermocline in the west basin is around 30-33 feet in depth during late summer, with cold water occurring at that depth and below. Dissolved oxygen levels, however, drop from 5.1 parts per million (ppm) at 30 feet to 3.4 ppm at 33 feet, and down to 1.6 ppm at 36 feet. A similar situation exists in the central basin. Dissolved oxygen levels for coldwater fish should not be below 6.5 ppm. At DO levels below 4 ppm, fish kills may occur (Novotny and Olem 1994). This results in a narrow range of depths in which both the temperature and dissolved oxygen conditions are suitable for coldwater fish species in late summer. Situations such as a hot summer, or an increase in nutrients in the lake, may further narrow the area of suitable habitat for coldwater fish species, and could result in a fish kill. The best conditions for splake occur in the East Basin, where there is a broader band of cold, oxygenated water.

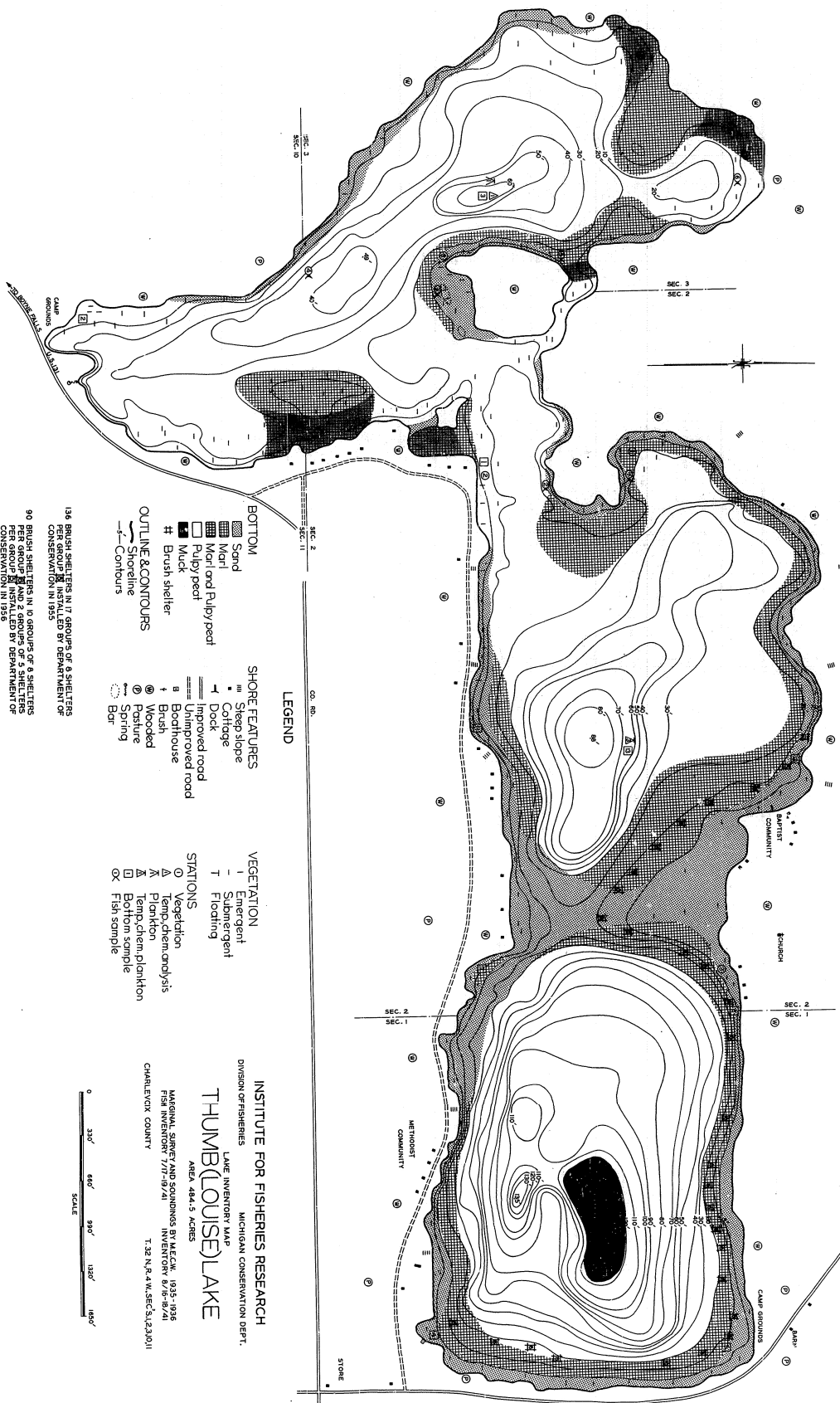
In summary, the fish community of Thumb Lake appears to be healthy and relatively stable, but the coldwater species may be at risk due to temperature and dissolved oxygen. It is uncertain how much targeted fishing effort the stocked splake are providing during the winter, which was not determined during the open-water creel survey done in 2007.

Management Direction

1. A summer limnological survey should be conducted on Thumb Lake to evaluate coldwater fish habitat and the potential for fish kills in the western and central basins. Based on the 2005 water-quality measurements (Tables 2-4), appropriate combinations of temperature and dissolved oxygen for coldwater fish may only occur in a narrow layer of water during late summer. This could threaten the coldwater fishery in these two basins, and perhaps the lake.
2. Managers should continue to stock splake in Thumb Lake at a rate of 41 yearlings per acre, or 20,000, each year. The splake are providing a popular fishery and provide a coldwater predator to this two-story lake.
3. A winter creel survey should be conducted on Thumb Lake to evaluate the effort for splake during the ice fishing season.
4. A follow-up general survey and splake species evaluation should be done by 2020 to monitor any changes in the fish community of Thumb Lake.
5. The current classification of Thumb Lake as a Type B trout lake appears to be appropriate and should be maintained.

References

- Novotny, V., and H. Olem. 1994. Water quality: prevention, identification, and management of diffuse pollution. Van Nostrand Reinhold, New York.
- Schneider, J.C., P.W. Laarman, and H. Gowing. 2000. Age and growth methods and state averages. Chapter 9 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.



LEGEND

- BOTTOM**
 - Sand
 - Mud
 - Mud and Pulpy peat
 - Pulpy peat
 - Muck
 - Brush shelter
- SHORE FEATURES**
 - Steep slope
 - Cottage
 - Dock
 - Improved road
 - Unimproved road
 - Boathouse
 - Boat
 - Posture
 - Spring
 - Bar
- VEGETATION**
 - Emergent
 - Submergent
 - Flooding
- STATIONS**
 - Vegetation
 - Plankton
 - Temp, chem, plankton
 - Bottom sample
 - Fish sample
- OUTLINE & CONTOURS**
 - Shoreline
 - Contours

136 BRUSH SHELTERS IN 17 GROUPS OF 8 SHELTERS PER GROUP ARE INSTALLED BY DEPARTMENT OF CONSERVATION IN 1935

90 BRUSH SHELTERS IN 10 GROUPS OF 8 SHELTERS PER GROUP AND 2 GROUPS OF 5 SHELTERS PER GROUP ARE INSTALLED BY DEPARTMENT OF CONSERVATION IN 1930



INSTITUTE FOR FISHERIES RESEARCH
DIVISION OF FISHERIES
LAKES INVENTORY MAP
MICHIGAN CONSERVATION DEPT.
THUMB(LOUISE) LAKE
AREA 484.5 ACRES
MARGINAL SURVEY AND SOUNDINGS BY M.E. COLE, 1935-1936
FISH INVENTORY 7/19/39-41
INVESTIGATED BY S.E. HARRIS
CHARTERED COUNTY
T. 32 N. R. 4 W. SEC. 1, 2, 3, 10, 11

Table 1. Stocking history for Thumb Lake, Charlevoix County. Life stage at time of stocking is denoted as follows: Y=yearling, mo=month of age at stocking, FF=fall fingerlings, SL=sublegal, L=legal. All splake were stocked as yearlings.

	Trout						Bass				
Year	Lake	Brook	Rainbow	Brown	Steelhead	Splake	Small mouth	Large mouth	Walleye	Yellow Perch	Bluegill
1922			35,000								
1928			40,000								
1931										16,100	
1932								2,500			3,000
1933							2,300 (4mo)	600 (3mo)		35,000 (6mo)	5,000 (4mo)
1934							3,000 (4mo)		400,000 fry	10,000 (7mo)	12,000 (4 mo)
1935							1,000 (4mo)		750,000 fry	32,000 (6 mo)	20,000 (4mo)
1936									150,000 fry		12,500 (5mo)
1937							250 (3mo) + 32 adults	250 (3mo)			17,000 (3mo)
1938							44 adults	500 (3mo)		7,000 (6mo)	8,000 (5mo)
1939							55 adults				25,000 (4.5mo)
1940							100 adults				4,500 (5mo)
1941							43 adults	3,000 (4mo)			72,000 (4mo)
1942			1,500 adults + 1,500 Y				5,000 (4mo)				
1944		3,000 adults + 3,000 Y	3,000 adults								

Table 1. Cont.

	Trout						Bass				
<u>Year</u>	<u>Lake</u>	<u>Brook</u>	<u>Rainbow</u>	<u>Brown</u>	<u>Steelhead</u>	<u>Splake</u>	<u>Small mouth</u>	<u>Large mouth</u>	<u>Walleye</u>	<u>Yellow Perch</u>	<u>Bluegill</u>
1945		3,000 Y	3,000 Y.				5,000 (3mo)				
1946		7,500 (7mo)	7,500 (6mo)				8,000 (4mo)				
1947		7,500 (8mo)	7,500 (7mo)				5,861 (6mo)				
1948			7,500 (4")				10,000 (2.7")				
1949			7,500 (3")								
1951			15,000 (2.5")								
1952			15,000 (5")								
1953			15,000 (3.5")								
1954			15,000 (4")								
1955			7,500 (SL)								
1956			10,000 (L)								
1957			5,000 (L)								
1958		10,000 (SL)	6,000 (SL)								
1959			5,000								
1960			5,000								
1961			5,000								
1962			5,000								

Table 1. Cont.

	Trout						Bass				
<u>Year</u>	<u>Lake</u>	<u>Brook</u>	<u>Rainbow</u>	<u>Brown</u>	<u>Steelhead</u>	<u>Splake</u>	<u>Small mouth</u>	<u>Large mouth</u>	<u>Walleye</u>	<u>Yellow Perch</u>	<u>Bluegill</u>
1963			5,000								
1964			7,500								
1965			5,000								
1966			5,000								
1967			15,000 FF								
1968			10,000Y + 1,005A								
1969			20,250 Y								
1970			20,000Y + 363 A								
1971			14,554 Y + 30,000FF								
1974			16,000 Y								
1975					16,000 Y						
1976						8,000					
1977				5,000 Y		15,009					
1978	16,000 Y										
1979	10,000 Y										
1980	10,000 Y										
1981						15,000					
1982						20,000					
1983						10,000					
1984						18,800					
1985						15,120					
1986						18,350					
1987						20,000					
1988						14,000					

Table 1. Cont.

	Trout						Bass				
<u>Year</u>	<u>Lake</u>	<u>Brook</u>	<u>Rainbow</u>	<u>Brown</u>	<u>Steelhead</u>	<u>Splake</u>	<u>Small mouth</u>	<u>Large mouth</u>	<u>Walleye</u>	<u>Yellow Perch</u>	<u>Bluegill</u>
1989			19,997 Y								
1990						20,000					
1991						20,000					
1992						20,000					
1993						17,400					
1994						23,997					
1995						21,900					
1996						24,000					
1997						20,259					
1998						21,400					
1999						22,000					
2000						19,200					
2001						20,440					
2002						21,200					
2003						21,000					
2004						21,505					
2005						24,000					
2006						24,000					
2007			24,071 FF			19,099					
2008			1,257 Y			19,992					

Table 2. Dissolved oxygen (mg/L), pH, conductivity, and temperature measured along a depth profile on April 27 and August 30, 2005, in the West Basin of Thumb Lake, Charlevoix County (USGS, personal communication).

April 27, 2005

Depth (ft)	Dissolved oxygen (mg/L)	pH	Conductivity ($\mu\text{S}/\text{cm}$)	Temperature ($^{\circ}\text{C}$)
3.00	10.6	7.9	205	8.5
8.00	10.6	7.9	205	8.5
13.00	10.6	7.9	205	8.5
18.00	10.6	7.9	205	8.5
23.0	10.5	7.9	206	8.0
28.0	10.5	7.9	206	8.0
33.0	10.4	7.8	207	8.0
38.0	9.8	7.8	209	7.5
43.0	8.6	7.6	219	7.0
48.0	5.6	7.3	236	6.5

Aug 30, 2005

Depth (ft)	Dissolved oxygen (mg/L)	pH	Conductivity ($\mu\text{S}/\text{cm}$)	Temperature ($^{\circ}\text{C}$)
3.00	8.4	8.5	193	22.0
9.00	8.3	8.4	193	22.0
15.0	8.2	8.4	195	21.5
21.0	7.9	8.4	196	21.5
27.0	7.1	8.2	203	20.5
30.0	5.1	7.7	231	18.5
33.0	3.4	7.5	251	14.5
36.0	1.6	7.4	258	13.5
42.0	0.4	7.1	262	10.5
50.0	0.2	7.0	301	9.0
56.0	0.1	6.6	435	9.0

Table 3. Dissolved oxygen (mg/L), pH, conductivity, and temperature measured along a depth profile on April 27 and August 30, 2005, in the East Basin of Thumb Lake, Charlevoix County (USGS, personal communication).

April 27, 2005

Depth	Dissolved oxygen (mg/L)	pH	Conductivity (μS/cm)	Temperature (°C)
3.00	11.1	7.5	198	7.5
13.0	11.1	7.6	198	7.5
23.0	11.1	7.6	198	7.5
33.0	11.1	7.7	197	7.5
43.0	11.1	7.6	197	6.0
53.0	10.2	7.6	198	5.0
63.0	9.0	7.4	199	4.5
73.0	8.6	7.4	200	4.5
83.0	8.4	7.3	200	4.5
93.0	8.3	7.3	200	4.5
103	8.2	7.3	200	4.5
113	7.9	7.3	200	4.5
123	3.7	7.0	304	4.5

Aug 30, 2005

Depth	Dissolved oxygen (mg/L)	pH	Conductivity (μS/cm)	Temperature (°C)
3.0	8.2	8.5	193	21.5
17.0	8.1	8.5	193	21.5
27.0	8.2	8.5	194	21.5
30.0	11.6	8.4	199	19.0
33.0	12.6	8.4	205	15.5
36.0	11.4	8.2	212	12.5
39.0	10.7	8.0	215	10.5
42.0	10.1	7.8	216	9.5
45.0	9.4	7.7	218	8.5
55.0	5.7	7.4	234	6.0
62.0	3.4	7.1	230	5.5
80.0	1.7	6.9	226	5.0
100	0.7	6.9	227	5.0
120	0.3	6.9	228	5.0

Table 4. Dissolved oxygen (mg/L), pH, conductivity, and temperature measured along a depth profile on April 27 and August 30, 2005, in the Central Basin of Thumb Lake, Charlevoix County (USGS, personal communication).

April 27, 2005

Depth	Dissolved oxygen (mg/L)	pH	Conductivity (uS/cm)	Temperature (°C)
3.0	10.9	7.7	198	8.0
10.0	10.8	7.8	198	8.0
17.0	10.8	7.8	198	8.0
24.0	10.8	7.8	198	8.0
31.0	10.7	7.8	198	8.0
38.0	10.8	7.8	198	7.5
45.0	10.7	7.8	198	7.5
52.0	10.7	7.8	198	7.5
59.0	10.5	7.8	198	7.5
66.0	10.3	7.7	198	7.0
71.0	7.9	7.4	198	6.5

August 30, 2005

Depth	Dissolved oxygen (mg/L)	pH	Conductivity (uS/cm)	Temperature (°C)
3.0	8.2	8.2	193	21.5
10.0	8.1	8.5	195	21.5
20.0	8.0	8.5	195	21.5
30.0	8.0	8.4	196	21.5
35.0	7.7	8.3	198	20.5
38.0	6.2	7.7	226	14.5
41.0	4.5	7.5	232	13.0
44.0	3.3	7.4	236	12.0
47.0	2.5	7.4	236	11.0
50.0	1.7	7.3	238	10.5
53.0	0.7	7.2	235	10.0
65.0	0.2	7.1	237	9.5
80.0	0.1	6.6	247	9.0

Table 5. Estimated harvest, catch per hour (C/H), and fishing pressure for Thumb Lake total (April 28-Sept 30, 2007). Two standard errors are given in parentheses. (MDNR Fisheries Division, unpublished data).

Species	C/H	April-May	June	July	August	September	Season
HARVEST							
Largemouth bass	0.0055 (0.0053)	0 (0)	37 (35)	0 (0)	0 (0)	0 (0)	37 (35)
Smallmouth bass	0.0191 (0.0115)	34 (40)	69 (56)	12 (23)	10 (12)	5 (7)	129 (74)
Yellow Perch	0.0139 (0.0111)	13 (22)	6 (9)	52 (64)	23 (27)	0 (0)	94 (73)
Bluegill	0.0290 (0.0171)	31 (49)	87 (64)	75 (73)	4 (8)	0 (0)	197 (109)
Pumpkinseed	0.0004 (0.0009)	0 (0)	0 (0)	3 (6)	0 (0)	0 (0)	3 (6)
Rock bass	0.0146 (0.0166)	26 (32)	74 (106)	0 (0)	0 (0)	0 (0)	99 (111)
Brown bullhead	0.0010 (0.0020)	0 (0)	7 (14)	0 (0)	0 (0)	0 (0)	7 (14)
Splake	0.0186 (0.0102)	31 (35)	44 (36)	21 (26)	23 (28)	8 (13)	127 (65)
TOTAL HARVEST	0.1022 (0.0360)	135 (82)	324 (146)	162 (103)	60 (42)	13 (15)	694 (202)
RELEASED							
Northern pike	0.0009 (0.0017)	0 (0)	0 (0)	6 (12)	0 (0)	0 (0)	6 (12)
Largemouth bass	0.0399 (0.0211)	69 (69)	171 (109)	5 (7)	17 (27)	9 (14)	271 (133)
Smallmouth bass	0.2300 (0.1009)	572 (502)	555 (309)	166 (88)	225 (128)	44 (43)	1,563 (611)
Yellow Perch	0.2493 (0.1397)	233 (273)	145 (118)	426 (318)	478 (455)	412 (625)	1,694 (887)
Bluegill	0.0712 (0.0600)	64 (83)	18 (23)	284 (358)	118 (147)	0 (0)	484 (396)
Pumpkinseed	0.0068 (0.0074)	0 (0)	0 (0)	25 (43)	16 (22)	6 (11)	46 (50)
Rock bass	0.1566 (0.0793)	92 (107)	698 (444)	149 (116)	117 (150)	8 (15)	1,064 (495)
Brown bullhead	0.0085 (0.0110)	0 (0)	13 (18)	45 (71)	0 (0)	0 (0)	58 (74)
Splake	0.0183 (0.0114)	39 (40)	70 (59)	6 (12)	10 (13)	0 (0)	124 (73)
TOTAL RELEASED	0.7816 (0.2424)	1,069 (593)	1,669 (568)	1,112 (507)	980 (518)	480 (627)	5,309 (1,262)
TOTAL CATCH	0.8837 (0.2577)	1,204 (598)	1,993 (587)	1,274 (518)	1,040 (520)	493 (627)	6,003 (1,278)
ANGLER HOURS		1,013 (545)	2,310 (787)	1,733 (674)	1,284 (567)	453 (376)	6,793 (1,354)
ANGLER TRIPS		478 (305)	818 (293)	787 (317)	585 (321)	153 (127)	2,821 (632)

Table 6. Number, percent, length range, and relative growth of fish species found in Thumb Lake, Charlevoix County, Michigan, May 19-22, 2008. Relative growth is not reported for non-game fish and for species having a small sample size in our collection. Relative growth is compared to statewide averages.

<u>Common Name</u>	<u>Number</u>	<u>Percent by Number</u>	<u>Percent by Weight</u>	<u>Length Range (in.)</u>	<u>Growth</u>
Black crappie	2	0.1	0.5	13-14	--
Bluegill	34	1.8	1.0	3-9	+0.2
Bluntnose minnow	249	12.8	0.6	2-4	--
Brown bullhead	209	10.8	5.3	3-10	--
Bullhead catfishes (family)	38	2.0	--	3-11	--
Common shiner	32	1.6	0.2	2-5	--
White sucker	153	7.9	53.9	3-22	--
Johnny darter	7	0.4	--	2-2	--
Largemouth bass	10	0.5	2.6	13-15	-1.5
Logperch	1	0.1	--	2-2	--
Northern pike	5	0.2	5.3	31-44	--
Pumpkinseed	15	0.8	0.3	3-6	-0.1
Rainbow trout	80	4.1	1.9	4-9	--
Rock bass	499	25.7	9.1	1-10	-0.9
Smallmouth bass	24	1.2	4.5	2-18	-0.6
Rainbow smelt	2	0.1	---	7-8	--
Splake	65	3.3	11.2	4-29	+0.1
Yellow perch	519	26.7	3.5	2-9	-1.0

Table 7. Length-frequency distribution of sport fish collected at Thumb Lake during the May 2008 general survey. These data do not include catch from mini-fyke nets.

Length group (inches)	Black crappie	Bluegill	Largemouth bass	Northern pike	Rainbow trout	Smallmouth bass	Splake	Yellow perch
1								
2								21
3		1				3		14
4		5			1			11
5		5			4			68
6		8			20		1	98
7		4			22		8	11
8		3			21	2	10	5
9		1			4	2	10	2
10						2	5	
11						3	2	
12						1	9	
13	1		2			1	6	
14	1		6			2	4	
15			2			2	3	
16								
17								
18						4	2	
19								
20								
21								
22								
23								
24								
25							1	
26								
27								
28							1	
29							2	
30								
31				1				
32								
33								
34				1				
35								
36								
37								
38								
39								
40				1				
41								
42								
43				1				
44				1				