Loon Lake
Oakland County, T3N R9E Sec.11
Last surveyed 2010

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Environment

Loon Lake is a 243 acre lake located approximately one mile west of the City of Pontiac in central Oakland County. The east third of the lake is predominantly a shallow flat (up to five feet deep), with an island and three deep pockets having depths of 37, 43, and 47 feet (Figure 1). The other two-thirds of the lake has a fairly wide shoal area along shore, but then drops off rather quickly to depths up to 73 feet. There is a large submerged island in this deeper end of the lake where the bottom rises up to within five feet of the surface. The shoal areas are mostly marl, with pulpy peat and muck in the deeper areas. The water in Loon Lake is clear, with water transparency readings from previous surveys of about 10 feet.

Loon Lake is located in the upper section of the Clinton River watershed. The Clinton River enters Loon Lake from the north and exits on the south west end (Figure 1). Lake Oakland is the first lake on the Clinton River upstream of Loon Lake. There is a dam at the outlet of Lake Oakland which is used to maintain its legal established lake-level. The navigable section of stream between Loon Lake and Lake Oakland provides access via a culvert into Schoolhouse, Wormer, and Mohawk lakes. In addition, the eastern shoreline of Loon Lake has culvert-access into Big Silver, Little Silver, and Kregor lakes. Boat access to these other lakes effectively raises the available water acreage from 243 in Loon Lake to a total of about 480. There is a dam on the Clinton River a short distance downstream of Loon Lake which is operated to maintain the legal established lake-level on Loon Lake.

The surficial geology of the surrounding area is primarily outwash sand and gravel, with some areas of end moraines of medium and course-textured till. The land use in the Loon Lake watershed is residential and light commercial use.

A 1973 Fisheries Division report indicated there were only 60 houses on the lake at that time. Based on counts from current aerial maps, development has more than doubled to 142 houses, 13 condominium buildings, and a commercial marina. It appears that all buildable sites have been developed. The only remaining shoreline that has not been developed is a wetland area on the west end, near where the Clinton River exits Loon Lake. A summer survey of the shoreline in 2010 documented 71 small docks (space for up to two boats) and 20 large docks (space for more than two boats). This large increase in development around the lake has resulted in modifications to the shoreline including increased armoring.

The current public access site was purchased by the state in 1948 and was used without development, before being improved in the early 1970s with the installation of a parking lot and concrete boat ramp. There are 15 parking spaces available at this site.

Loon Lake is sufficiently deep that the lake stratifies annually. During summer, the lake develops three distinct layers; the upper most layer (epilimnion) is warm and well oxygenated and temperature

and oxygen are uniform in this layer; the middle layer (thermocline) is intermediate in temperature and the amount of dissolved oxygen varies; the bottom layer (hypolimnion) is cold and has very low oxygen. In late August 2010, a thermocline was established from 19 to 30 feet with oxygen levels ranging from 1.4 to 7.9 mg/l (Figure 2). Water clarity in Loon Lake was good, with a Secchi disk reading of 19 feet.

History

A variety of game fish species were stocked in Loon Lake during the 1930s and 1940s (Table 1). Species stocked included bluegill, crappie, largemouth bass, yellow perch, walleye, and crayfish for forage. The connecting lakes including Schoolhouse, Wormer, Mohawk, Big Silver, and Little Silver had similar stocking programs. It is uncommon for most of these species to be stocked today, because research has demonstrated that once established, these species are usually ubiquitous and self-sustaining.

Walleyes were stocked in Loon Lake for a couple of years in the mid-1950s, as well as northern pike in 1956 (Table 1). Surveys to evaluate the success of the walleye stockings were done in 1956 and 1958. Although the walleye stockings were not successful, these first fisheries surveys documented good growth rates for bluegill, black crappie, yellow perch, and largemouth bass.

Stocking did not occur again until 1973 and 1974 when brown trout and rainbow trout were planted both years. The trout program was discontinued in Loon Lake due to poor survival. Rainbow trout were stocked intermittently into Schoolhouse, Mohawk, Big Silver, and Little Silver lakes from the mid-1930s to 1980. A 1973 Fisheries Division report indicated medium summer and winter fishing pressure on Loon Lake and the fishery was described as fair.

Loon Lake was again stocked with walleye in the 1980s and early 1990s and surveys were conducted to evaluate their success. After documenting poor survival of walleye, the stocking program was discontinued after 1992.

Northern pike have been stocked intermittently since 1995 to supplement the population (Table 1). There is an active recommendation to stock northern pike, but due to the presence of VHS in Michigan, northern pike have not been produced in the hatchery since 2006.

Current Status

A fish community survey was conducted on Loon Lake by DNR Fisheries Division during May 2010 using a standardized sampling protocol (Status and Trends Program). A variety of sampling gear was used in attempts to accurately survey the entire fish community. Sampling consisted of 3 trap net lifts, 6 fyke net lifts, 9 small mesh fyke net lifts, 12 minnow trap lifts, 4 beach seine hauls, and 4 gill net lifts during May 10-13, 2010. Four sites were also surveyed by night time electrofishing on June 1, 2010. The lake was divided into eleven equal sized sections, from which net set locations were randomly selected. As time allowed, nets were re-set in randomly selected sections. The goal of the survey was to evaluate the current fish population and determine future management needs of the fishery.

A total of 1,117 fish were caught during the survey, represented by 24 species (excluding hybrid sunfish) (Table 2). Panfish such as bluegill, black crappie, longear sunfish, pumpkinseed, rock bass, warmouth, and yellow perch comprised 70% of the total catch by number and 12% by weight. Large game fish including channel catfish, largemouth bass, smallmouth bass, and northern pike accounted for 9% of the total catch by number and 14% by weight. Common carp were fairly abundant and represented the majority of the biomass, accounting for 68% of the total catch by weight (Table 2).

Bluegills were the most abundant fish caught during the survey. They represented 54% of the total catch by number and 9% by weight (Table 2). The bluegill ranged in size from 1 to 8 inches (Table 3). From the trap and fyke nets, bluegills averaged 6.1 inches, with 16% of the catch being 7 inches or larger. The bluegill had a negative Mean Growth Index (-0.9), which means that bluegills in Loon Lake were about an inch shorter than the statewide average length at age (Table 4). Most bluegills were 4 to 5 years old (71%), but age-classes 1-8 were represented in the catch (Table 5).

The quality of the bluegill population in Loon Lake was evaluated using Schneider's Index. This index provides a relative measure of the quality of the bluegill size in a lake based on a scale from 1 to 7, with 7 being the best (Schneider 1990). Based on the trap net catch, the bluegill in Loon Lake scored a 4.25 and ranked "average."

Rock bass were the next most abundant fish, making up 9% of the total catch by number (Table 2). Rock bass caught in all gear types averaged 5.6 inches and almost a quarter of them were larger than 8 inches (Table 3). Similar numbers of pumpkinseeds and yellow perch were caught, each representing about 3% of the total catch by number. Pumpkinseeds in the trap and fyke nets averaged 6 inches and had a slightly positive Growth Index (+0.1) (Table 4), whereas yellow perch only averaged 4.3 inches and had a Growth Index of -0.6. Few black crappies were caught during the current survey (Table 2).

Largemouth bass dominated the catch of large game fish, making up 6% of the total catch by number and 7% by weight (Table 2). The bass average 12.9 inches long in the trap and fyke nets, and 21% of all bass exceeded the minimum legal-size limit of 14 inches (Table 3). Although larger bass were caught in the survey, growth rates were slow. The bass had a Mean Growth Index of -1.8, meaning on average, the fish were 1.8 inches shorter than the average length at a given age (Table 4).

Seventeen northern pike were caught, ranging from 12 to 33 inches (Table 3). The pike averaged 22.2 inches and almost a third exceeded the minimum size limit of 24 inches. Growth rates were above average (Table 4). Age-classes 2 through 7 were represented in the catch, with the exception of age-5 (Table 5).

Carp were fairly abundant and large sized. They represented 7% of the total catch by number and ranged in size from 14 to 30 inches (Table 3).

Analysis and Discussion

Bluegills continue to be one of the most abundant fish in the catch. Catch rates were comparable to earlier surveys, but size and growth rates have declined in the most recent survey. Bluegills averaged 6.1 inches in the 2010 survey, compared to an average size of 7.5 in 1986 and 7.0 in 2000. Several 9 inch bluegills were caught in each of the last two surveys, while none were caught in this current

survey. In addition, there was a marked decline in the Growth Index compared to the surveys in 1986 and 2000 when growth rates were about ½ inch above statewide average (Table 6). The Schneider's Index (Schneider 1990) was 4.25 in the current survey, a decline from the impressive 5.75 score from the 2000 survey.

The relative abundance of other panfish has been consistent across surveys, with rock bass being abundant, and fewer pumpkinseeds and yellow perch. Similar to bluegills, the growth rates of pumpkinseeds has declined since 1986 (Table 6).

Black crappie were somewhat uncommon in 2010; only 9 were caught. While similar catch rates were observed in 2000, they were down significantly from 1986. In addition to the decline in catch, there was also a reduction in size. The crappie averaged 7.1 inches in 2010, compared to 8.5 inches in 1986. Only one 8 inch crappie was caught in this survey, whereas almost half of the crappie catch in 1986 was greater than 9 inches long. Similar to bluegills and pumpkinseeds, growth rates for black crappie declined markedly from 1986 to 2010 (Table 6).

Overall, catch rates of largemouth bass in Loon Lake were good. The catch rate was consistent with that of other lakes in southeast Michigan, but growth rates were below average. Similar to the changes in growth rates of black crappie, bluegill, and pumpkinseeds, growth rates for largemouth bass declined markedly relative to 1986. All age classes were represented from age-1 to age-12, with the exception of age-11, indicating good production. Smallmouth bass are present in Loon Lake, but are not common. Similar to largemouth bass, large smallmouth bass were caught in the survey (up to 20 inches), but growth rates were below average.

A fair number of pike were caught in the current survey, however pike catch rates have declined slightly over time. The catch rate was 3.5 pike/gill net lift in 1993, 3.0 pike/gill net lift in 2000, and 2.8 pike/gill net lift in 2010.

Age-classes 2 through 7 northern pike were represented in the catch, with the exception of age-5. Age-6 and age-7 pike correspond to the years when stocking occurred in Loon Lake (Table 1). Each of these year classes represented about 10% of the catch and the other 80% were from year classes when stocking did not take place. So based on the catch data in 2010, it does not appear that spawning is limiting the pike population. However, in the 2000 survey, only three year classes of pike were represented in the catch and all were from years when stocking occurred.

Northern pike spawn in early spring and require emergent vegetation. As riparian areas are developed, modifications to the shoreline often result in the loss of this important habitat. There are many examples in Oakland County where the loss of marsh habitat and emergent vegetation has occurred as a result of from shoreline development. These lakes often see a reduction or loss of northern pike due to the loss of this critical habitat.

Ciscoes have been caught previously in Loon Lake, but in very low numbers. Gill net surveys in 1956 and 1958 found no ciscoes, but several were caught in gill net surveys in 1972, 1973 and 1986. However, no ciscoes were caught in the most recent surveys in 1993, 2000, or 2010. Although ciscoes were not caught in Loon Lake, they are still present in the system, with good numbers of ciscoes being caught in the connected Big Silver Lake in the most recent survey in 1998. Ciscoes are not common in

area lakes because they are limited to deep lakes which have sufficient oxygen in the thermocline. The majority of inland lake populations in Michigan occur in southern Michigan from Oakland County southwest to Cass County in areas of moraine kettle lakes (Latta 1995).

Ciscoes rarely occur in inland lakes where the temperature exceeds 64 degrees F (Latta 1995). That means during summer months, ciscoes are restricted to colder water in the thermocline. However, only the upper half of the thermocline in Loon Lake had sufficient oxygen levels (>5mg/l) to support ciscoes (Figure 2). Therefore, cisco habitat appears limited in Loon Lake and may account for their low abundance.

Carp accounted for over two-thirds of the total catch in weight. The fish averaged almost 25 inches long and over 7 pounds. It is not uncommon for carp to account for so much of the biomass in an impoundment like Loon Lake. Results were similar in the connected Big Silver Lake, with carp making up a large proportion of the catch by weight.

Management Direction

Loon Lake supports a balanced fish community and provides a good fishery for panfish and largemouth bass. Although it is a concern that the growth rate and average size of all the major species declined relative to earlier surveys, as well as a decline in catch rates for crappie and northern pike. Northern pike production in Loon Lake has been variable over the years and stocking has been done in the past to supplement natural reproduction. However, in the current survey, 3 of the 5 year classes represented were from years when stocking did not occur. Based on this production, stocking of northern pike will be discontinued. The next survey should put an emphasis on adequately sampling northern pike to evaluate the population. Northern pike spawning habitat has likely been reduced due to the extensive development of the shoreline. An emphasis should be made to protect remaining habitat and to restore lost habitat where feasible.

Ciscoes have a limited distribution in southeast Michigan. They are limited to deep lakes which have sufficient oxygen in the thermocline. This species is important to monitor because they are sensitive to environmental changes and pollution. Changes in cisco abundance may be an indicator for changes in water quality. Future fisheries surveys should make a more targeted effort to evaluate the status of ciscoes in Loon Lake.

References

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

Latta, W. C. 1995. Distribution and abundance of the lake herring (Coregonus artedi) in Michigan. Michigan Department of Natural Resources, Fisheries Research Report No. 2014.

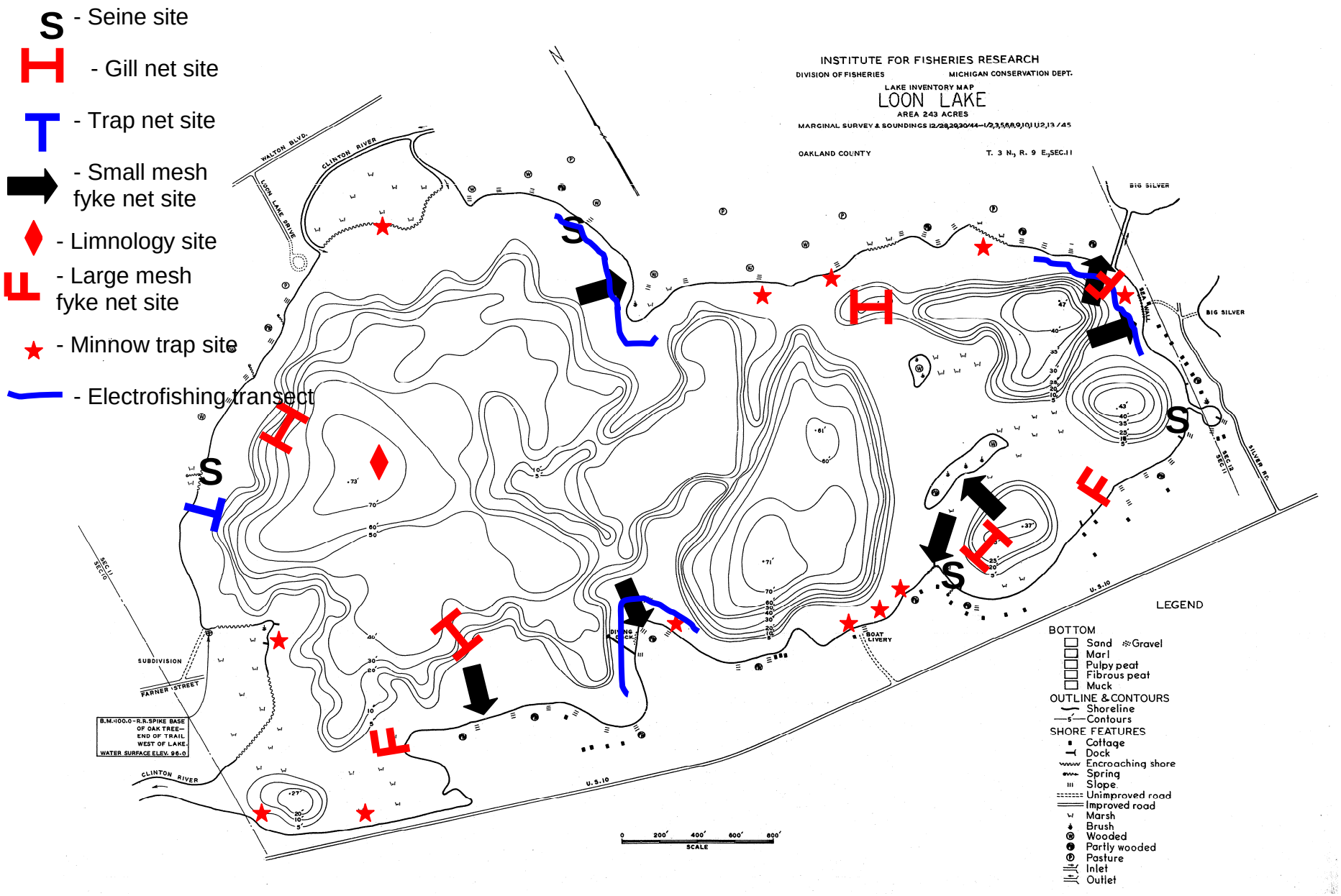

Figure 1.-Lake map of Loon Lake, Oakland County

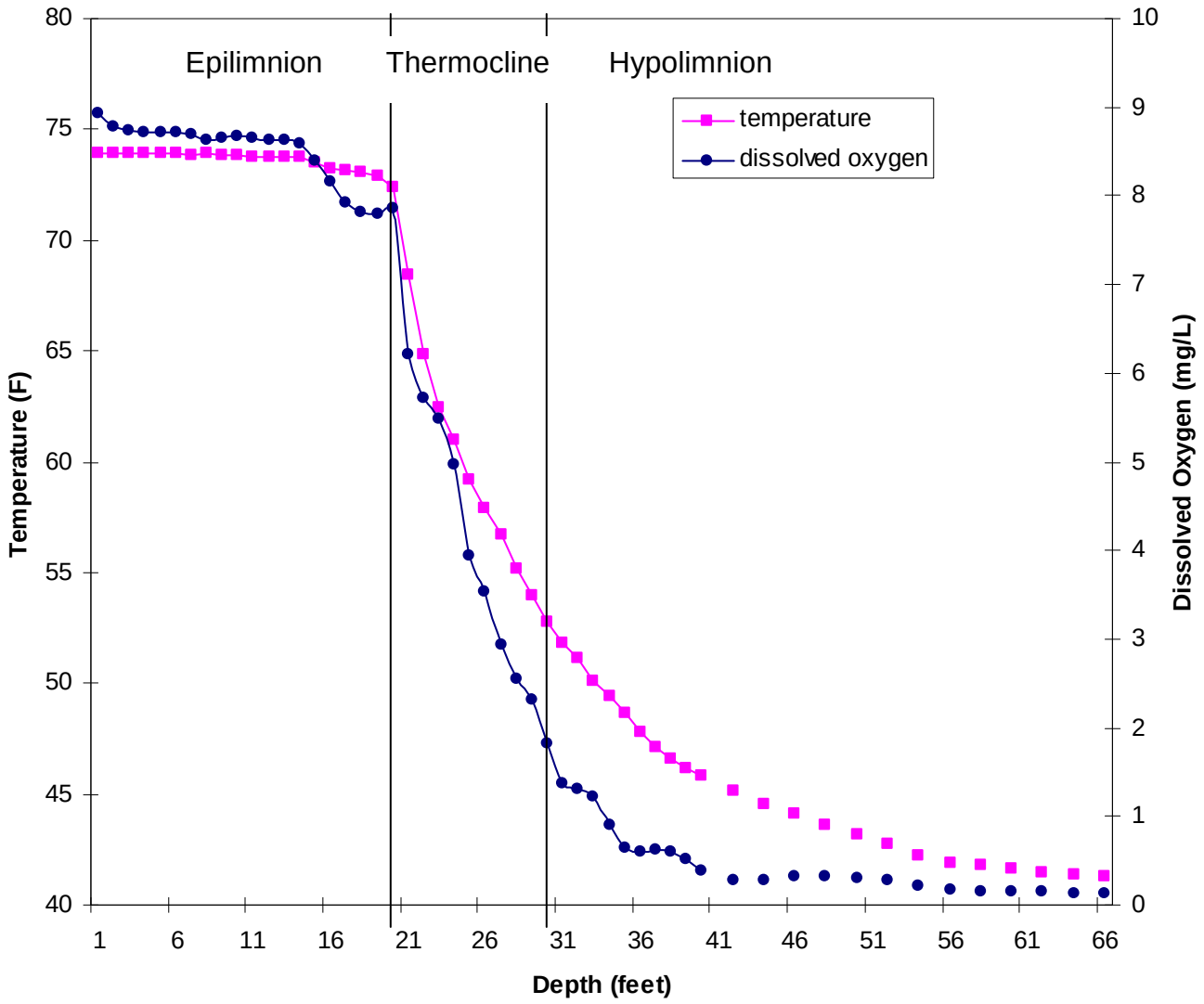

Figure 2.-The temperature and dissolved oxygen profile from Loon Lake on August 27, 2010. The lines on the graph indicate the dividing line for the epilimnion, thermocline, and hypolimnion.

Table 1.-Summary of fish stocking into Loon Lake, Oakland County

Stocking year	Species	Number Stocked	Age at stocking/ average size
1934	Bluegill	6,000	5 months
	Yellow perch	3,000/1,600	7 months/yearling
1935	Bluegill	6,000	4 months
	Largemouth bass	500	4 months
	Walleye	300,000	Fry
	Yellow perch	5,000	7 months
1936	Bluegill	6,000	4 months
1937	Bluegill	7,000	4 months
	Crayfish	1,429	
	Largemouth bass	750	3 months
	Walleye	104,000	Fry
	Yellow perch	10,000	7 months
1938	Bluegill	10,000	3 months
	Crappie	1,500	3 months
	Walleye	120,000	Fry
1939	Bluegill	19,000	4 months
	Crappie	1,100	3 months
	Crayfish	7,500	4 months
	Largemouth bass	800	3 months
	Yellow perch	1,500	7 months
1940	Bluegill	60,000	4 months
	Largemouth bass	1,400	3 months
	Yellow perch	700	7 months
1941	Bluegill	20,000	4 months
	Crayfish	4,000	Yearling
	Largemouth bass	1,000	4 months
	Yellow perch	3,000	4 months
1942	Bluegill	30,000	4 months
	Smallmouth bass	500	4 months
1943	Bluegill	15,000/10,000	4 months/6 months
	Smallmouth bass	1,000/2,000	4 months/6months
1944	Bluegill	5,000	4 months
	Smallmouth bass	2,000	4 months
	Walleye	40,000	Fry
1945	Bluegill	4,800	4 months
	Largemouth bass	2,000	4 months
1946	Walleye	6,000	Fry
1953	Walleye	2,000	2.8 inches
1955	Walleye	18,525	Fry
1956	Northern pike		
1973	Brown trout	8,000	Yearling
	Rainbow trout	16,000	Yearling
1974	Brown trout	8,000	Yearling
	Rainbow trout	16,000	Yearling
1982	Northern pike	250	9.9 inches
1983	Walleye	11,000	5.0 inches
1984	Walleye	11,070	2.0 inches

Table 1.-Continued

Stocking year	Species	Number Stocked	Age at stocking/ average size
1986	Walleye	18,000	1.8 inches
1988	Walleye	10,000	1.7 inches
1990	Walleye	46,911	1.6 inches
1992	Walleye	26,397	2.3 inches
1995	Northern pike	2,000	3.4 inches
1996	Northern pike	5,971	3.2 inches
1997	Northern pike	4,197	2.4 inches
2001	Northern pike	510	2.9 inches
2003	Bluegill*	1,000	5.1 inches
	Yellow perch*	1,500	5.1 inches
	Walleye*	1,000	5.1 inches
	Northern pike	1,500	2.1 inches
2004	Northern pike	970	3.0 inches

*-stocking permit was issued for a private stocking

Table 2.-Species catch and relative abundance of fishes collected with all gear types combined during the Loon Lake fish community survey 2010.

Species	Number	Percent by number	Weight (lb)	Percent by weight	Length range (in)	Average length (in)	Percent legal size*
Bluegill	598	53.5	73.5	8.9	1-8	5.4	31
Rock bass	102	9.1	17.2	2.1	2-9	5.6	40
Common carp	79	7.1	566.2	68.4	14-30	24.6	--
Largemouth bass	72	6.5	59.3	7.2	3-18	10.5	21
Sand shiner	52	4.7	0.2	<0.1	0-2	2.4	--
Pumpkinseed	33	3.0	6.9	0.8	2-7	6.0	67
Brown bullhead	33	3.0	18.4	2.2	7-12	10.5	100
Yellow perch	31	2.8	1.2	0.1	2-6	4.3	0
Bluntnose minnow	29	2.6	0.2	<0.1	1-2	2.3	--
Northern pike	17	1.5	46.7	5.6	12-33	22.2	29
Black bullhead	13	1.2	9.8	1.2	9-13	11.7	100
Longear sunfish	10	0.9	0.3	<0.1	3	3.5	--
Black crappie	9	0.8	1.7	0.2	5-8	7.1	100
Smallmouth bass	9	0.8	10.6	1.3	3-20	9.9	33
Logperch	7	0.6	0.1	<0.1	2-3	3.2	--
Blackchin shiner	7	0.6	<0.1	<0.1	1-2	1.6	--
Bowfin	3	0.3	9.2	1.1	19-21	20.5	--
Hybrid sunfish	3	0.3	0.6	0.1	5-7	6.5	67
Longnose gar	3	0.3	4.1	0.5	23-28	25.2	--
Yellow bullhead	2	0.2	0.7	0.1	8-9	9.0	100
Blacknose shiner	1	0.1	<0.1	<0.1	1	1.5	--
Channel catfish	1	0.1	0.5	0.1	12	12.5	100
Iowa darter	1	0.1	<0.1	<0.1	1	1.5	--
Johnny darter	1	0.1	<0.1	<0.1	1	1.5	--
Warmouth	1	0.1	0.1	<0.1	5	5.5	0

*Legal size refers to the minimum legal size limit where applicable or minimum size acceptable to anglers.

Table 3.-Number per inch group of important game fishes collected with all gear types combined, during the 2010 Loon Lake fish survey.

Length (in)	Black crappie	Bluegill	Largemouth bass	Northern pike	Pumpkin-seed	Rock bass	Smallmouth bass	Yellow perch
0								
1		1						
2		31			2	3		4
3		29	3		3	22	2	9
4		161	2		1	19		9
5	2	193	6		5	17		7
6	1	130	3		14	15	3	2
7	5	45	4		8	16		
8	1	8	9			7	1	
9			6			3		
10			5					
11			8					
12			6	1				
13			5					
14			6				1	
15			6					
16								
17			1					
18			2					
19				6			1	
20				2			1	
21				1				
22				1				
23				1				
24				2				
25								
26								
27								
28				2				
29								
30								
31								
32								
33				1				
34								

Table 4.-Mean length-at-age (inches) for selected fish species from Loon Lake 2010. Number in parenthesis represents the number of fish aged.

Species	Age group	State average	Total length (inches)	Mean Growth Index[1]
Black crappie				-1.2
	III	7.5	6.7 (2)	
	IV	8.6	7.4 (7)	
Bluegill				-0.9
	I	1.8	1.6 (1)	
	II	3.8	2.7 (11)	
	III	5.0	4.1 (14)	
	IV	5.9	4.9 (12)	
	V	6.7	6.1 (19)	
	VI	7.3	7.4 (9)	
	VII	7.8	7.9 (2)	
	VIII	8.2	7.8 (4)	
Largemouth bass				-1.8
	I	4.2	3.2 (3)	
	II	7.1	5.6 (11)	
	III	9.4	8.4 (15)	
	IV	11.6	10.4 (13)	
	V	13.2	11.8 (6)	
	VI	14.7	12.6 (6)	
	VII	16.3	13.9 (6)	
	VIII	17.4	14.8 (4)	
	IX	18.3	15.1 (5)	
	X	19.3	15.4 (1)	
	XII		17.4 (1)	
	XIII		18.6 (2)	
Northern pike				+1.4
	II	17.7	19.1 (10)	
	III	20.8	23.0 (2)	
	IV	23.4	23.8 (1)	
	VI	27.3	26.4 (2)	
	VII	29.3	30.7 (2)	
Pumpkinseed				+0.1
	II	3.8	2.8 (2)	
	III	4.9	3.6 (3)	
	IV	5.6	4.7 (1)	
	V	6.2	6.2 (8)	
	VI	6.6	6.7 (12)	
	VII	7.1	7.3 (2)	

Table 4.-Continued

Species	Age group	State average	Total length (inches)	Mean Growth Index[1]
Smallmouth bass				--
	I	3.8	3.5 (2)	
	II	7.5	6.5 (3)	
	III	10.8	8.9 (1)	
	V	14.4	14.8 (1)	
	XII		19.4 (1)	
	XIII		20.2 (1)	
Yellow perch				-0.6
	I	3.3	3.1 (13)	
	II	5.2	4.5 (9)	
	III	6.5	5.6 (7)	
	IV	7.5	5.9 (2)	

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

Table 5.-Weighted age frequency (percent) of selected fish species collected in Loon Lake, May 10-15, 2010.

Species	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	XIII	Number caught
Black crappie			22	78										9
Bluegill	<1	5	15	32	39	7	1	1						598
Largemouth bass	4	15	21	17	8	9	7	6	8			1	3	72
Northern pike		59	12	6		12	12							17
Pumpkinseed		6	9	3	30	45	7							33
Smallmouth bass	22	33	11		11		11	11						9
Yellow perch	42	29	23	6										31

Table 6.-A comparison of the mean Growth Index for selected species from recent surveys.

Species	1986	2000	2010
Black crappie	+1.1	--	-1.2
Bluegill	+0.6	+0.5	-0.9
Largemouth bass	+0.2	-1.0	-1.8
Pumpkinseed	+1.1	-0.1	+0.1