

## **FISH LAKE**

*Barry County (T2N, R10W, Sec. 16, 21)*

**Surveyed May 1994**

**Jay K. Wesley**

### **Environment**

Fish Lake is located in western Barry County, southwestern Michigan, about 1 mile east of the Village of Orangeville. The lake is natural, having been formed during the Wisconsin glacial stage (10,000 to 75,000 years ago). The 9.4 square-mile watershed contains Lime Lake, Hough Creek, Bagley Creek, and Buck Lake. The lake outlets to the west through Orangeville Creek, which is a tributary to the Gun River and joins the Kalamazoo River and Lake Michigan.

The topography of the watershed is that of moderately sloping hills made up of excessively drained till plains, outwash plains, and moraines. The soils are classified as Oshtemo-Coloma-Marlette associations, which are well-drained sandy and loamy soils. The watershed consists of forested and wetland areas with scattered agricultural plots and residential homes.

Fish Lake is 165 acres in size and up to 56 feet deep ([Figure 1](#)). It has a volume of 4,692 acre-feet and an estimated flushing rate of 0.8 years. Shoal areas (less than 20 feet deep) account for about 26% of the surface area of the lake. This is a very narrow shoal and a large pelagic zone compared to other area lakes. For example, a comparable figure for Deep Lake is 35% shoal (Dexter 1991). Aquatic vegetation is abundant along the perimeter and primarily consists of reeds, cattails, arrowhead, coontail, various pondweeds, and Chara. The substrate is mostly made up of marl with some sand and organic material.

Water quality conditions were surveyed August 23, 1993. The water was light green in color with a Secchi disc reading of 8.5 feet. Within the water column, alkalinity ranged from 168 to 226, and pH was 8.8. These values indicate that the water was very hard and well buffered. Water temperature varied from 77°F at the surface to 45°F at the bottom (54 feet), with a thermocline occurring between 14 and 25 feet. Oxygen levels dropped below 3 ppm between 29-30 feet, effectively prohibiting most fish from using the water column deeper than 30 feet. However, there is a sufficiently cold and oxygenated layer in the thermocline where coldwater fishes can thrive in midsummer. Mesotrophic characteristics of the lake have remained constant based on various limnological surveys conducted since 1946.

Fish Lake is a popular recreation lake for canoeing, hunting, and fishing. The entire lake is surrounded by wetlands and wooded areas. The land surrounding the lake is completely owned by the State of Michigan and is part of the Yankee Springs Recreation Area. There is a launch area on the west side of the lake in the outlet channel. The parking area can accommodate 15 vehicles.

### **Fishery Resource**

Fish stocking occurred as early as 1935 according to Michigan Fish Commission reports, but Fish Lake may have been stocked in the late 1800s along with many other Michigan lakes. Between 1935 and 1943 various combinations of bluegill, black crappie, and yellow perch were stocked ([Appendix 1](#)). Brown and rainbow trout stocking began in 1947, rainbow smelt were stocked

from 1958 to 1960, and walleye stocking commenced in 1971. The Institute for Fisheries Research mapped the lake in 1946. At that time, hook and line fishing was popular for bluegill, black crappie, yellow perch, and northern pike. Also popular was the use of gill nets to harvest cisco.

The first fish survey on record for Fish Lake was 1946. Gill nets were used for 1 night along with several hauls with a small seine. At that time the bottom was described as marly and the shore as wooded and marshy. Bluegill, yellow perch, black crappie, bullhead, northern pike, and cisco were noted as present as well as several forage fishes such as blacknose shiner, blackchin shiner, common shiner, bluntnose minnow, banded killifish, johnny darter, and brook silverside.

In 1955, the lake was surveyed again with small seine and gill net. The catch was similar to the 1946 survey with the addition of grass pickerel and lake chubsucker. In 1960, a survey with a large seine (1600 feet long) reported that fish were in good condition but were not very large or numerous. Fishing was poor at that time according to anglers because of a perceived decrease in northern pike numbers. Seining picked up 1 pound of predator to 11.5 pounds of prey. Managers felt that the lake contained too many species for its low fertility. They recommended chemically treating the lake and managing for trout and northern pike. The public was opposed to the chemical treatment, so it was not pursued.

Fish Lake was surveyed again in 1971 using a wider variety of gear that included five fyke nets and three experimental gill nets set for 2 nights along with 1.5 hours of electrofishing (230-V DC). Species composition was similar to past surveys with the addition of brown trout and cisco. The brown trout were mostly from 6 to 10 inches in length and were presumably age 1 fish stocked that year. One large brown trout (24.5 inches) was caught that was either a holdover from the 1968 stocking or from the wild populations in Bagley or Hough creeks. The overall size of fish seemed larger than past surveys, but this could be due to the use of fyke nets and electrofishing gear in the 1971 survey. Twenty-eight percent of the bluegill were of acceptable size (exceeded 6.0 inches in length).

Gill nets were fished for 1 night in 1973 to evaluate walleye and brown trout stockings. Four walleye were caught averaging 14.7 inches, and 11 brown trout were caught averaging 15.5 inches. One 16-inch channel catfish was caught, a species not been reported in the lake prior to this survey. Fishing reports at that time were good with a few walleye being taken.

Several electrofishing surveys were conducted between 1976 and 1989. The results of those surveys indicated that spring and fall fingerling walleye plants had limited and sporadic success and fry plants did not survive. Walleye were growing at the Michigan state average growth rate. In 1989, populations of yearling and young-of-year walleyes were estimated using index methods (Serns 1982). Based on a catch of five yearlings, the population estimate was approximately 0.30 yearling walleye per acre, which is considered to be low. No young-of-year walleye were collected, indicating little or no survival from the spring 1989 planting. Brown trout, cisco, northern pike, and bowfin were observed during electrofishing in 1989.

On September 8, 1991, an unusual specimen was brought into the district office for identification. It was later identified as a freshwater jellyfish, *Craspedacusta sowerbyi*. According to Pennak (1989), there is only one species in the United States. Freshwater jellyfish are rare in Michigan and occur sporadically. In water bodies where they occur, they are usually observed between July and October.

### **The 1994 Fishery Survey**

The most recent survey was conducted in May, 1994 using four 6'x3'x1.5" mesh standard trap nets (8 net lifts), four 125' experimental gill nets (8 net lifts), and 1.0 hr of night-time, 250-V DC

electrofishing. Netting was conducted for 2 nights.

The fish community found in 1994 did not differ significantly from any previous survey except for the absence of some minnow and shiner species ([Table 1](#)). Bluegill, black crappie, largemouth bass, yellow perch, and northern pike were the mainstay of the fishery. Overall, sport fish populations were in good shape.

The bluegill was the most abundant species collected by number. Over 52% of those collected were of acceptable size. Growth rates were 0.5 inches below the state average ([Table 2](#)). Nine year classes were present in the survey, and most (44%) of the bluegill collected were age 3 or 4 ([Table 3](#)). Recruitment had been steady until a weak year class occurred in 1992 (age 2). The poor recruitment in 1992 may have been due to the very cold spring and summer of 1992, apparently from the effects of the Mt. Pinatubo eruption in the Phillipines. Using Schneider's index of bluegill populations (1990), this population ranked average to good at 4.8 on a scale of 1-7, using trap net length-frequency data.

Yellow perch was the second most abundant species collected by number and 72% were of acceptable size. Eight-year classes of yellow perch were present, and growth was equal to the state average. The 1989-year class (age 5) was strong and made up 20% of the yellow perch caught.

A total of 153 largemouth bass ranging from 2-19 inches was collected ([Table 1](#)). Largemouth bass made up 77% of the catch by weight. Twenty-one percent were of legal size (>14 inches). Six-year classes were collected, and growth rates were 0.8 inches below the state average. Survival also apparently drops after age 6 due to angling pressure once bass become legal size.

Black crappies appear to be sparse, comprising only 1.5% of total weight caught ([Table 1](#)). However, 67% of the crappie were of acceptable size and the maximum length was 11 inches. Growth was at or below the state average. There was a strong year class in 1992 that made up 44% of the population.

Only nine northern pike were collected, ranging from 8 to 39 inches. Although the survey catch was low, anglers report good catches of large northern pike. Growth rates were at the state average, and 20% of the catch was over legal size. Recruitment is infrequent with good year classes in 1992 and 1990. Six year classes were present. Northern pike can spawn in marsh areas around the lake and in wetlands along the inlets.

A total of 19 brown trout were collected from 6 to 15 inches in length. Eleven percent were of legal size. Brown trout growth was almost 1 inch below the state average. The 1993-year class (age 1) was strong, but there was no evidence of age 2 or 3 brown trout surviving from 1993 and 1992 stockings. It is presumed that most of the brown trout leave the lake for the coldwater tributaries.

The walleye stocking program has been poor at best with no significant fishery produced since stocking began in 1971. Only two walleye were caught in nets; they were 17 and 20 inches long. There appears to be no survival of walleye from 1991 and 1993 spring fingerling stocking.

The cisco population appears to be holding its own. Eleven cisco were caught, ranging from 10 to 14 inches in length. Growth was at the state average. Five age classes were present between ages 3 and 8. The lack of younger ages suggests either that recruitment was low the last 2 years or age 1 and 2 cisco were not susceptible to our sampling gear.

The forage base is good and diverse. Golden and sand shiner, bluntnose minnow, central mudminnow, brook silverside, lake chubsucker, and white sucker were collected ([Table 1](#)). The existence of top predators such as northern pike, largemouth bass, and bowfin do not appear to be changing the forage base.

Overall, the fish populations of this lake are good. There have been very few complaints about the fishery of this lake. Anglers report good catches of bluegill. The walleye and brown trout fishing has been poor with little success by anglers. Anglers report a growing northern pike fishery.

### Management Direction

Fish Lake should be managed as a self-sustaining warmwater fishery. Brown trout yearlings have been stocked annually at a rate of 24 per acre, and walleye spring fingerlings have been stocked biannually at rates between 20 and 60 per acre. Yet, no significant walleye or brown trout fisheries have been produced. It is recommended that both walleye and brown trout stockings be immediately discontinued, so these resources can be put to better use.

Our goal into the next century will be to maintain the warmwater fish community and monitor the status of the cisco population. Full surveys with standard trap nets, experimental gill nets, and night time electrofishing is recommended every 10 to 15 years to monitor the overall fish community.

Report completed: September 29, 2000.

### References

Dexter, J.L, Jr. 1991. Deep Lake. Michigan Department of Natural Resources, Status of the Fishery Resource Report 91-1, Ann Arbor.

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Serns, S.L. 1982. Relationship of walleye fingerling density and electrofishing catch per effort in Northern Wisconsin lakes. North American Journal of Fisheries Management 2:38-44.

**Table 1.**-Number, weight, and length (inches) of fish collected from Fish Lake with trap nets, gill nets, and DC boomshocker, May 5-26, 1994.

Species	Number	Percent by number	Weight (Pounds)	Percent by weight	Length range (inches) <sup>1</sup>	Average length	Percent legal size <sup>2</sup>
Bluegill	927	52.5	121.3	27.1	1-9	5.1	66 (6")
Pumpkinseed	33	1.9	4.3	1.0	2-7	5.2	27 (6")
Black crappie	25	1.4	6.9	1.5	4-11	7.4	67 (7")
Green sunfish	17	1.0	0.4	0.1	2-5	3.2	0 (6")
Rock bass	52	2.9	10.0	2.2	1-8	6.1	56 (6")
Largemouth bass	153	8.7	77.5	17.3	2-19	8.8	21 (14")

Brown trout	19	1.1	5.3	1.2	6-15	8.2	11 (10")
Cisco	11	0.6	5.9	1.3	10-14	13.0	100 (8")
Walleye	2	0.1	4.6	1.0	17-20	19.0	100 (15")
Yellow perch	181	10.2	20.7	4.6	2-11	5.6	72 (7")
Northern pike	9	0.5	27.6	6.2	8-39	20.5	20 (24")
Channel catfish	2	0.1	6.2	1.4	18-23	21.0	100 (12")
Bullhead species	168	9.5	0.0	0.0	4-12	9.9	...
Bowfin	55	3.1	145.0	32.3	12-26	18.5	...
Longnose gar	3	0.2	7.8	1.7	28-32	30.5	...
White sucker	1	0.1	0.2	0.1	8-8	8.5	...
Lake chubsucker	45	2.5	2.4	0.5	2-8	4.5	...
Bluntnose minnow	10	0.6	0.1	0.0	2-2	2.5	...
Golden shiner	4	0.2	0.0	0.0	2-2	2.5	...
Sand shiner	15	0.8	0.1	0.0	2-2	2.5	...
Central mudminnow	4	0.2	0.0	0.0	1-2	1.8	...
Brook silverside	2	0.1	0.0	0.0	3-3	3.5	...
<b>Total</b>	1,767	100.0	448.2	100.0			

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

<sup>2</sup> Percent legal size or acceptable size for angling. Legal size or acceptable size for angling is given in parentheses.

**Table 2.-** Average total weighted length (inches) at age, and growth relative to the state average, for fish sampled from Fish Lake with trap nets, gill nets, and DC boomshocker, May 2-26, 1994. Number of fish aged is given in parentheses.

Species	Age										Mean growth index <sup>1</sup>
	1	2	3	4	5	6	7	8	9	10	
Black crappie	...	5.3	7.5	8.4	9.4	10.0	10.6	11.8	...	...	-0.7
	...	(11)	(3)	(2)	(3)	(4)	(1)	(1)	...	...	
Bluegill	1.5	2.3	3.6	5.4	7.0	7.6	8.2	9.1	8.7	...	-0.5
	(10)	(8)	(17)	(18)	(12)	(7)	(5)	(2)	(1)	...	
Brown trout	7.7	...	...	15.0	...	...	...	...	...	...	-0.8
	(8)	...	...	(1)	...	...	...	...	...	...	
Cisco	...	...	10.8	...	12.3	13.0	13.8	14.8	...	...	0.0
	...	...	(1)	...	(4)	(3)	(2)	(1)	...	...	
Largemouth bass	3.7	6.6	8.6	10.5	12.3	13.5	...	...	...	...	-0.8
	(28)	(18)	(15)	(24)	(12)	(6)	...	...	...	...	
Northern pike	8.6	16.4	18.8	20.2	...	...	...	28.6	...	39.5	
	(1)	(3)	(1)	(2)	...	...	...	(1)	...	(1)	
Walleye	...	...	...	...	17.8	20.0	...	...	...	...	
	...	...	...	...	(1)	(1)	...	...	...	...	
Yellow perch	2.8	4.1	5.6	7.7	8.8	9.8	9.9	...	11.2	...	-0.3
	(15)	(11)	(18)	(11)	(17)	(8)	(4)	...	(1)	...	

<sup>1</sup> Mean growth index is the average deviation from the state average length at age.

**Table 3.**-Estimated age frequency (percent) of fish caught from Fish Lake with trap nets, gill nets, and DC boomshocker, May 2-26, 1994.

Species	Age										Number aged
	1	2	3	4	5	6	7	8	9	10	
Black crappie	...	44	12	8	12	16	4	4	...	...	25
Bluegill	13	10	21	23	15	9	6	3	1	...	80
Brown trout	89	...	...	11	...	...	...	...	...	...	1
Cisco	...	...	9	...	36	27	18	9	...	...	11
Largemouth bass	27	17	15	23	12	6	...	...	...	...	103
Northern pike	11	33	11	22	...	...	...	11	...	11	9
Walleye	...	...	...	...	50	50	...	...	...	...	2
Yellow perch	18	13	21	13	20	9	5	...	1	...	85

**Appendix 1.**-History of fish stocking in Fish Lake, Barry County.

Year	Species	Number	Size
1935	Yellow perch	500	Fall fingerlings
1936	Bluegill	5,000	Fall fingerlings
1937	Bluegill	3,000	Fall fingerlings
1939	Bluegill	13,000	Fall fingerlings
1943	Black crappie	200	Fall fingerlings
1947	Brown trout	45	Fall fingerlings
	Rainbow trout	90	Fall fingerlings
1948	Brown trout	5,000	Fall fingerlings
	Rainbow trout	5,000	Fall fingerlings
1949	Rainbow trout	5,000	Fall fingerlings
1958	Rainbow smelt	5,600	Adults
1959	Rainbow smelt	7,000	Adults
1960	Rainbow smelt	2,700	Adults
1965	Brown trout	2,813	Yearlings
1966	Brown trout	4,000	Fall fingerlings
1968	Brown trout	2,000	Yearlings
1970	Rainbow trout	3,500	Yearlings
1971	Brown trout	2,500	Yearlings
	Walleye	1,285	Fall fingerlings
1972	Brown trout	4,000	Yearlings
1973	Brown trout	5,000	Yearlings
	Walleye	150,000	Fry
1974	Brown trout	5,000	Yearlings

	Walleye	150,000	Fry
1975	Brown trout	5,000	Yearlings
	Walleye	200,000	Fry
	Walleye	10,000	Fall fingerlings
	Walleye	5,020	Spring fingerlings
1976	Brown trout	5,000	Yearlings
	Walleye	40,000	Fry
	Walleye	5,400	Spring fingerlings
1977	Brown trout	5,000	Yearlings
	Walleye	5,000	Spring fingerlings
1978	Brown trout	5,000	Yearlings
1979	Brown trout	2,000	Yearlings
	Walleye	200,000	Fry
1980	Rainbow trout	5,000	Yearlings
	Walleye	201,465	Fry
1981	Rainbow trout	5,000	Yearlings
1982	Rainbow trout	2,000	Yearlings
	Walleye	2,000	Fall fingerlings
1983	Brown trout	5,000	Yearlings
	Walleye	2,029	Fall fingerlings
1984	Brown trout	5,000	Yearlings
	Walleye	8,867	Fall fingerlings
1985	Brown trout	2,090	Yearlings
	Walleye	2,530	Spring fingerlings
1986	Brown trout	3,400	Yearlings
	Walleye	2,029	Spring fingerlings
	Walleye	220	Fall fingerlings
1987	Brown trout	3,390	Yearlings
	Walleye	2,032	Spring fingerlings
1988	Brown trout	4,260	Yearlings
1989	Brown trout	4,000	Yearlings
	Walleye	1,952	Spring fingerlings
1990	Brown trout	3,998	Yearlings
1991	Brown trout	3,950	Yearlings
	Walleye	4,118	Spring fingerlings
1992	Brown trout	3,950	Yearlings
1993	Brown trout	3,945	Yearlings
	Walleye	10,841	Spring fingerlings

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**Questions, comments and suggestions are always welcome! Send them to**  
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