

## **MAPLE LAKE**

*Van Buren County (T3S, R14W, Sec. 1, 12) and (T3S, R13W, Section 6)*

**Surveyed September 1995**

**James L. Dexter, Jr.**

### **Environment**

Maple Lake is a small reservoir on the South Branch of the Paw Paw River. Located in east central Van Buren County, it is found in the Village of Paw Paw.

The South Branch of the Paw Paw River upstream of the lake drains over 60,000 acres (94 square miles). Rolling hills and sandy soils characterize the geography of the area. The soils of the immediate lake area are primarily loamy sands, which are very well drained. The basin of the South Branch is characterized by Adrian and Houghton muck soils. Most of the watershed is agricultural (54%); of less importance are forested land (20%), urban land (11%), open field (9%), water bodies (4%), and wetland (2%). The East Branch of the Paw Paw River is another tributary, entering the South Branch just prior to entering Maple Lake. Both branches are designated trout streams.

Ackley Lake (62 acres) is connected to Maple Lake via a 10-foot arch culvert under M-40 located at the northeast corner of Maple Lake. The outlet for Maple Lake is blocked by a retired hydropower dam 27-foot high (17-foot head), originally constructed in 1907 on the north side of the lake. It is owned by the Village of Paw Paw.

Maple Lake is 172 acres in size and has a maximum depth of about 15 feet ([Figure 1](#)). Depths can vary over time because the flow-through system acts as a sediment basin. The deepest areas are associated with the old river channel. *Chara* is common in the lake, and little if any emergent vegetation is present. Floating vegetation is sparse. Submergent vegetation (milfoil and coontail) is quite thick in most areas.

Bottom substrates are made up of primarily sand and organic material. The south end of the lake contains a thick organic bottom that is mostly deposition from the inlet. It is sufficiently deep to allow some boat traffic in the very south end. That area is currently being hydraulically dredged.

Water quality parameters were measured August 29, 1995. Secchi disc readings were 6.0 feet. Dissolved oxygen levels were greater than 3 ppm from the surface to 12 feet, the deepest spot found. Alkalinity ranged from 158 ppm at the surface to 178 ppm at the bottom, while pH was 8.8-9.0. These parameters indicate the water is hard and well buffered, and have not changed since the 1991 survey (Dexter 1993). Temperature varied from 78°F at the surface to 68°F at the bottom. The lake does not stratify because of the flow-through system and shallow depth. The water retention time of the lake is very short, about 7 days (Southwest Regional Planning Commission 1978).

Overall water quality in Maple Lake is rated as fair to poor. While there have been no problems with fish kills, the environment of the lake is far from good. Phosphorus loading of the lake has been estimated at 11,900 pounds annually. This is an excessive amount, but detrimental effects are reduced by the very short retention time of the impoundment. In addition to the heavy nutrient loading, the physical characteristics of the lake (many channels, bays, peninsulas, and shallow depths) make it highly susceptible to eutrophication.

Residential development around Maple Lake is almost total. It sits in the middle of an urban area

and has practically no undeveloped shoreline left. A cement boat launch (township-owned) is located on the north shore off M-40 and can handle 20-30 vehicles and trailers. Shore-fishing access (and parking) is available at the dam and at Maple Isle (a small city-owned island with pedestrian bridge access, beach house, and picnic facilities). The Village has also installed a shore fishing access with piers at the south end of the lake off of Red Arrow Highway.

### **Fishery Resource**

According to historical records, Maple Lake has been actively managed by the State since at least 1934. Between 1934 and 1945, combinations of bluegill, largemouth bass, yellow perch, and black crappie were stocked. No additional stocking occurred until 1954 when walleye fingerlings were introduced. Between 1954 and 1956 about 21,200 walleye fingerlings were stocked. Walleyes were not stocked between 1957 and 1979, but stocking was re-initiated in 1980 on an annual basis ([Appendix 1](#)). Stocking rates in the 1980s were about 20/acre. Stocking rates were increased to 50/acre, minimum, starting in 1990 to meet statewide walleye stocking guidelines.

On December 8, 1937 the dam and hydroelectric plant at the north end of the lake washed out, draining both Maple and Ackley lakes. This allowed access to the lake by carp and they gained a strong presence. In 1945 the first documented angler complaint on Maple Lake was received. Anglers complained of poor fishing for everything except carp. An abundance of carp continued to plague the lake through the 1960s.

The first fishery investigations on Maple Lake occurred in 1955 and 1956. Gill net surveys were conducted to evaluate the success of walleye introduction. Gamefish captured included bluegill, largemouth bass, black crappie, yellow perch, and walleye. Unexpectedly, nine net lifts took only one carp. All gamefish were growing at or above state average growth rates.

A follow-up survey in 1962 did show a large number of carp (43% of the total weight collected). All gamefish were, however, still exhibiting average to good growth rates. Though the gamefish population (which included holdover walleye) appeared to be in good shape, the extreme abundance of carp led to a management proposal to eradicate the fishery and start anew. A public hearing was held regarding the proposal, and it was soundly defeated by a lack of public support.

In the spring of 1972, the Village of Paw Paw drew the lake down for maintenance of the dam and to allow riparians to clean their beaches. The Village tried to set up a schedule of fall drawdown every 3 years to provide for dam and shore maintenance. Apparently this never occurred, for the hydroelectric plant at the dam was retired in the mid-1970s, and no further references were made regarding drawdown until 1979.

An electroshocking survey was conducted in 1974 to evaluate the status of the fishery. At that time the gamefish population was still in good shape, but there were many carp and white suckers.

In 1980, concern mounted over the poor spring fishery. The cause of the poor fishing may have been the fall 1979 drawdown for dam repairs that left levels low throughout the winter. Since walleye had grown and survived well in the lake from stocking in the 1950s, it was recommended to restock walleye. It was thought that under the circumstances of prolonged drawdown (and loss of fish over the dam) that walleye would have a good chance to succeed. A 1984 electroshocking survey, targeting only walleye, evaluated the success of walleye stocked in 1980-1984. Only three walleye were collected. Hundreds of white suckers and "lots" of carp were observed in that survey.

As early as 1990 the Maple Lake Association began a campaign to convince riparian owners that it was time to dredge out the lake. The Lake Association took the lead and over a several-year period obtained required permits, procured funding, and purchased a hydraulic dredge. Portions of the south end of Maple Lake are currently (2000) being dredged to remove sediment that is being transported into the lake by the South Branch of the Paw Paw River. This is an ongoing project,

which started in 1997 and continues each year as money becomes available.

In 1993 the Village drew Maple Lake down for 2 months to build docks at the south end of the lake and remove sediments with a bulldozer. Concern about the effects of the drawdown on the fishery prompted the most fish recent survey, on September 18-20, 1995. This was the same week the 1991 survey had been conducted.

The most recent survey used four standard trap nets (6'x3'x 1.5"), four experimental gill nets (125 feet long), and 2.6 hours of nighttime boomshocking (250-V DC). Only 0.60 hours of the boomshocking were used for the general survey, while the remaining 2.0 hours were used strictly for conducting a SERNS walleye index (Serns 1982).

The fish community of Maple Lake appeared little different from that of almost 50 years ago. It is interesting to note that with the exact same effort as the 1991 survey, the 1995 survey collected more of practically every species except walleye. Catches of bluegill, perch, and crappie were double.

Bluegill were most numerous fish in the catch by number and weight ([Table 1](#)). Over 2,500 bluegills were sampled. Their length ranged from 1.4 to 8.5 inches. Forty percent of the bluegill catch was considered to be acceptable size (>6 inches). Schneider (1990) developed five criteria for ranking bluegill populations from survey catches in Michigan. Using trap net catch and growth rates from this survey, this bluegill population ranked 4.6 (good) on a scale of 1 (poor) to 7 (excellent). This is a decline in population size structure compared to 1991 when bluegill ranked a 6, which at that time was one of the highest rankings recorded for southwest Michigan. Growth rates were similar to 1991, again above state average rates ([Table 2](#)). Age frequency analysis ([Table 3](#)) shows that the 1992 year class was practically missing (as was true at most area lakes), apparently due to the very cool year resulting from the Mt. Pinatubo eruption in the Philippines.

Black crappie were collected from 1.0 to 10.6 inches in length. A total of 330 were captured using all gear ([Table 1](#)). Thirty-three percent were of acceptable size. Black crappie were growing at the State average ([Table 2](#)), which was down slightly from the 1991 growth pattern. The 1993-year class was poor ([Table 3](#)). Crappie populations in turbid reservoirs often have weak year classes. Mt. Pinatubo appeared to have no effect on crappie recruitment in 1992.

A total of 271 largemouth bass were sampled ([Table 1](#)). Largemouth were growing at the State average rate ([Table 2](#)), but significantly slower than in 1991. No legal size (>14") bass were collected. Recruitment levels appeared to be poor for the 1992 and 1993 year classes, again, not an uncommon occurrence for this type of waterbody. The lack of bigger bass may also have been caused by some fish going over the dam during the drawdown.

Over 250 yellow perch were collected that ranged in length from 1 to 11 inches. Acceptable size yellow perch accounted for 44 % of the catch. The growth rate of yellow perch also had declined compared to 1991, going from well above average (+1.2 inches) to just above average (+0.7 inches). Recruitment appeared variable with a very strong 1991 year class.

Fifty-three walleye were collected that ranged from 6 to 21 inches. Twenty-eight percent were legal size. Growth rates for walleye were well above the state average, but still had declined somewhat compared to 1991. Age groups 0, 1, 3, and 4 were present. No walleye were stocked in 1993 (age group 2, [Appendix 1](#)) due to the drawdown.

Additional electroshocking was done to estimate the abundance of young-of-year walleye. A total of 17 young-of-year walleye were collected per mile of shoreline electrofished. Based on the SERNS index methodology, this equates to 1.17 young-of-year walleye per surface acre. Age-1 walleye were estimated at 0.28 per surface acre. These results are low compared to most previous SERNS indexing at Maple Lake ([Appendix 2](#)).

## **Management Direction**

Maple Lake should continue to be stocked with spring fingerling walleyes at the rate of 50 – 100 per acre. Over the past 20 years the lake has received annual stockings. Stocking should occur annually, and if time permits fall SERNS indexing should be continued. Past experience on this lake and others seem to indicate that if two "good" year classes in a row are found, that it is not necessary to stock the third year. In many instances walleye fisheries are carried by one or two strong year classes.

The remainder of the gamefish population is in excellent shape at this time. Fishing in Maple Lake is as good as can be expected of any lake in the District. However, there are some recruitment problems that may effect fishing in the future. Gamefish populations in Maple Lake exhibit wide fluctuations in recruitment rates. Fluctuations in yearly recruitment levels are to be expected because this is a turbid reservoir with frequently changing environmental conditions (Bennett 1962).

It should be noted that there was a lot of apprehension regarding the extended drawdown and its potential effects on the fishery. The results of this survey indicate that numbers of fish were not strongly affected. Based on these results, and positive results at another local impoundment (Pine Creek Impoundment, Allegan County), extended drawdown of small impoundments should not cause undue concern regarding fish populations. Breeding populations remain and can re-populate impoundments in a couple of years.

The goal of management should be to at least maintain, if not improve, the fishery. This should be possible because of the good growth of fish and the continued high nutrient loading of Maple Lake. The major goals presented in the Management Plan for Maple Lake (Dexter 1993) have been accomplished. It is not necessary for an additional plan at this time.

Twenty-five years from now Maple Lake may be significantly changed. The lake may be deeper, have less organic sediment, and probably will have improved water quality. Since Maple Lake is located in a fairly densely populated area, it will continue to receive significant use by the public and will require our attention to monitor the fishery.

Report completed: May 19, 2000.

## **References**

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**Table 1.**-Number, weight, and length (inches) of fish collected from Maple Lake with trap nets, gill nets, and DC boomshocker, September 18-20, 1995.

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	2574	53.7	169.8	30.2	1-8	4.8	40 (6")
Pumpkinseed	116	2.4	15.3	2.7	2-7	5.2	25 (6")
Black crappie	330	6.9	83.6	14.9	1-10	7.0	53 (7")
Green sunfish	2	0.0	0.2	0.0	3-6	5.0	50 (6")
Rock bass	1	0.0	0.5	0.1	8-8	8.5	100 (6")
Warmouth	11	0.2	2.7	0.5	4-8	6.6	73 (6")
Largemouth bass	271	5.6	54.7	2.7	2-13	6.4	0 (14")
Walleye	53	1.1	42.6	7.6	6-21	12.2	15 (15")
Yellow perch	254	5.3	40.1	7.1	1-11	6.2	48 (7")
Bullhead species	73	1.5	0.0	0.0	7-13	11.1	...
White sucker	86	1.8	144.2	25.6	10-20	15.9	...
Common carp	1	0.0	6.8	1.2	24-24	24.5	...
Bluntnose minnow	1,000	20.8	0.0	0.0	...	...	...
Golden shiner	25	0.5	2.3	0.4	3-8	6.5	---
<b>Total</b>	<b>4,797</b>	<b>100.0</b>	<b>563.0</b>	<b>100.0</b>			

<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 Maple Lake with trap nets, gill nets, and DC boomshocker, September 18-20, 1995. Number of fish aged is given in parentheses.

Species	0	1	2	3	Age 4	5	6	7	8	Mean growth index <sup>1</sup>
Black crappie	2.3 (7)	5.5 (37)	7.7 (1)	8.4 (7)	9.1 (18)					-0.1
Bluegill	1.9 (14)	4.2 (25)	6.1 (13)	6.9 (1)	7.8 (21)	6.9 (1)				+0.8
Largemouth bass	4.0 (32)	7.8 (35)	8.8 (7)	11.3 (4)	12.8 (16)					+0.1
Walleye	7.3 (18)	13.3 (26)	...	17.3 (3)	20.2 (5)					+2.2
Yellow perch	2.9 (19)	6.4 (7)	7.2 (2)	7.8 (6)	9.0 (34)	...	...	10.0 (1)	9.3 (1)	+0.7

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

**Table 3.**-Estimated age frequency (percent) of fish caught from Maple Lake with trap nets, gill nets, and DC boomshocker, September 18-20, 1995.

Species	Age									Number aged
	0	1	2	3	4	5	6	7	8	
Black crappie	10	53	1	10	26					70
Bluegill	19	33	17	1	28	1				75
Largemouth bass	34	37	7	4	17					94
Walleye	35	50		6	10					52
Yellow perch	27	10	3	9	49			1	1	70

**Appendix 1.**-Walleye stocking history of Maple Lake, Van Buren County.

Year	Number	Age/size
1954	5,000	Spring fingerlings
1955	14,000	Spring fingerlings
1956	2,200	Spring fingerlings
1980	85	
1980	160,000	Fry
1981	160,000	Fry
1982	2,000	Spring fingerlings
1983	1,750	Spring fingerlings
1984	407	Adults
1985	3,550	Spring fingerlings
1986	4,076	Spring fingerlings
1987	3,552	Spring fingerlings
1988	3,502	Spring fingerlings
1989	3,555	Spring fingerlings
1990	13,658	Spring fingerlings
1991	8,943	Spring fingerlings
1992	10,806	Spring fingerlings
1993	0	Spring fingerlings
1994	9,246	Spring fingerlings
1995	8,655	Spring fingerlings
1996	9,589	Spring fingerlings
1997	8,816	Spring fingerlings
1998	15,476	Spring fingerlings
1999	17,265	Spring fingerlings

**Appendix 2.**-History of SERNS index results from Maple Lake.

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Year	Estimated population of walleye per acre	
	Young of year	Age 1
1989	0	0
1990	5.5	0.1
1991	9.0	2.1
1992	0.7	0
1994	6.3	0.3
1995	1.2	0.3

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**Questions, comments and suggestions are always welcome! Send them to**  
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INSTITUTE FOR FISHERIES RESEARCH  
 DIVISION OF FISHERIES MICHIGAN CONSERVATION DEPT.  
 LAKE INVENTORY MAP  
**MAPLE LAKE**  
 7626 ACRES  
 MAXIMUM SURVEY AND SOUNDINGS BY  
 LAKE & STREAM IMPROVEMENT SECTION 2/26-28/52/1-2/62  
 VAN BUREN COUNTY T.S.L. S.M.V. REG. 5,10

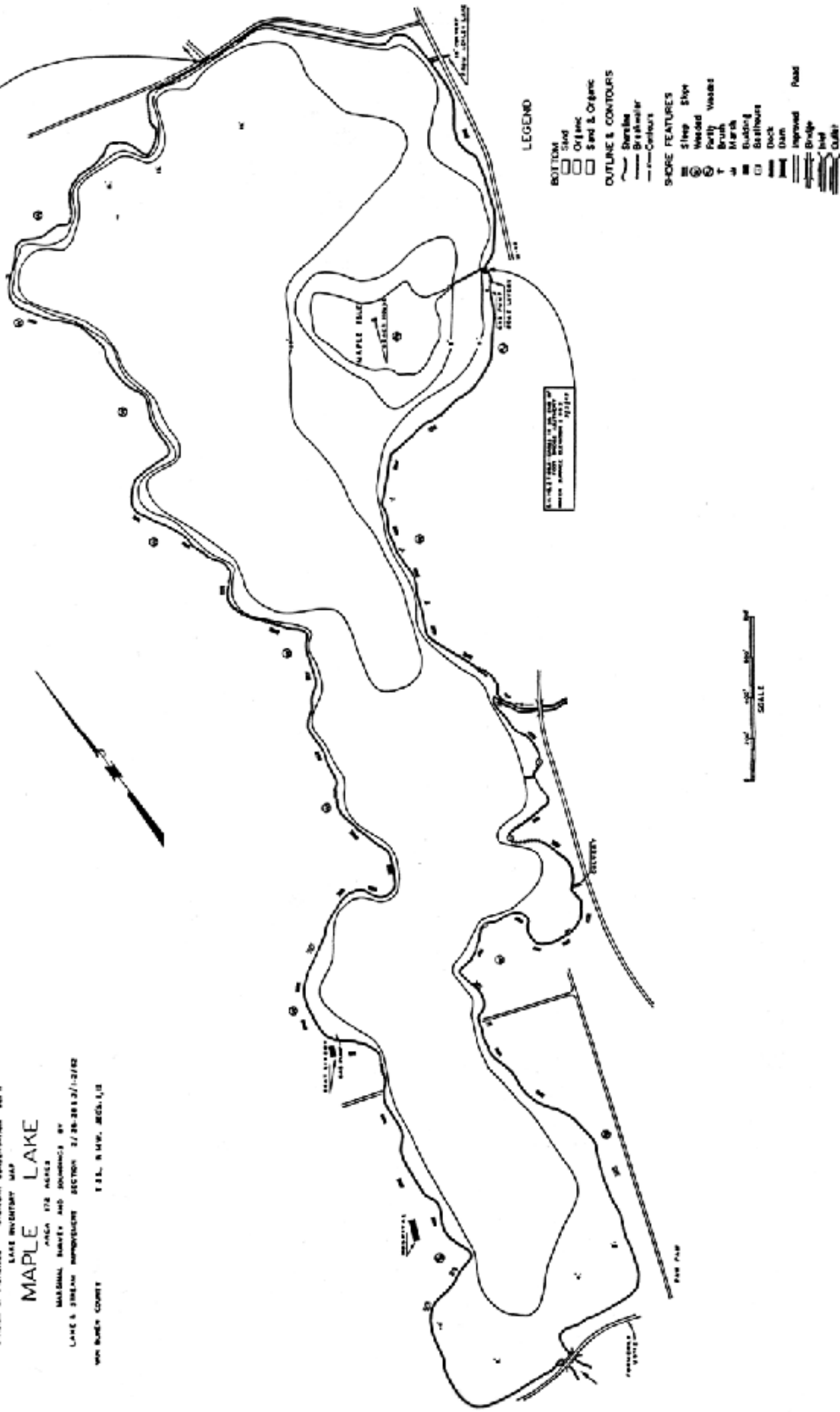


Figure 1.—Map of Maple Lake, Van Buren County, showing depth contours and other features in 1962.