Michigan Department of Natural Resources
Status of Fishery Resource Report 91-4, 1991
Renumbered in 2024, Status of the Fishery Resource Report 0004

GULL LAKE

Barry County (T1N, R9W, Sections 31, 36)
Kalamazoo County (T1N, R9-10W, Sections 6, 7, 8, 17, 18, 20, 1, 2, 12)

James L. Dexter, Jr.

Environment

Gull Lake is one of only a few lakes in southern Michigan that could be classified as a mesotrophic, perhaps slightly oligotrophic lake. Born of glacial origin about 14,000 years ago, the lake lies mostly in northern Kalamazoo County. Gull Lake is located just 2 miles from Richland, and about 6 miles south of Delton. The population center of Kalamazoo is about 11 miles to the southwest of the lake.

The land surrounding the lake is mostly well-drained loamy sand formed from glacial outwash. The topography ranges from nearly level farmland to steep hills (usually associated with small wetland systems). Land use in the watershed includes farming (corn, wheat, hay), woodlots, and residential areas.

The drainage area of the lake is small (17,000 acres) compared to the size of the lake (2,030 acres). The watershed is in the Kalamazoo River Basin, which drains into Lake Michigan. The outlet (Gull Lake outlet or Gull Creek) is at the south end of the lake. A control structure was built on the outlet in the mid-1800s to provide power for a grist mill and to control lake level. At present, the lake has no legally established lake level and is maintained about 8 feet above its original level. Each fall the lake is drawn down 8-10 inches to alleviate ice damage to the shoreline. Lake levels are raised back to normal at ice out. This practice of raising and lowering has been occurring since at least 1935.

A number of inlets exist, all of which are quite small. Prairieville Creek, a designated trout stream, drains into the north end of the lake and is the largest inlet (approximately 5-10 ft3/s). Along the west shore, Long, Miller, and Grass lakes drain into Gull Lake. Wintergreen Lake drains into Gull Lake on the east shore. Numerous springs are located along the shores.

The long axis of Gull Lake extends in a northwest-southeast direction. The lake is over 4 miles long and more than 1 mile wide for most of its length. Mapped in 1941 by the Institute for Fisheries Research, several deep depressions exist in the lake. The deepest (110 feet) is located almost directly in the middle of the lake. Another depression (108 feet) is at the north end of the lake. One large island exists toward the southern end. This island used to be a peninsula before the dam was installed. Two sunken islands, locally known as the "Hogs backs," are present in the middle of the lake. Both are about 20 feet underwater.

The shoal areas of Gull Lake cover approximately 30% of the total surface area. Composed primarily of sand, gravel, and rubble, the shoal areas less than 10 feet deep are kept clean by strong wave action. Marl extends from the edge of the sand/gravel areas to about the 30-foot contour. The rest of the lake bottom is largely a mixture of marl and pulpy peat.

The water quality of Gull Lake is excellent. A sewage system was completed around the lake in 1983. Water clarity, and perhaps quality, has improved substantially since that time. The water of Gull Lake is clear. Although, from a distance, it appears emerald green due to the suspension of marl in the water column. Secchi disk readings in May of 1989 were as deep as 40 feet. A water chemistry survey in August of 1989 found Secchi disk readings of 9-11 feet. Also, dissolved oxygen levels were at least 5 ppm down to 65 feet. Water temperatures ranged from 74°F at the surface to 46°F at the bottom, with a thermocline from 29 to 37 feet. Alkalinities ranged from 116 to 145 ppm (hard) and pH readings were alkaline (8.6-8.8). These values are similar to those found in the 1940s.

In 1941, Perry and Brown (1942) observed Gull Lake was "well supplied with submergent vegetation from the edge of the sand and gravel shoals to depths as great as 40 feet." They identified 24 aquatic plant species. Today, I would rank the overall aquatic plant community as "sparse" rather than "well-supplied," but have not examined it closely.

Most of the lake shore has been developed into home sites. A four-lane boat launching ramp is located in Prairieville Township Park on the north shore. This site can handle 70 boat trailers. Another small access site is at the end of Baseline Road on the northeast shore. Michigan State University owns a sizeable portion of the east shore, upon which the Kellogg Biological Station and Bird Sanctuary is located. Two marinas and a golf course are also located on the shores of the lake.

Fishery Resource

Biologists (state and university) have collected 55 species of fish from Gull Lake (Appendix 1). At least 10 species have been introduced. Gull Lake has one of the most diverse fish communities found in Michigan.

The earliest fish surveys were made in the 1930s and 1940s, primarily with seines. Collected were a variety of forage species including several shiner and minnow species, four darter species, brook silverside, and mottled sculpin (Appendix 1). Common game fish species at that time were largemouth and smallmouth bass, yellow perch, rock bass, bluegill, and cisco (now believed to be extinct). Northern pike and walleye were considered much less common. Walleye were introduced by private citizens only once in the late 1920s. Local anglers considered that stocking to be very unsuccessful.

The fish community present today is probably little changed from that of 60 years ago except for the addition of some species by stocking. In addition to the fish listed above, landlocked Atlantic salmon, rainbow trout, lake trout, brown trout, splake, and smelt have been added at one time or another (Appendix 2). Currently, only Atlantic salmon and rainbow trout are stocked yearly. Brown trout, although not stocked since 1964, are still occasionally captured. A good number of lake trout persist though they have not been stocked since 1982. It is assumed that smelt do not exist anymore, as the last smelt run was observed in 1983.

The most recent and thorough general fish survey was conducted in 1989 with gill nets, trap nets, and electrofishing gear (Table 1). Rock bass dominated in both number and weight among the 2,000 fish we examined. Unusually large rock bass (11.8 inches), yellow perch (12.9 inches), bluegill (9.8 inches), and Atlantic salmon (30.1 inches) were taken.

There is little prior fish survey data suitable for comparison. The majority of the work by Division biologists was accomplished in the first half of this century. Other than yearly monitoring of smelt runs, the Division's primary involvement over the last 2 decades was in assisting Michigan State University in their studies during the mid-1970s.

Growth rates of game fish in 1989 were very good (Table 2). Growth indices ranged from 0.2 to

2.7 inches above state average, depending on the species. Both northern pike and Atlantic salmon reached a length of 21 inches by Age II (two growing seasons). No problems with inter- or intraspecific competition are indicated.

Some comparison can be made to 1976 samples collected by Michigan State University (Table 2, in parentheses). Largemouth bass and yellow perch were well sampled in both years and both species have shown large improvements in growth. Smallmouth bass average growth appears to have improved slightly, although sample sizes for both collection years were small. Bluegill growth is comparable only for age groups II and III. Bluegills in 1989 were growing much slower than the same age groups in 1976. However, after age-IV, bluegill growth in 1989 was above average.

Age composition and survival characteristics of sport fish are close to normal (Table 3). Note that ages I and II fish are under-represented in Table 3 because nets are selective for medium-to-large fish. Also, small fish collected by electrofishing were not included. Recruitment of all species appears to be good. Age III and IV northern pike were relatively abundant, suggesting either that strong year classes occurred in 1985 and 1986, or that pike are not being heavily fished. Other species seem to have a high mortality rate after they reach legal or acceptable size (age III-IV).

The clear, cool environment of Gull Lake would seem to offer better habitat for smallmouth bass than for largemouth bass. However, the largemouth bass is the more abundant species according to fish surveys. Studies by graduate students have noted that smallmouth bass reproduction is impaired by heavy infestations of the bass tapeworm (*Proteocephalus ambloplitis*). Records dating back 50 years indicated that most smallmouth bass are infected.

Currently, a very good fishery exists for most game species. Large and abundant bluegills, rock bass, and yellow perch are the mainstay of the fishery. Northern pike, although not abundant, grow to a very large size and are caught primarily by ice anglers. Each winter, at least a couple of pike over 20 pounds are landed. The largemouth bass population in the lake is very good. The bass populations support one or more organized bass tournaments every week, from the end of May through October.

Rainbow trout have provided an excellent year-round fishery ever since stocking began. Rainbows as large as 20 pounds have been landed. Landlocked Atlantic salmon have added a new dimension to the coldwater fishery. Developed primarily as a broodstock source for the State of Michigan, this highly unique program has been well accepted. This species is easily caught, so new regulations designed to protect broodfish have been developed. We have heard of few lake trout being caught in recent years, although they are still present. Fall broodstock collections in 1989 netted 14 lake trout which were mostly 7- and 10-year old fish (10-15 pounds each).

It is known that rainbow trout, Atlantic salmon, smelt, suckers, and perhaps brown trout all utilize Prairieville Creek as a spawning site. Rainbow trout reproduction is quite successful, as indicated by the healthy resident population of small rainbows in the creek. A few naturally produced salmon have also been found in the creek. Smelt sustained themselves for 3 decades by spawning in and near Prairieville Creek.

Creel surveys were conducted at Gull Lake during June-August 1986, and January-September 1987. Results of those surveys will be presented at a future date in a Fisheries Division Technical Report. Preliminary results indicate bluegill, rock bass, largemouth bass, and yellow perch sustain the fishery. Catch rates ranged from a high of 0.492/hour for bluegill to a low of 0.001/hour for rainbow trout in 1987. Highlights of the 1987 survey include: over 64,000 angler hours expended, and over 63,000 fish harvested. During January and February, over 1,150 illegally kept Atlantic salmon were recorded, along with 13,583 Atlantics caught and released. (Only 25,556 Atlantics were stocked in 1986). More than 80% of the fish harvested were bluegill, rock bass, largemouth bass, and yellow perch.

Management Direction

Currently, the Michigan Department of Natural Resources manages the coldwater fishery more intensively than the warmwater fishery. Atlantic salmon and rainbow trout are stocked each year as spring yearlings. The number stocked per acre has varied, with new rates to be implemented in spring of 1991. Rainbow trout will be stocked at a rate of 11/acre, while Atlantic salmon will be stocked at a rate of 9/acre. Regulations for rainbow trout are typical (year-round season, five trout/day, 10-inch minimum size limit). Atlantic salmon regulations have been changed to protect the fish which are used as the state's brood source. The size limit for Atlantic salmon has been raised from 18 inches to 25 inches; the daily bag limit has been reduced from 2/day to 1/day; and the fishing season is the last Saturday in April through September 30.

Changes in water quality parameters are being investigated by Michigan State University. In progress now is a study assessing changes in the phytoplankton and zooplankton communities due to the installation of the sewage system.

The management goals of Gull Lake are fourfold:

1. Develop a trophy landlocked Atlantic salmon fishery, yet maintain enough adult fish to supply propagation needs. Mature salmon are netted and stripped of eggs and sperm each fall. Gull Lake is the state's designated broodstock lake for this species.

2. Expand the rainbow trout fishery and try to regain the fishery present a decade ago.

3. Reintroduce smelt to provide a winter ice fishery.

4. Maintain the good growth rates of warmwater species and their good fisheries.

Regulation and stocking changes have been implemented to attain goals #1 and #2. Attempts to procure adult smelt and smelt eggs for stocking have begun. Obstacles to attainment of goal #3 include tight budgets for purchase of adults and lack of adult spawning runs in Great Lakes tributaries. An attempt to get smelt and smelt eggs during spring 1990 was a complete failure due to the lack of significant runs anywhere in the state. Stocking of smelt is scheduled for 3 years in a row at 10 adults/acre. Attainment of goal #4 will depend on the careful monitoring of game fish growth rates and forage analysis.

We believe that through careful management of the coldwater fishery the good warmwater fishery will be maintained (goal #4). Our stocking rates for trout and salmon are almost half of the recommended rates. This action alone should prevent a major loss of forage and collapse of the fishery. The following recommendations can help accomplish our management goals:

1. A full fisheries survey should be conducted at *least* every 10 years.

2. Develop better educational signs to help anglers differentiate between salmon and trout species. A cooperative venture with the local Trout Unlimited Club is being pursued under this recommendation.

3. A program to evaluate survival of salmon and trout, and angler utilization, should be implemented as soon as possible. This should be in the form of some type of creel survey.

4. Yearly monitoring of Atlantic salmon and rainbow trout stocks through fall netting should continue.

Report completed: November 19, 1990

References

Carbine, W. F. 1941. A sixth examination of Michigan lakes in which plantings of the Great Lakes emerald shiner (*Notropis atherinoides*) have been made. Michigan Department of Natural Resources, Department of Conservation, Fisheries Research Report 715, Ann Arbor.

Perry, L. E., and C. J. D. Brown. 1942. A fisheries survey of Gull Lake, Kalamazoo and Barry counties. Michigan Department of Natural Resources, Department of Conservation, Fisheries Research Report 725, Ann Arbor.

Tague, D. F. and G. H. Lauff. Gull Lake - past, present, future. Michigan State University, W. K. Kellogg Biological Station, Battle Creek.

Table 1.- Number, weight, and length range of fishes collected from Gull Lake, May and October 1989.

Common name	Number	Percent by number	Length range (inches)	Weight (lbs.)	Percent by weight	Percent legal size	Average size (inches)
Rock bass	784	39.5	2.0-11.8	242.8	24.3	61.0	6.9
Yellow perch	486	24.5	2.0-12.9	69.5	6.9	23.0	6.6
Bluegill	321	16.2	2.0-9.8	57.1	5.7	57.3	6.2
Largemouth bass	177	8.9	3.0-18.0	152.6	15.3	40.1	11.3
Smallmouth bass	50	2.5	2.0-14.0	22.8	2.3	14.0	9.7
Atlantic salmon	37	1.8	8.0-30.1	130.4	13.1	53.2	16.8
White sucker	35	1.8	12.0-24.0	112.3	11.3		
Northern pike	22	1.1	12.0-34.7	64.2	6.4	86.4	22.5
Bullhead	18	0.9	7.5-14.0	27.4	2.7		
Bowfin	13	0.7	21.0-29.0	96.5	9.7		
Black crappie	12	0.6	9.0-11.0	6.3	0.6	100.0	10.3
Pumpkinseed	6	0.3	5.0-8.0	2.0	0.2		
Grass pickerel	5	0.3	5.0-11.0	1.0	0.1		
Green sunfish	4	0.2	2.0-6.6	0.6	0.1		
Golden shiner	3	0.1	7.0-8.0	1.2	0.1		
Warmouth	3	0.1	5.5-8.0	1.0	0.1		
Hybrid sunfish	3	0.1	4.0-6.0	0.5	0.1		
Rainbow trout	2	0.1	7.8-11.2	0.9	0.1	50.0	9.5
Common shiner	2	0.1	7.0-8.0	0.6	0.1		
Carp	1	0.1	18.0	4.6	0.5		
Northern hog sucker	1	0.1	16.0	2.5	0.3		
Longnose gar	1	0.4	14.5	0.2	*		

Total	1987	100.0	997.0	100.0

* Less than 0.1%

Table 2.-Mean length and age at capture and mean growth index of game species in Gull Lake, May 1989. Numbers in parentheses are from data collected in May 1976, by Michigan State University.

	Age								Mean growth
Species	I	II	III	IV	V	VI	VII	VIII	index[1]
Bluegill	-	3.5	4.9	6.7	7.8	7.8	8.7	9.8	+0.6
	(2.9)	(4.4)	(5.6)	-	-	-	-	-	-0.5
Largemouth bass	-	8.3	10.2	12.2	13.4	13.8	14.3	-	+0.7
	-	(7.3)	(8.0)	-	(13.9)	(15.1)	(16.8)	-	-0.7
Smallmouth bass	7.1	8.4	11.6	14.7	-	-	-	-	+0.8
	-	(7.4)	(8.8)	-	(17.1)	(17.4)	(17.9)	-	+0.3
Yellow perch	-	4.6	6.5	7.4	8.2	10.2	11.0	8.3	+0.2
	-	(4.4)	(5.3)	(6.9)	(7.8)	(8.9)	(11.9)	(12.1)	-0.8
Black crappie	-	-	10.2	11.3	-	-	-	-	+2.7
Northern pike	13.6	20.8	22.1	24.8	26.2	34.7	-	-	+1.9
Atlantic salmon[2]	14.2	21.0	23.1	24.1	-	-	-	-	-

[1]Mean growth index-inch increment over or under state average lengths.
[2]Sample collected in late October (1989) by trapnetting.

Table 3.-Estimated age frequency (percent) of six species of fish captured from Gull Lake in May of 1989.

	Age									Number
Species	I	II	III	IV	V	VI	VII	VIII	IX	caught
Bluegill	-	1	34	54	8	2	1	-	1	320
Largemouth bass	-	-	7	44	20	21	7	1	-	111
Smallmouth bass	-	4	39	54	3	-	-	-	-	28
Yellow perch	-	3	37	40	8	4	2	5	1	484
Black crappie	-	-	92	8	-	-	-	-	-	12
Northern pike	10	28	24	26	7	5	-	-	-	21

Appendix 1.-Referenced taxonomic list of Gull Lake fish.

Family, generic, and common name	Reference source[1]	Current status if known

Lepisosteidae		
Lepisosteus osseus Longnose gar	a, b, c, d, f	Common (20-50 captures)
Amiidae		
Amia calva Bowfin	a, b, d, f	Uncommon (10-20 captures)
Salmonidae		
Coregonus artedii Lake herring (cisco)	a, b, d	? Unknown (not captures)
Salvelinus namaycush Lake trout	b, c, f	Uncommon - introduced (10-20 captures)
Oncorhynchus mykiss Rainbow trout	b, f,	Few - introduced (1-10 captures)
Salmo salar Atlantic salmon	a, b, f	Abundant - introduced (More than 50 captures)
Salmo trutta Brown trout	b, f,	Few - introduced (1-10 captures)
S. namaycush x fontinalis Splake (hybrid)	Stocked in 1965	? Unknown - introduced (Not captures)
Osmeridae		
Osmerus mordax Rainbow smelt	a, b	Abundant - introduced (More than 50 captures)
Catostomidae		
Catostomus commersonni White sucker	a, b, d, f	Common (20-50 captures)
Hypentelium nigricans Northern hog sucker	f	Few (1-10 captures)
Cyprinidae		
Nocomis biguttatus Hornyhead chub	d	? Unknown (Not captures)
Notemigonus crysoleucas Golden shiner	a, b, c, f	Common (20-50 captures)

Notropis anogenus Pugnose shiner	e	? Unknown (Not captures)
Notropis atherinoides Emerald shiner	c	? Unknown -introduced (Not captures)
Notropis cornutus Common shiner	a, b, c, d, f	Common (20-50 captures)
Notropis heterodon Blackchin shiner	c, d, e	? Unknown (Not captures)
Notropis heterolepis Blacknose shiner	a, b, c, d, e	Uncommon (10-20 captures)
Notropis rubellus Rosyface shiner	e	? Unknown (Not captures)
Notropis stramineus Sand shiner	a, b, c	Abundant (More than 50 captures)
Notropis texanus Weed shiner	a, b, e	Uncommon (10-20 captures)
Pimephales notatus Bluntnose minnow	a, b, c, d	Abundant (More than 50 captures)
Rhinichthys atratulus Blacknose dace	a, b	? Unknown (Not captures)
Cyprinus carpio Common carp	f	Few (1-10 captures)
Ictaluridae		
Ictalurus natalis Yellow bullhead	a, b, d	Uncommon (10-20 captures)
Ictalurus nebulosus Brown bullhead	a, b	Few (1-10 captures)
Ictalurus punctatus Channel catfish	a, b	Few (1-10 captures)
Ictalurus melas Black bullhead	g	Few (1-10 captures)

Noturus gyrinus Tadpole madtom	a, b, d	Few (1-10 captures)
Umbridae		
Umbra limi Central mudminnow	b, d	Few (1-10 captures)
Esocidae		
Esox lucius Northern pike	b, d, f	Common (20-50 captures)
Esox americanus vermiculatus Grass pickerel	a, b, c, f	Few (1-10 captures)
Fundulus diaphanus menona W. banded killifish	c, d	? Unknown (Not captures)
Percidae		
Etheostoma caeruleum Rainbow darter	a, b, c, d	Uncommon (10-20 captures)
Etheostoma exile Iowa darter	a, b, c, d	Uncommon (10-20 captures)
Etheostoma nigrum Johnny darter	a, b, c, d	Common (20-50 captures)
Etheostoma microperca Least darter	d	? Unknown (Not captures)
Percina caprodes Logperch	a, b, c, d	Abundant (More than 50 captures)
Perca flavescens Yellow perch	a, b, c, d, f	Abundant (More than 50 captures)
Stizostedion vitreum Walleye	d	? Unknown - introduced (Not captures)
Centrarchidae		
Ambloplites rupestris Rock bass	a, b, c, d, f	Abundant (More than 50 captures)

Lepomis cyanellus Green sunfish	a, b, c, d, f	Common (20-50 captures)
Lepomis gibbosus Pumpkinseed sunfish	a, b, e, f	Common (20-50 captures)
Lepomis gulosus Warmouth	a, b, f	Few (1-10 captures)
Lepomis macrochirus Bluegill	a, b, c, d, f	Abundant (More than 50 captures)
Lepomis megalotis Longear sunfish	a, b, d	Few (1-10 captures)
Lepomis spp. Hybrid sunfish	f	Few (1-10 captures)
Micropterus dolomieui Smallmouth bass	a, b, c, d, f	Abundant (More than 50 captures)
Micropterus salmoides Largemouth bass	a, b, c, d, f	Abundant (More than 50 captures)
Pomoxis nigromaculatus Black crappie	b, f	Few - introduced (1-10 captures)
Anthernidae		
Brood silverside sicculus	a, b, c, d	Few - ? Unknown (1-10 captures-Not captures)
Cottidae		
Cottus bairdi Mottled sculpin	a, b, d	Uncommon (10-20 captures)
Gasterosteidae		
Culaea inconstans Brook stickleback	b, c	Few (1-10 captures)
Pungitius Ninespine stickleback		1 record, 1920s

[1]Reference sources:
a,= Michigan State University Museum specimen collected 1974-80.
b,= Captured or observed 1962-79, per W. C. Johnson.
c,= Ichthyology class records 1959-62.
d,= Perry and Brown (1942).

e,= Collected G. P. Cooper, October 18, 1935 (MDNR).
f,= Michigan DNR surveys, 1989.
g,= 1968 MSU Gill net data -- on file at Plainwell.

Compiled by: W. C. Johnson, Kellogg Biological Station.
Updated by: Jim Dexter, MDNR Plainwell

Appendix 2.-Fish stocked in Gull Lake[1] (**A**=adult, **f**=fingerling, **ff**=fall fingerling, no designation=yearling)

Year	Lake trout[2]	Rainbow trout	Atlantic salmon
1965		15,000 **f**	
1966	157 **A**	4,000 **ff**	
1967			
1968		8,000	
1969		8,000 **ff**	
1970	8,100	8,000 **ff**	
1971		12,000	
1972	4,525	10,070	
1973		14,000	
1974	10,000	14,000	2,558 (37 **A**)
1975	10,000		11,366
1976	10,000		29,905
1977	10,000		280 **A**
1978	10,000	22,023	324 **A**
1979	13,700	30,000	
1980	15,000	30,000	
1981		22,000	
1982	10,000	25,000	
1983		30,000	
1984	194 **A**	19,000	
1985		29,900	
1986		7,500	25,356
1987			23,632
1988		6,018	11,956
1989		5,300	23,688
1989		25,000 **ff**	
1990		6,000	25,103

[1]Additional stocking: Bluegill, largemouth bass, yellow perch-1930's and 1940's; emerald shiners-1933 and 1934 (160,000); smelt-1950-1953; splake-1965; brown trout-1964 and 1966.
[2]Lake trout also stocked in 1949, 1957, and 1961.

Last Update: 08/06/02
Web Author: *Tina M. Tincher, Librarian*

Questions, comments and suggestions are always welcome! Send them to
tinchert@michigan.gov