Clear Lake
T23N, R1E, sections 2, 3, 10 and 11
AuSable River Watershed

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Environment

Clear Lake is a glacial lake located in northeast Ogemaw County approximately nine miles north of West Branch, Michigan (Figure 1). The catchment area of the lake is 494 acres and lies within the Au Sable River watershed and borders the Rifle River watershed immediately to the south. The surrounding topography is level with very limited and moderate elevation changes in the immediate vicinity. The soils within the watershed are sandy, excessively drained, and generally unproductive, supporting the mixed pine-oak forest type typical of Michigan's northern Lower Peninsula. The shoreline is 7.05 km in length and is almost entirely composed of upland hardwoods except for a wetland on the south west shore. Development on the southern half of the lake is quite high with over 50 homes and cottages, while the northern half of the lake is sparsely developed. Overall, there are 8.76 dwellings per shoreline km. The entire shoreline of the lake is under private ownership except for a public access site in the southeast corner which is maintained by the DNR Parks and Recreation Division. The access site provides a concrete hard-surfaced boat ramp, in an area of limited water depth where launching and retrieving of largest boats may be difficult and therefore not recommended. The site has eight parking spaces, a public restroom, and a fishing pier/dock.

Clear Lake is a medium-sized lake (Wehrly et al. in Press) with a surface area of 171 acres and a maximum depth of 59 feet. Shallow-water habitat is limited, as 80% of the lake's area is greater than 5 feet deep (Figure 2). A small inlet of less than a mile in length enters the lake from the wetland but the flow rate is negligible. There is no outlet to speak of and the lake should be considered landlocked for management purposes. Data collected by the DNR in 2007 showed a substrate composed of 35% organic, 35% marl, 20% sand, and 5% gravel in shallow parts of the lake, which was consistent with previous observations of the near shore area. Historical descriptions of the deeper water substrates noted that they were comprised primarily of "pulpy peat." Aquatic vegetation in the lake was described as sparse in 1990, with emergent plants comprised of bulrush and pond lilies while the submergent plants were mainly Chara species and large leaf pondweed. Since 2002, the Michigan Department of Environmental Quality has regularly issued a permit (Pesticide Application to Surface Waters of the State of Michigan) to treat Clear Lake for invasive Eurasian watermilfoil. Recent permits have been issued to a state license applicator on behalf of the Clear Lake Association to treat the lake for invasive plants. The permits have authorized just under 5 acres of the lake (2.9% of the total surface area) to be treated per year.

Water quality conditions have not been comprehensively evaluated since August 1961 with only visual observations recorded during subsequent fish surveys. Water color was described as "clear" with a secchi depth (measure of clarity) recording of 18 ft and 13.5 ft in 1961 and 1990, respectively. These are considered to be high clarity values. In 1961 alkalinity was measured from 77 ppm on the bottom to 100 ppm at the surface with a pH range from 7.4 to 8.0 indicating that the water was moderately hard and buffered. Water temperatures taken at the time also show that the lake stratifies during the summer with the thermocline located from 25 to 30 ft. Summer dissolved oxygen levels above the

thermocline are adequate for fish survival but below the thermocline dissolved oxygen levels dropped in some measurements to 0.0 ppm which would not support fish. Based on subsequent observations, it is believed that water quality conditions have not changed much since 1961 and are high enough quality with moderate productivity to provide an environment suitable for a cool to warm water fishery.

History

Stocking

Most fish stocking in Clear Lake has been conducted by the State of Michigan. The first stocking record for Clear Lake dates to 1874, however, consistent stocking and management of the lake did not begin in earnest until 1933. The state stocked varying numbers of Bluegill, Yellow Perch, Walleye as well as Smallmouth and Largemouth bass annually from 1933 to 1941. This type of stocking was common for the pre-World War II era when a fledgling Fish Division of the Michigan Department of Conservation raised and stocked various fish species haphazardly around the state. Subsequent surveys documented that these species persisted in the lake. Rainbow Trout were stocked in 1961 and 1971 in an attempt to establish a two story fishery with the previously established cool to warm water species inhabiting the shallow areas of the lake and trout in the deeper off shore environments. By all accounts these stockings failed to produce an acceptable trout fishery.

Beginning in 1990, the state began stocking fingerling Walleye, and that effort continues through today (Table 1). Spring fingerlings were stocked 12 times at an average rate of 120 fish per acre; however the most recent stocking events in 2014 and 2016 were at significantly higher rates (206 and 277 fish per acre, respectively). Fall fish were stocked in 1994 and 1995 at 20 fish per acre. The higher spring stocking rates in recent year is because of a general belief that survival rate is relatively poor due to competition with other species at young ages or predation. Overall these Walleye stockings have and continue to provide fishing opportunities in Clear Lake.

A small amount of fish stocking has been done by private individuals. Between 2007 and 2012, five private stocking efforts of yearling and adult Bluegill were authorized by the DNR under a series of Public Waters Stocking Permits issued to the Clear Lake Association of riparian owners (Table 1). Fish were stocked at a rate of 5 fish per acre.

Surveys

Clear Lake was first surveyed in 1938 with seines and experimental gill nets fished simultaneously. The effort revealed a fish community composed of Yellow Perch, Bluegill, Pumpkinseed Sunfish, Largemouth Bass, Smallmouth Bass, Northern Pike, White Suckers and Yellow Bullhead. Observations at the time also identified Iowa Darters and Bluntnose Minnows as available forage fishes. After this initial effort, Clear Lake has been surveyed 12 times from 1942 until present for various reasons. The earliest surveys were done to assess the success of stocking warm water fishes in the 1930s and 1940s. A comprehensive survey was completed in 1961 and 1962 which recorded physical, chemical, as well as biological characteristics of the lake, including temperature and dissolved oxygen profiles throughout the water column. Gill nets were used in both 1961 and 1971 to evaluate the earlier trout stocking efforts. No trout were found in either survey and it was suggested that predation by Northern Pike and Largemouth and Smallmouth bass probably caused the stocking

efforts to fail. Other fish sampled in these surveys indicated a community similar to that documented earlier, with the addition of Brown Bullhead, Black Crappie, and Golden Shiners.

The lake was surveyed three times in the 1990s in attempts of evaluating the Walleye stocking efforts that were initiated that decade by MDNR. Again the fish community was composed of the same species as earlier surveys. This effort documented at that time that predator growth was slow while panfish grew above the state average for each species. The Brown Bullhead population was described as being relatively abundant. Baitfish populations were noted as low with shiners contributing the most. Good spawning gravel bars were recorded for Largemouth and Smallmouth bass as well as for Walleye but vegetated nearshore habitat for Northern Pike spawning was described as limited.

Master Angler Program

There have been eight fish caught from Clear Lake that were entered in the DNR's Master Angler Award program over the years including: 1 Largemouth Bass; 1 Channel Catfish; 2 Pumpkinseed Sunfish; and 4 Bluegills.

Current Status

In 2007, a Status and Trends survey was conducted on Clear Lake. This survey was completed using a standard sampling protocol where the aquatic community is examined and sampling effort is based on lake size (Wehrly et al. in Press). Survey effort included 2 maxi-mini fyke nets, 6 fyke nets, 4 trap nets, 3 gill net sets, and 3 15-minute boat electrofishing transects. The catch summary showed acceptable predator populations of Smallmouth Bass and Walleye in size ranges preferred by recreational anglers (tables 2 and 3). Additionally, Largemouth Bass and Northern Pike were available, but in limited numbers. The most abundant forage species was the Sand Shiner, with the surveys indicating a strong population of 2-3 inch fish available to support the lake's bass and Walleye. Growth rates had changed from the 1990 survey with bass and Walleye now exceeding the statewide average for each species. Pike exhibited good growth at the young age classes but growth slowed as the fish aged and outgrew the available Sand Shiner forage base. Overall, Northern Pike exhibited growth rates within an inch of the state average. Bluegill and other panfish were abundant and growing slightly slower than the statewide average. Brown Bullhead and to a lesser extent Yellow Bullhead were common but not overabundant in the lake, with almost 75% of the fish surveyed exceeding 11 inches and several fish surpassing Michigan's Master Angler minimum standard. Overall the fish assemblage, abundance, and growth rates in 2007 indicated a heathy system and a fish community typical to many of the medium-sized inland lakes of northern Michigan.

In the fall of 2014, a Walleye stocking assessment survey was conducted and the entire shoreline was electroshocked during nighttime hours. Thirty-one Walleye were collected and all fish were either age 0 or age 2 (both from stocking years). Age 0 Walleye from the 2014 stocking were 5 to 8 inches long, while age 2 Walleye were near 16 inches in length. The conclusion in 2014 was that post-stocking survival of Walleye in Clear Lake was adequate and that stocking spring fingerlings in alternate years should be continued.

As of this report's completion in 2017, no bass fishing tournaments have been registered on Clear Lake in the DNRs Fishing Tournament Information System. However, 2016 was the first year that mandatory registration of bass tournaments was required by the state.

In 2016, a Clear Lake riparian owner reported a "bad zebra mussel infestation." This was the first time zebra mussels appear in the lake's file and follow up data were not available. However, a "bad infestation" would indicate that the mussels had been in the lake for some time and none were noted in surveys as recent as 2014. Zebra mussel presence in Clear Lake would not be surprising given the public boat launch and the mussel's common occurrence in other lakes in the Northeast Lower Peninsula.

Analysis and Discussion

Failed attempts at stocking trout in the 1960s and 1970s, coupled with the presence of Northern Pike and low dissolved oxygen readings in late summer below the thermocline, indicate that Clear Lake has not and will not support a two story fishery.

Walleye stocking efforts that began in 1990 and continued regularly until the present have and continue to provide fishing opportunities in Clear Lake.

The small private stocking efforts of Bluegill by the Clear Lake Association between 2007 and 2012 were probably not needed, as the 2007 survey showed adequate Bluegill spawning stock biomass and growth rates slightly below the statewide average. However, at a stocking rate of just over 5 fish per acre, these small scale stocking efforts likely did not influence overall bluegill size structure and fish community composition in the lake. Since these efforts were citizen-driven by the local lake association they might have helped facilitate stewardship on the lake by riparian owners responsible for the stocking.

All recent surveys showed good populations of catchable-sized Brown and Yellow bullhead. Typically, bullheads are a resource that is underutilized by the recreational community. Promoting angling for these fish as a fun, easy, and family-friendly means to getting people involved in fishing is advised.

Management Direction

1) The lake should be continued to be managed for a mixed cool to warm water fish assemblage with the prominent sportfish consisting of Largemouth Bass, Smallmouth Bass, Northern Pike, Walleye, and panfish species.

2) The continued biennial stocking of fingerling Walleye at annual rates within or slightly above state guidelines is advised in order to support the fishery and supplement any natural reproduction that may occur in the lake. Periodically, a fall survey should be conducted to assess the survival of spring fingerling stocking efforts and determine if survival continues to meet or exceed expectations. Additionally, walleye stocking levels should be periodically evaluated against angler satisfaction in the panfish populations to ensure an acceptable predator-prey balance in the lake.

3) Fisheries managers should continue to consult with the Clear Lake Association on any private stocking efforts planned in the future. While private stocking events such as those that occurred between 2007 and 2012 are low risk, Fisheries Division should be consulted to ensure that all stocking efforts are aligned with current knowledge and management direction.

4) Independent verification that zebra mussel presence and abundance in Clear Lake and evaluating the extent of their impact might be warranted. A future status and trends survey could be utilized to evaluate changes in the lake since the last survey in 2007 and determine if the introduction of zebra mussels requires an adjustment in Management direction.

References

Wehrly, K.E., G.S. Carter, and J.E. Breck. (in press) Standardized sampling methods for the inland lakes status and trends program. Michigan Department of Natural Resources, Fisheries Special Report, Ann Arbor.

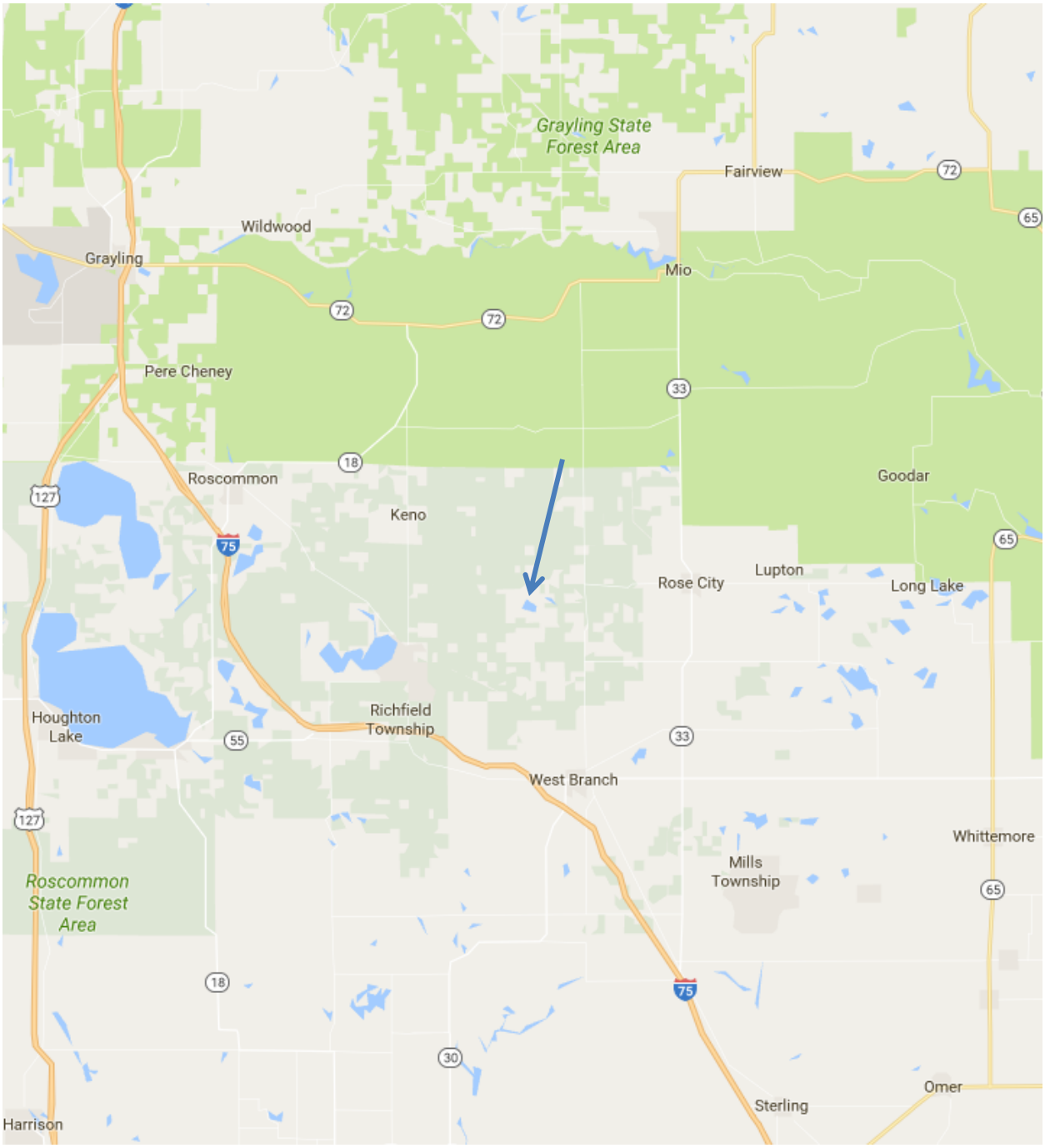

Figure 1. Arrow indicates the location of Clear Lake in the Northcentral Lower Peninsula.

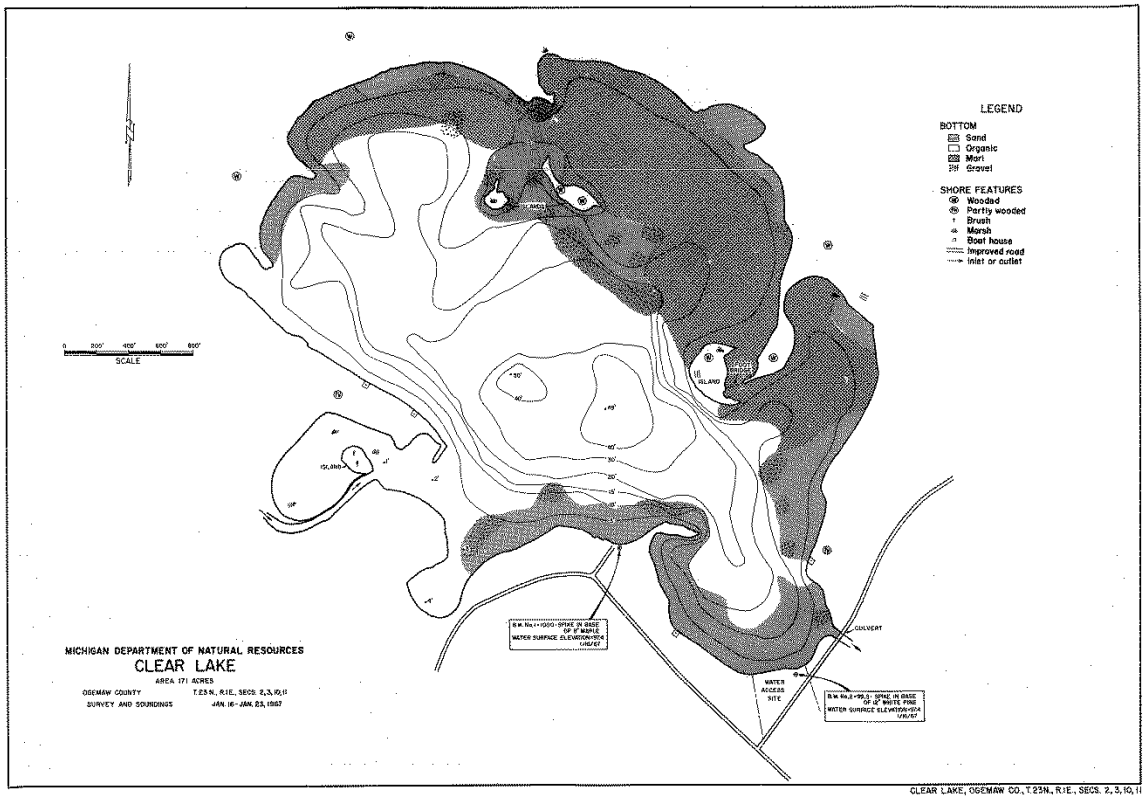

Figure 1. Clear Lake shape and bathymetry.

Table 1.-Stocking history for Clear Lake, Ogemaw County, 1990-present.

Year	Species	Number	Size	Operation/Source
1990	Walleye	13,230	Spring fingerlings	DNR
1992	Walleye	9,139	Spring fingerlings	DNR
1994	Walleye	2,050	Fall fingerlings	DNR
1995	Walleye	4,965	Fall fingerlings	DNR
1999	Walleye	17,270	Spring fingerlings	DNR
2003	Walleye	10,000	Spring fingerlings	DNR
2006	Walleye	19,071	Spring fingerlings	DNR
2007	Bluegill	1,600	3 to 5 in	Private
2008	Bluegill	1,004	3.5 in	Private
2009	Walleye	18,739	Spring fingerlings	DNR
2009	Bluegill	900	6 in	Private
2010	Walleye	25,561	Spring fingerlings	DNR
2011	Bluegill	1,300	6 in	Private
2012	Bluegill	600	6 in	Private
2012	Walleye	19,119	Spring fingerlings	DNR
2014	Walleye	11,456	Spring fingerlings	DNR
2014	Walleye	35,183	Spring fingerlings	DNR
2016	Walleye	47,307	Spring fingerlings	DNR

Table 2.-Species catch and relative abundance of fishes (without sand shiners) collected during the 2007 Clear Lake Status and Trends fish community survey. Weight is estimates from statewide length-weight relationships.

Species*	Number	Percent by number	Weight (lb.)	Percent by weight	Length range (in.)	Percent Legal or Acceptable for Angling
Bluegill	217	41.7	37.9	12.2	2.0 – 9.7	41
Rock Bass	81	15.6	22.1	7.1	2.5 – 10.1	60
Smallmouth Bass	52	10.0	71.5	23.0	3.3 – 18.6	54
Brown Bullhead	44	8.5	34.4	11.1	8.0 – 14.3	100
Walleye	26	4.8	43.0	13.9	9.2 – 23.5	69
Northern Pike	21	4.0	45.6	14.6	12.5 – 30.0	14
Largemouth Bass	20	3.8	14.7	4.7	3.1 – 16.2	20
Yellow Perch	16	3.1	1.0	<1	3.0 – 9.1	6
Pumpkinseed	15	2.9	4.2	1.3	3.5 – 8.9	67
White Sucker	12	2.3	31.4	10.0	16.4 – 20.1	100
Yellow Bullhead	7	1.3	4.9	1.6	9.8 – 12.0	100
Bluntnose Minnow	7	1.3	0.1	<1	2.0 – 3.0	NA
Black Crappie	1	<1	0.5	<1	9.1 – 9.1	100
Golden Shiner	1	<1	0.1	<1	5.7 – 5.7	NA
TOTAL	**520**		**311.3**			

*Additionally, there were 4,000 Sand Shiners surveyed weighing 28.6 pounds.

Table 3.-Length-frequency distribution of popular game fishes collected during the spring 2007 Status and Trends survey at Clear Lake conducted by the DNR.

Length (in)	BLG/ PSF	SMB/LMB Bass	Walleye	Northern Pike	Yellow/Brown Bullhead
1					
2	10				
3	34	8			
4	24	2			
5	66	1			
6	41	3			
7	24	3			
8	21	5			2
9	12	6	4		2
10		3	4		9
11		4			17
12		3		1	15
13		2		3	4
14		8		1	2
15		9	3		
16		6	1	1	
17		6	1	1	
18		3	6	1	
19			2	1	
20			2	1	
21			2	2	
22				3	
23			1	3	
24					
25				1	
26					
27					
28					
29				1	
30				1	

BLG = Bluegill, PSF = Pumpkinseed Sunfish, SMB = Smallmouth Bass, LMB=Largemouth Bass