

CLEAR LAKE

Jackson County (T1 and 2S, R2E, Sections 1,2,35, and 36)
Surveyed June 1995

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Environment

Clear Lake is located in extreme eastern Jackson County, less than 1 mile from the Washtenaw County line. The small community of Waterloo is less than 2 miles to the north and the City of Jackson is approximately 12 miles to the southwest ([Figure 1](#)). This lake, in the Waterloo Recreation Area, is surrounded by rolling, tree-covered hills. Clear Lake is included in the Upper Grand River watershed and was mapped in 1944 by the Michigan Department of Conservation. Permanent homes and cottages now surround nearly 75% of the shoreline. A county park on the western shore offers swimming, shore fishing and carry-on boat access, but there is no public boat launch. Clear Lake spans 136 acres and has one major basin with a maximum depth of 34 feet ([Figure 2](#)). Basin substrates are composed mainly of marl, with lesser amounts of sand and fibrous peat. There are no large inlets and spring-flow from the surrounding hills maintains the lake water level. Water exits the lake through a small outlet along the northern shore. A concrete sill at this site helps to maintain the water level in the lake.

In 1944, an inventory of aquatic plants was conducted. *Chara sp.*, a macro-algae, was found to be the most common plant in the lake. Lily pads, bulrushes, pondweeds and many other plant species common to area lakes were also found. Based on observations made during the 1991 and 1995 surveys, the aquatic plant community of Clear Lake has remained relatively unchanged.

History

The first scientific survey of Clear lake was conducted in 1890. Captured in gill nets were bluegill, perch [yellow], sunfish [pumpkinseed], and "big mouth bass" [largemouth bass]. Bluegills were reported to be large, and perch and bass to be small but very plump and "hard." The stocking of "eels" [American eels, very popular at the time] and "black bass" [smallmouth bass] was recommended because none were present.

The next recorded inventory of biological and physical features of Clear Lake occurred in 1936. At that time, there were numerous cottages, a few resorts and at least one boat livery. Even at that time, summer fishing pressure was reported as "heavy" and the lake had a good fishing reputation. During the 1936 study, a rather typical collection of warmwater fish was observed that included bluegill, largemouth bass, yellow perch, pumpkinseed, rock bass, green sunfish, mud pickerel, black crappie, brown and yellow bullheads, as well as a variety of shiners, darters and minnows.

Data on fishing pressure and catch were collected during the winters of 1935-36, 1936-37, 1937-38 and 1938-39, and also during the summer of 1939 (Hazzard and Eschmeyer 1938; Clark 1939 and 1940). Clear Lake received relatively heavy fishing pressure compared to other lakes in the Waterloo area. Winter catch rates varied from 0.7 to 1.0 fish/hour and 9.1 to 28.3 fish/acre, composed primarily of yellow perch, bluegill and black crappie. Catch rate for the summer of 1939 was 1.9 fish/hour and 136 fish/acre, composed primarily of bluegill, pumpkinseed, yellow perch, and largemouth bass. Some northern pike were caught.

Stocking records show that Clear Lake was planted with bluegills, bass, and yellow perch several times between 1937 and 1946. This was a common practice in public waters until fishery research showed that such stocking was unnecessary and uneconomical. In 1946, approximately 3000 fingerling smallmouth bass were stocked. Sandy shoals with fair amounts of gravel led to expectations of smallmouth bass reproduction. Apparently similar considerations were made when walleye fry were stocked from 1951 through 1955. Subsequent surveys and fishing reports indicate that neither of these species survived.

A more detailed fish survey of Clear Lake was conducted in 1956. Trap nets, gill nets, and seines were used in an effort to fully evaluate the fish population. The same species were found with the addition bowfin (dogfish). The growth rates of game fish captured in 1956 were analyzed using fish scales. Average growth rates for most species were found to be below state averages. Yet, pumpkinseed, yellow perch, and rock bass appeared to be growing above state average rates.

Another fish survey in 1961 resulted in the capture of nearly 4,400 fish. During this survey, a 1600-foot long seine was used to sample approximately 10 acres of the lake. Once again, growth rates were poor. Bluegills and black crappie were found to be growing an inch or more below state average growth rates. Largemouth bass and northern pike were growing more than 2 inches below state averages. Only pumpkinseed sunfish and yellow perch were growing at average rates. The largest bluegill captured during that survey was 7.3 inches long.

A survey in 1971 using gill, fyke and trap nets again captured many fish, but of relatively small size. Growth was not analyzed, but observers reported that bluegills appeared "stunted" while pumpkinseeds were in fair condition. The average size of the pumpkinseed catch was 5.9 inches, which was nearly 0.5 inch above the bluegill average size.

In 1985, another intensive survey of the fish population indicated that growth trends over time were very stable and, in general, well below state averages. The average growth rates for bluegills and crappie were well below state growth rates. Some larger bluegills were captured in this survey (up to 8.3 inches), but they were found to be old fish. In fact, over 71% of scale-sampled bluegills were 5 years old or older. After the 1985 study, it was concluded that fish were growing slower, but surviving longer than in other comparable lakes. This resulted in a fair to good panfish fishery. Pumpkinseeds

once again sported a larger average size than bluegills. Fishing pressure remained "intense" during that period with many reports of limit catches of bluegills in the first few weeks of the 1985/86 ice fishery.

Because pumpkinseed sunfish have consistently exhibited good growth and condition in Clear Lake, redear sunfish were stocked in 1987. Redear usually do well in clear, marl bottom lakes. Snails are a preferred food item of both pumpkinseed and redear. However, unlike pumpkinseed sunfish, redears grow to much larger sizes and exceed 12 inches in some Michigan lakes.

Smallmouth bass were stocked in Clear Lake in 1987 at the request of Clear Lake riparians who remembered having some success in catching smallmouth after they were stocked by the DNR in 1946. An experiment to raise smallmouth bass in nearby Portage Creek Pond was all but a failure. The entire annual production of 415 smallmouth bass fingerlings was stocked in Clear Lake. Shortly after draining the Portage Creek Pond in 1987, the dam was inspected and determined to be unsafe. Because the cost of repairing the dam was prohibitive, the pond was abandoned.

Another fishery survey using trap nets and gill nets was conducted in 1991 with the goal of evaluating the recent redear and smallmouth bass plants as well as reviewing the status of the existing fishery (Towns 1991). Bluegills caught in trap nets averaged 6.5 inches and 73% were large enough (>6 inches) to be considered as "keeper size" by most anglers. However, most of the bluegills appeared thin and in rather poor condition. Bluegill growth dynamics were again analyzed using fish scales. As with all past surveys, bluegill growth was about 1 inch below the state average rate.

This survey resulted in a fair catch of pumpkinseeds which averaged 6.6 inches. Historically, this species has exhibited better growth rates and larger average sizes than bluegills in Clear Lake and the results of the 1991 survey are no exception. Nineteen catfish ranging in size from 22 to 26 inches were caught in trap nets during this survey. They were completely unexpected since we had no prior knowledge of their introduction. It was later learned that one lake resident had stocked approximately 100 channel catfish sometime in the mid-1980's. Pectoral spines were taken from several of the catfish for the purpose of aging them and most were 7 years old and appeared very healthy and in excellent condition.

Only two smallmouth bass were captured during this survey. Both smallmouth were over 12 inches and are likely the result of the 1987 fingerling plant from Portage Creek Pond. Apparently, smallmouth bass did not survive well or reproduce in Clear Lake because smallmouth habitat is a limiting factor.

Redear sunfish proved to be a good addition to the fishery. Over 70 redear sunfish were captured and they averaged an impressive 8.4 inches. A local angler reported catching about 30 redear this size from shallow water nests a few days prior to the 1991 survey. Many active redear sunfish nests were observed in several shallow water areas of Clear Lake during this survey.

Fishery Resource

Clear Lake was last surveyed in early June of 1995 with four standard trap nets (8 x 5 x 3-foot, 1.5-inch mesh) and two experimental gill nets (125-feet long, six mesh panels). All of the nets were fished for 1 night. Gamefish species captured during this survey in descending order of abundance included bluegill, redear sunfish, largemouth bass, rock bass, bullhead, pumpkinseed sunfish, black crappie, and yellow perch (Tables 1a and 1b). Data on growth and age composition of gamefish are summarized in tables 2 and 3.

Bluegills comprised 56% of all fish caught in trap nets and they averaged 5.8 inches. Out of 361 bluegills caught in trap nets, only 35% were over 6 inches long (Table 1a). Based on growth analysis using fish scales, bluegills caught in trap and gill nets during the 1995 survey exhibited growth rates that were approximately 1 inch below the state average (Table 2).

Generally, few largemouth bass are captured with trap and gill nets. However, 29 were caught during the 1995 survey and they averaged nearly 12 inches. Only 17% were over 14 inches, suggesting that legal-size bass are probably significantly reduced by angler harvest from this lake. The slow growth of largemouth bass in Clear Lake is not surprising and is quite typical of similar lakes in the Jackson fisheries district.

Pumpkinseeds caught in trap nets averaged nearly 7 inches and over 80% of them were at least 6 inches or "keeper" size. Fish scale analysis showed that pumpkinseed growth was near the state average.

Evaluation of redear sunfish natural reproduction was a major objective of the 1995 survey of Clear Lake. The survival of redears to adult spawning size was evident during the 1991 survey of this lake when redears were observed on nests. Results of the 1995 survey show that redear sunfish natural reproduction has been highly successful in Clear Lake. Five year classes of naturally reproduced redears presently exist in this lake (Table 2). Although survival and natural reproduction had been very good, redear growth was quite poor over 1 inch below the state average for this species. Growth evaluation of redears was not possible prior to this survey since redears are a relatively recent introduction in Michigan waters and baseline growth data was not previously available. Based on the past history of slow panfish growth in this lake, it is likely that redear growth was somewhat below average in 1991 also. As was true of bluegill and pumpkinseed sunfish, redears captured during the 1995 survey exhibit their poorest growth trends in their earlier years, suggesting that there was intense competition for food resources at that time of their life. As these species attained larger sizes, growth markedly improved. Even though redears were somewhat slow-growing, they were not emaciated and appeared to be in relatively good condition.

Analysis

Bluegills are targeted for sampling in inland lakes because of their role in determining fish community structure and overall sportfishing quality (Schneider 1981). Even though the goal of the lake surveys is to sample all fish species and all sizes present, many times the bluegill population is the only one adequately sampled because bluegills are typically the most abundant fish. Recently, a ranking system has been developed that allows fish managers to get an idea of the relative quality of a lake's fish population (Schneider 1990). On a scale of 1 to 7, the quality of the bluegill population in Clear Lake based on the trap net catch was calculated as 2.5 or marginally "acceptable".

Survey records show that species composition has remained quite constant in Clear Lake (with the noted exceptions of stocked channel catfish and redear sunfish) since the intensive survey in 1956, and probably since the first survey in 1890. Growth of bluegill, pumpkinseed, largemouth bass and rock bass has also remained remarkably consistent, although generally poor over this time period. Age composition and survival characteristics of the species listed in Table 2 appear to be normal based on scale sample frequencies.

Clear Lake supports a varied, although slow-growing fish community. Despite slow growth and an only mediocre sport fishery, this lake produces significant recreational fishing opportunities and plenty of fish for the table. The one-time stocking of redear sunfish has been successful and several anglers have reported catching these large panfish. Although somewhat slow-growing, redears have survived well in Clear Lake and a significant number of redears exceeding 10 inches were captured in trap nets during the 1995 survey. The goal of a trophy panfish fishery has been achieved and it appears that the redear population has become and will remain self-sustaining. Channel catfish introduced by a Clear Lake riparian in the mid-1980's have survived and grown remarkably well as evidenced by the channel catfish catch during the 1991 survey. Although no channel cats were captured during the 1995 survey, those observed in 1991 were already 7 years old and have likely succumbed to old age. Continued stocking of this species may benefit slow-growing panfish populations.

Management Direction

Future management should be aimed at encouraging predators to improve the growth and size of panfish. Largemouth bass are one of the main panfish predators which presently exist in Clear Lake, but they are very desirable sport fish and are often targeted by anglers who harvest fish. Because channel catfish are probably caught less frequently than largemouth bass and are long lived, stocked channel catfish would likely become more effective predators on small panfish. Recent research has shown that stocked catfish less than 8 inches are heavily preyed upon by largemouth bass (Storck 1988). The one-time introduction of large (6-8 inch) channel catfish fingerlings in Clear Lake resulted in very good survival and growth of this species. Therefore, large channel catfish fingerlings are recommended for stocking in Clear Lake at the rate of 10/acre for a minimum of 3 years whenever fingerlings become available. The installation of

channel catfish spawning structures in Clear Lake is also recommended with the hope of eventually creating a self-sustaining channel catfish population. Based on the surface acreage of Clear Lake, approximately 20 spawning receptacles (milk cans, nail kegs or earthenware crocks) should be placed in 5-7 feet of water for this purpose.

Clear Lake presently supports good populations of bluegill, redear, rock bass and largemouth bass for angling and anglers are generally satisfied with the existing fishery. Even though most fish caught by Clear Lake anglers are not large, they are quite abundant and provide significant angling opportunity for many anglers. Other than channel catfish fingerling introductions, no other fishery management is recommended at this time. Natural reproduction, growth and survival of redears and channel catfish should be monitored with another general fishery survey in the spring of the year 2000.

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Table 1a. Number, weight and length indices of fish collected from Clear Lake with trap nets, June 8, 1995.

Species	Number	Percent by number	Weight (pounds)	Percent by weight	Length range (inches) ¹	Average length	Percent legal size ²
Bluegill	361	55.1	49.1	29.0	4-7	5.8	35
Redear sunfish	228	35.0	100.0	58.2	5-10	8.1	92
Pumpkinseed	18	3.0	4.8	3.0	5-7	6.8	83
Black crappie	3	0.5	0.6	0.4	5-9	6.8	33
Rock bass	12	2.0	3.7	2.0	5-8	7.3	75
Yellow bullhead	6	1.0	2.4	1.0	8-10	9.3	100
Green sunfish	7	1.0	1.1	1.0	5-6	6.1	57
Hybrid sunfish	11	2.0	1.8	1.0	4-7	6.0	45
Bowfin	1	0.2	5.2	3.0	24.5	24.5	--
Largemouth bass	1	0.2	2.4	1.4	16.5	16.5	100
Total	648	100.0	171.1	100.0			

¹Note: some fish were measured to 0.1 inch, others to inch group: eg., "5" = 5.0 to 5.9 inches, "12" = 12.0 to 12.9 inches, etc.

²Percent legal size or acceptable for angling.

Table 1b. Number, weight and length indices of fish collected from Clear Lake with gill nets, June 8, 1995.

Species	Number	Percent by number	Weight (pounds)	Percent by weight	Length range (inches) ¹	Average length	Percent legal size ²
Largemouth bass	28	28.0	24.5	43.8	8-16	11.7	14
Bluegill	12	12.0	2.2	4.0	4-7	6.2	58
Black crappie	9	9.0	3.7	7.0	4-9	8.8	89
Yellow perch	1	1.0	0.2	0.1	7.4	7.4	100
Redear sunfish	8	8.0	3.4	6.0	5-9	8.1	88
Yellow bullhead	16	16.0	8.3	15.0	9-11	10.3	100

Brown bullhead	5	5.0	2.5	4.0	9-11	10.1	100
Green sunfish	1	1.0	0.2	0.1	6.5	6.5	100
Rock bass	17	17.0	3.7	7.0	5-7	6.6	65
Bowfin	3	3.0	7.1	13.0	18-19	18.8	--
Total	100	100.0	55.8	100.0			

¹Note: some fish were measured to 0.1 inch, others to inch group: eg., "5" = 5.0 to 5.9 inches, "12" = 12.0 to 12.9 inches, etc.

²Percent legal size or acceptable for angling.

Table 2. Average total length (inches) at age, and growth relative to the state average, for five species of fish sampled from Clear Lake with trap and gill nets, June 8, 1995. Number of fish aged is given in parentheses.

Species	Age								Mean Growth Index ¹	
	I	II	III	IV	V	VI	VII	VIII		
Bluegill			4.5 (7)	4.9 (9)	6.3 (15)	6.9 (13)				-0.8
Largemouth bass			9.5 (4)	10.9 (12)	12.7 (8)	12.3 (2)				-1.0
Redear sunfish			5.0 (1)	6.1 (20)	7.9 (28)	9.5 (4)	10.0 (13)	10.0 (3)		-1.2
Rock bass				5.4 (4)	6.3 (13)	7.2 (8)	7.8 (2)	7.8 (2)		-0.9
Black crappie	4.6 (1)	5.1 (2)		9.3 (9)						+0.4

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

Table 3. Estimated age frequency (percent) of five species of fish caught from Clear Lake with trap and gill nets, June 8, 1995.

Species	Age									Number caught
	I	II	III	IV	V	VI	VII	VIII	IX	
Bluegill			11	51	38					373
Largemouth bass			15	46	31	8				26
Redear sunfish			1	29	36	8	21	5		236
Rock bass				14	45	27	7	7		29
Pumpkinseed				17	11	33	33	6		18

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