Cedar Lake

Leelanau County
Last surveyed 2014

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Environment

Cedar Lake (Figure 1) is 252 acres in size and is located near Greilickville in the south-east corner of Leelanau County, approximately one mile north of Traverse City. A long and narrow lake, Cedar Lake is located just inland from the southern tip of West Grand Traverse Bay (Figure 2). Public access is provided by the Michigan Department of Natural Resources (MDNR) on the south end of the lake. This site is located off East Cherry Bend Road and has a concrete boat launch with parking for 15 vehicles. Most of the land at the north end of Cedar Lake is part of the De Young Natural Area which has a public fishing pier. Access to this fishing pier is also off Cherry Bend Road. The site features a large historic barn with a parking area that connects to a newly built 6 foot wide and 480 foot long boardwalk leading to the pier or viewing platform (Leelanau Conservancy 2014). The boardwalk and platform meet universal access standards.

Cedar Lake has one outlet that flows east out of the lake and empties into Grand Traverse Bay. A control structure on the channel immediately downstream of the M22 road crossing regulates the water level of Cedar Lake. This is a fixed-height structure that the lake association monitors but does not adjust. Several fish species identified in the lake such as Muskellunge, Rainbow Smelt, and Splake are presumed to have migrated from Lake Michigan via the outlet channel into Cedar Lake. There are also four inlets on Cedar Lake; a small unnamed stream located on the north side of the lake, and a small unnamed stream located on the south side of the lake. Hines Creek is a small stream that flows into Cedar Lake along the southwestern shore. Cedar Creek is the largest inlet and enters from the west side. Cedar Creek is a Type 1 trout stream and is likely the source of the adult trout in Cedar Lake. In the past Brown Trout were stocked by the MDNR and provided a viable fishery (Table 1), however stocking was discontinued when angler's desired a more "diverse fishery" (Fisheries Division files). Trout caught today are of wild origin from the tributaries of Cedar Lake or potentially migrants from Lake Michigan.

The substrate of Cedar Lake is composed primarily of sand and marl which is typical for most lakes in Leelanau County. It has several deep break-lines along the south, southwest, and east shoreline while the drop-off is more gradual on the north end of the lake. On the south end of the lake, just north of the boat launch, there is a 45-foot hole which is the deepest spot in the lake. The majority of the lake is less than 25 feet deep, especially on the north end. Aquatic vegetation is typical for a lake of this size and is found at all depths.

The land around Cedar Lake is mostly lowland swamp with a few developed residential areas. The south shore is mostly developed and the northwest shoreline, including the De Young Natural Area (Leelanau Conservancy 2014) with nearly a mile of undeveloped shoreline. The De Young Natural Area was purchased by the Leelanau Conservancy in 2006 and is considered vital to the overall water quality and health of Cedar Lake.

History

Fish stocking in Cedar Lake began in 1897, and stocking in the adjacent tributaries began in 1896 (Table 2). The Michigan Department of Conservation (MDOC) first stocked Cedar Creek with Brook Trout and Cedar Lake with Walleye. While the stocking of Cedar Creek remained exclusively Brook Trout during the six years it was stocked, a variety of species such as Walleye, Bluegill, Largemouth Bass, Brown Trout, and Rainbow Trout were also stocked into Cedar Lake. No fish have been stocked in Cedar Lake since the last stocking of Rainbow Trout in 1964.

The first documented survey of Cedar Lake was a lake and stream survey with water analysis conducted in 1948 by the Michigan Department of Conservation in cooperation with the University of Michigan. At this time they found that the lake was deep and supported a Rainbow Smelt population which was reported by anglers. Local anglers also believed Cedar Lake could possibly provide trout fishing. The maximum depth recorded in the survey was 40 feet supporting the idea that trout could survive in the lake.

In a 1952 survey, MDOC staff found a new maximum depth of 47 feet, enhancing the possibilities for trout. The survey also documented the presence of 10 cottages on Cedar Lake at that time. Fishing reports were good for a variety of species including Yellow Perch, Bluegill, sunfish, Black Bass, Rock Bass, Rainbow Smelt, Brook Trout, Rainbow Trout, suckers, Northern Pike, Muskellunge, and chubs.

By 1954 the number of cottages had increased to 30, but the lake continued to sustain superior water quality and good fishing opportunities. At this time the MDOC stocked 5,000 Brown Trout ranging between 8 and 8.5 inches, and recommended annual planting of adult Brown Trout each fall for a 3 year trial period. A partial survey was conducted that found stunted Yellow Perch and Bluegill were present. Fishing for Rainbow Smelt was reported to be very good, and the lake was known for its Muskellunge and bass fishing.

In 1956 a local Boy Scout troop conducted a creel survey on Cedar Lake and documented a total of 81 trout harvested. Many anglers had reported good catches of fish, with the largest Brown Trout caught reported as 18 inches in length, and the smallest Brown Trout caught being 8 inches. In 1957 a Muskellunge 37.5 inches long and weighing 14 ¼ pounds was caught and determined to be approximately 6 years old. In 1959 Cedar Lake was reclassified as a designated trout lake by the MDOC; however this designation was removed in 1961 to increase angler opportunities.

In 1964 Cedar Lake was scheduled to be treated with the fish toxin, toxaphene, to reduce competition and focus on the trout fishery. Due to the possibility of killing desirable fish and the negative public reaction to the treatment the MDOC biologists decided to cancel the treatment. Subsequently all further management plans were cancelled and Cedar Lake was left to return to its natural state of self-sustaining fish populations.

The lake was not surveyed again until 1995. Small mesh fyke nets, large mesh fyke nets, and inland gill nets were set and collected an abundance of Bluegill that averaged 5.5 inches with 25% of those at 6 inches or longer, which is generally considered an acceptable size for anglers. Pumpkinseed Sunfish were also collected in healthy numbers and ranged in size up to 8 inches. Age and growth analysis indicated both species were growing below state average. Twenty one Yellow Perch were collected and average length was 6.5 inches. Rock Bass were abundant in the survey with fish up to 10 inches in

length collected. Bass numbers were also strong, however, age and growth analysis indicated below the state average growth. Northern Pike, bullhead, White Sucker, Brown Trout, and Rainbow Smelt were also collected in small numbers. Muskellunge were not observed in this survey, but anglers report occasionally catching them in Cedar Lake.

The Grand Traverse Overall Supply Company was located along the shore of the Cedar Lake Outlet for over 20 years, and had discharged dry cleaning and laundry wastewaters to a dry well or to a series of lagoons adjacent to the outlet channel. Cedar Lake was investigated by the DNR Water Quality Division (now part of the Department of Environmental Quality (DEQ)) in 1978 due to concerns that discharged wastewaters had damaged the indigenous aquatic plant and animal communities within the outlet (Evans 1979). As a result, a number of wells in the area were found to be contaminated with perchloroethylene and trichloroethylene. Seven sampling stations were used to collect benthic fauna using a Petite Ponar grab above the former discharge, while benthos samples were collected using a pipe sampler at five locations below the discharge location. Samples collected above the site were similar in number, but higher in species richness and diversity. The most striking discovery in the sampling was the absence of burrowing mayflies (Ephemeroptera) downstream of the former discharge points. Water Quality Division determined that since mayflies (or "wigglers") have a market value, monetary losses could be assigned to this discharge, and estimated that the theoretical market value for wigglers lost ranged from about $70,000 to $140,000 per year. The continued discharge of these wastewaters clearly had negatively affected the aquatic plant and animal community of the creek as well as adjacent water wells. The GTOSC site was placed on the EPA's Superfund list in 1983 because of groundwater contamination and the facility was demolished in 2007. Monitoring and periodic clean-up activities at the site are ongoing (EPA 2018).

The MDNR Fisheries Division Master Angler program has had 14 entries from Cedar Lake since 1994. These entries have included seven Smallmouth Bass (all greater than 21 inches), two Muskellunge (49 and 53 inches), four Rock Bass, and one Bluegill.

Current Status

MDNR last surveyed Cedar Lake in 2014 using Status and Trends protocols (Wehrly et al. 2009). Net sampling occurred from May 19 through June 12, and included the use of one large-mesh fyke net (3 net nights), three trap nets (3 net nights), one small-mesh fyke net (2 net nights), one experimental gill net (3 net nights), and one straight-run gill net (3 net nights). The electrofishing component and seine hauls were conducted on June 12. Three ten-minute transects were shocked along the shoreline in 2-8 feet of water, and five seine hauls were made along the water's edge.

A total of 2,480 fish were collected representing 20 different species (Table 3). Rock Bass, Largemouth Bass, and Mimic Shiner comprised the largest portion of the catch. A total of 1,240 Mimic Shiner made up 50% of the total catch by number. Largemouth Bass made up 34% of the catch by weight with 252.7 pounds. Rock Bass represented 15.5% of the total catch with 384 individuals collected. Bluegill, Yellow Bullhead, Brown Bullhead, Brown Trout, White Sucker, Green Sunfish, Northern Pike, Pumpkinseed Sunfish, Smallmouth Bass, Yellow Perch, and many small forage fish were also observed during the survey.

Game fish caught in the 2014 survey included Bluegill, Brown Trout, Largemouth Bass, Northern Pike, Pumpkinseed Sunfish, Rock Bass, Smallmouth Bass, and Yellow Perch. Although Smallmouth

Bass only represented 0.9% of the catch by number, they represented 7.5% of the catch by weight and 64% were at or above legal size (i.e. 14 inches). Cedar Lake has produced many master angler Smallmouth Bass over the years. Three Brown Trout were caught and ranged between 15 and 24 inches, all above legal size. Of the panfish collected during the survey, 36% of the Pumpkinseed, 82 % of Rock Bass, 32% of Green Sunfish, and 4% of Bluegill were 6 inches or above, which is considered to be an acceptable size to harvest by most anglers.

Scales and fin rays (aging structures) were collected according to Status & Trends protocol from all components of the survey. Aging structures are analyzed to determine age and growth of individual fishes for comparison with other fish populations within the state (Tables 4 and 5).

Analysis and Discussion

The 2014 MDNR fisheries survey showed Cedar Lake to have a healthy and diverse fish community similar to other inland lakes in Leelanau County. Game fish species collected include Brown Trout, Largemouth Bass, Northern Pike, and Smallmouth Bass. During the May netting survey, the three Brown Trout captured represented three-year classes (Ages 3, 4, and 5), indicating above average growth. Brown Trout found in Cedar Lake likely migrating from Lake Michigan through the outlet or move into the lake from connected tributaries. Largemouth Bass were represented by 10 year classes (Ages 2-9 and Ages 11,12) and are growing near state average (-0.1 inches). Northern Pike were represented by 6 year classes (Ages 1-6) and are growing above the state average (+0.4 inches). Smallmouth Bass were represented by 10 year classes as well (Ages 3-6, 8-10, and 12-14), and are growing significantly below state average (-1.3) based on analysis of age 3 and 4 fish (Table 2). Smallmouth Bass were collected in the survey however, not enough of any given inch class to allow for statistical analysis.

Panfish species collected in the May netting survey include Bluegill, Green Sunfish, Pumpkinseed Sunfish, Yellow Perch, and Rock Bass. Very few Yellow Perch and Green Sunfish were collected (Table 2). Bluegill were represented by 6 age classes (Ages 4-9), and exhibited below state average growth of -1.3 inches. Pumpkinseed Sunfish and Rock Bass are both growing at +0.1 inches above the state average. Pumpkinseed Sunfish are represented by 7 age classes (Ages 3-9), and Rock Bass represented 10 age classes (Ages 3-12).

A notable difference between the 2014 fisheries survey and the 1995 fisheries survey was an increase in all mean growth indices, with the exception of Bluegill. In the 2014 survey fish species were collected in numbers large enough for analysis indicated growth rates at or slightly below state average.

In the June seining and electrofishing portion of the 2014 survey of Cedar Lake the same species and age classes were represented. Growth indices decreased slightly for all species except Smallmouth Bass and Pumpkinseed Sunfish (Table 3). Electrofishing and seining surveys tend to capture more juvenile fish and this may explain decrease in growth rates. Smallmouth Bass improved to -0.1 below state average and Pumpkinseed Sunfish improved to +0.2 inches above state average.

The 2014 survey of Cedar Lake failed to collect Muskellunge and Rainbow Smelt as documented in past surveys and reports. It is very likely both species are still present in the lake and through angler engagement we hope to hear future reports of both species.

Management Direction

Cedar Lake is a high quality inland lake that offers a healthy and diverse fishery. Wetlands, undeveloped shoreline, and the tributaries to Cedar Lake are critical components of the lake's ecosystem and should be protected through the review of Department of Environmental Quality permits and best management practices. Guidelines for protecting fisheries habitat in inland lakes can be found in Fisheries Division Special Report 38 (O'Neal and Soulliere 2006).

MDNR Fisheries Division should continue to collaborate and support the Leelanau Conservancy who manages the De Young Natural Area including its wetlands and nearly a mile of undeveloped shoreline. MDNR Fisheries Division should work with the Leelanau Conservancy, riparian's, local government and the public to identify opportunities to restore connectivity within the watershed by removing or modifying barriers that prohibit fish movement and diminish water quality. Developing a holistic approach to managing the Cedar Lake watershed will ensure heathy and sustainable aquatic resources now and into the future.

Gamefish and panfish species should continue to thrive in Cedar Lake. The possibility of catching Brown Trout, Rainbow Smelt, or Muskellunge will continue as long as connectivity to Grand Traverse Bay remains accessible. Cedar Lake is a standout Smallmouth and Largemouth Bass lake for this region as well. Fish stocking is not needed to maintain the fishery as natural reproduction is sufficient to maintain the current populations, and current hook-and-line regulations are suitable and do not need to be changed.

MDNR Fisheries Division should survey Cedar Lake within to the next ten years or when feasible to continue to monitor and assess the fish community and water quality. An effort should also be made to survey the major tributaries of Cedar Lake to better understand their contributions to this watershed.

References

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Figure 1. Contour map of Cedar Lake, Leelanau County, Michigan.

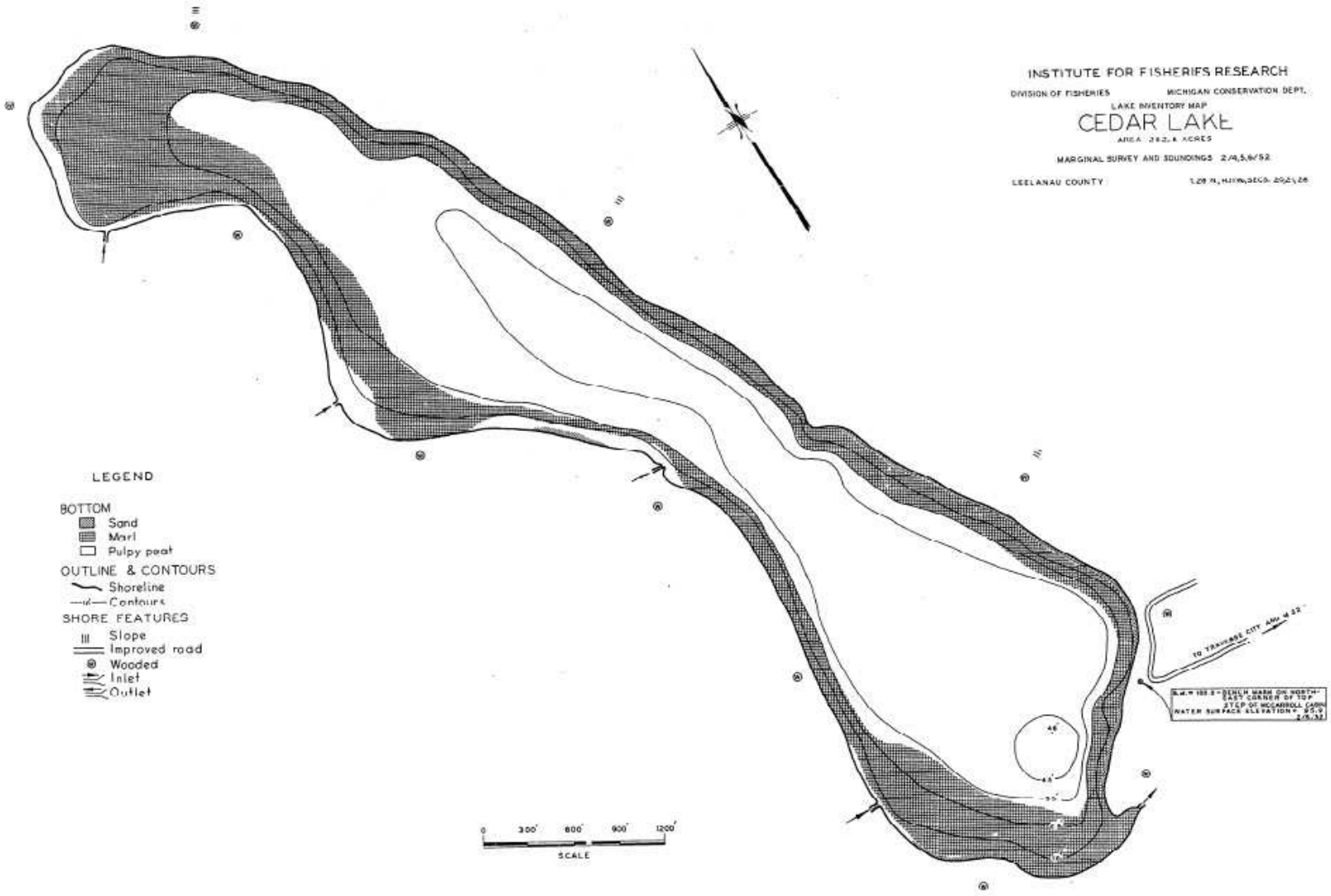

Figure 2. Location map of Cedar Lake, Leelanau County, Michigan.

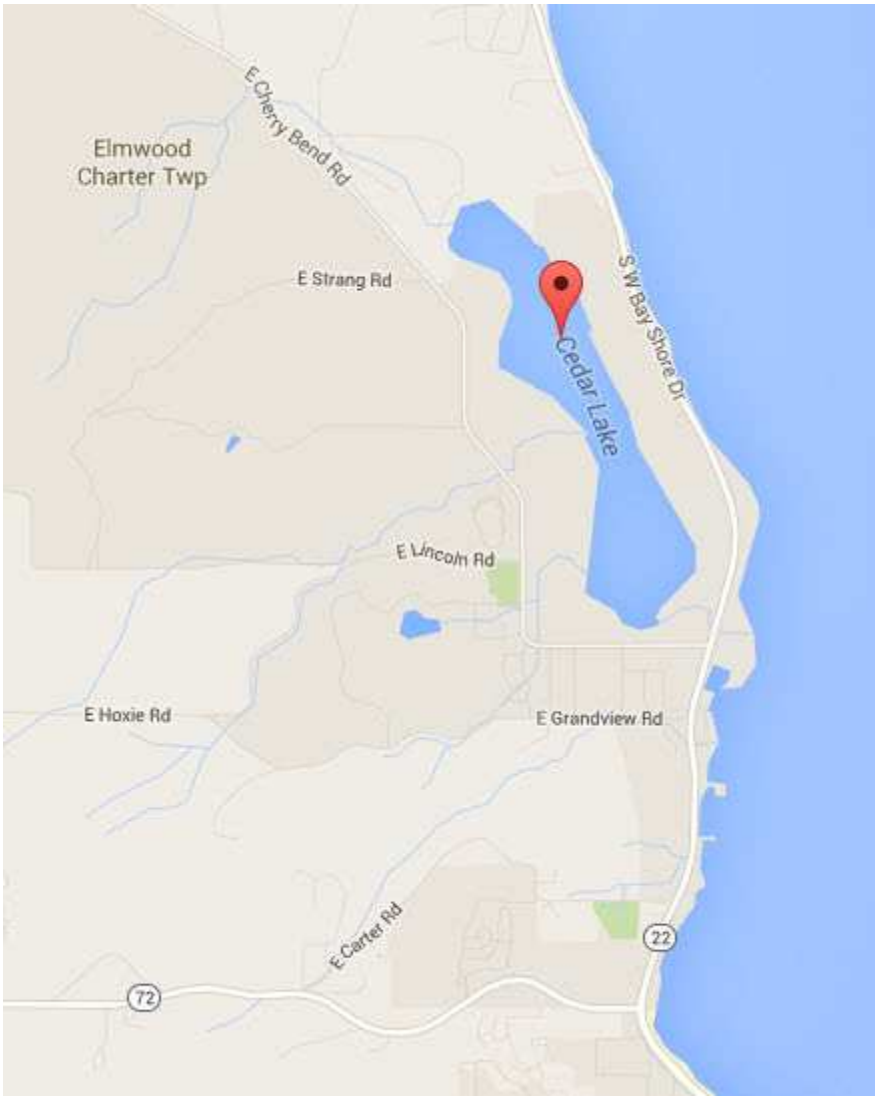

Table 1. Historic Cedar Lake fish stocking, 1896-1949.

Year	Species	No. of Fish Stocked	Lifestage
1897	Walleye	400,000	fry
1910	Walleye	600,000	fry
1939	Bluegill	10,000	fingerling
1940	Bluegill	200	yearlings
	Largemouth Bass	250	yearlings
1941	Bluegill	3,000	yearlings
1943	Bluegill	200	yearlings
1944	Bluegill	500	yearlings
	Largemouth Bass	300	yearlings
1954	Brown Trout	5,000	legal size
1955	Brown Trout	5,000	legal size
1956	Brown Trout	5,000	legal size
1959	Brown Trout	2,000	legal size
1960	Brown Trout	5,000	legal size
1961	Brown Trout	2,000	legal size
1964	Rainbow Trout	3,000	legal size

Table 2. Historic Cedar Creek fish stocking, 1896-1951.

Year	Species	No. of Fish Stocked	Lifestage
1896	Brook Trout	6,000	fingerlings
1897	Brook Trout	6,000	fingerlings
1933	Brook Trout	15,000	legal size
1949	Brook Trout	3,000	fingerlings
1950	Brook Trout	150	adults
1951	Brook Trout	75	adults

Table 3. Number, weight, and length of fish collected from Green Lake with large mesh fyke nets, seins, small mesh fyke nets, trap nets, and inland gillnets on May 19 - June 12, 2014.

Species	Number	Percent by number	Weight (Pounds)	Percent by weight	Length range (inches)[1]	Average length	Percent legal size[2]
Black Bullhead	8	0.3%	7.0	0.9%	10-13	12.9	100 (7")
Bluegill	218	8.8%	5.0	0.7%	1-8	4.2	4 (6")
Brown Trout	3	0.1%	12.9	1.7%	15-24	20.8	100 (10")
Brown Bullhead	33	1.3%	31.1	4.2%	9-14	12.7	100 (7")
White Sucker	35	1.4%	105.2	14.2%	12-24	19.9	
Green Sunfish	28	1.1%	3.0	0.4%	1-7	5.3	32 (6")
Largemouth Bass	214	8.6%	252.7	34.0%	3-18	13.0	36 (14")
Northern Pike	37	1.5%	77.1	10.4%	13-28	20.1	8 (24")
Pumpkinseed	105	4.2%	19.2	2.6%	1-9	6.5	36 (6")
Rock Bass	384	15.5%	170.5	23.0%	1-11	7.8	82 (6")
Smallmouth Bass	22	0.9%	55.9	7.5%	1-22	16.2	64 (14")
Yellow Perch	6	0.2%	0.1	0.0%	3-3	3.5	0 (7")
Yellow Bullhead	1	0.0%	0.7	0.1%	11-11	11.5	100 (7")
Brook Stickleback	11	0.4%	0.0	0.0%	1-1	1.5	
Iowa Darter	7	0.3%	0.0	0.0%	1-2	1.9	
Bluntnose Minnow	100	4.0%	0.3	0.0%	1-3	2.1	
Johnny Darter	22	0.9%	0.0	0.0%	1-2	1.5	
Mimic Shiner	1240	50.0%	1.7	0.2%	1-3	2.0	
Mottled Sculpin	4	0.2%	0.0	0.0%	1-2	1.8	
Log Perch	2	0.1%	0.0	0.0%	2-2	2.5	
Total	2,480	100.0%	742.4	100%			

[1]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.

[2]Percent legal size or acceptable size for angling. Legal size or acceptable size for angling is given in parentheses.

Table 4. Average total weighted length (inches) at age, and growth relative to the state average, for fish sampled from Cedar Lake with trap nets, fyke nets, and inland gill nets, May 20-23, 2014. Number of fish aged is given in parenthesis. A minimum of five fish per age group is statistically necessary for calculating a Mean Growth Index, which is a comparison to the State of Michigan average.

	Age														Mean Growth
Species	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	XIII	XV	Index
Bluegill				4.52 (12)	5.21 (4)	6.15 (8)	6.20 (1)	7.20 (1)	8.30 (2)						-1.3
Brown Trout			15.00 (1)	22.60 (1)	24.00 (1)										--
Green Sunfish				6.40 (1)											--
Largemouth Bass		5.87 (3)	9.20 (38)	10.54 (28)	13.90 (24)	14.41 (13)	16.87 (8)	16.17 (2)	16.53 (2)		17.20 (1)	18.80 (1)			-0.1
Northern Pike	13.70 (2)	18.51 (10)	20.70 (8)	23.38 (9)	24.29 (4)	25.43 (4)									+0.4
Pumpkinseed			3.90 (1)	5.09 (26)	6.13 (13)	7.38 (9)	7.44 (9)	9.18 (4)	8.80 (2)						+0.1
Rock Bass			4.43 (18)	5.71 (18)	6.95 (22)	7.71 (15)	8.86 (21)	9.67 (10)	10.56 (10)	10.93 (5)	11.55 (2)	11.37 (3)			+0.1
Yellow Perch	3.10 (1)														--
Smallmouth Bass			9.52 (5)	14.07 (4)	16.50 (2)	18.93 (2)		19.25 (2)	19.60 (1)	21.00 (1)		19.90 (1)	20.40 (2)	22.00 (1)	-1.3

Table 5. Average total weighted length (inches) at age, and growth relative to the state average, for fish sampled from Cedar Lake with seining and electrofishing, June 12, 2014. Number of fish aged is given in parenthesis. A minimum of five fish per age group is statistically necessary for calculating a Mean Growth Index, which is a comparison to the State of Michigan average.

Species	Age I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	XIII	XV	Mean Growth Index
Bluegill				4.52 (24)	5.21 (8)	6.15 (16)	6.20 (2)	7.20 (2)	8.30 (4)						-1.5
Brown Trout			15.00 (2)	22.60 (2)	24.00 (2)										--
Green Sunfish				6.40 (2)											--
Largemouth Bass		5.87 (6)	9.20 (76)	10.54 (56)	13.90 (48)	14.41 (26)	16.87 (16)	16.17 (4)	16.53 (4)		17.20 (2)	18.80 (2)			-0.6
Northern Pike	13.70 (4)	18.51 (20)	20.70 (16)	23.38 (18)	24.29 (8)	25.43 (8)									-1
Pumpkinseed			3.90 (2)	5.09 (52)	6.13 (26)	7.38 (18)	7.44 (18)	9.18 (8)	8.80 (4)						+0.2
Rock Bass			4.43 (36)	5.71 (36)	6.95 (44)	7.71 (30)	8.86 (42)	9.67 (20)	10.56 (20)	10.93 (10)	11.55 (4)	11.37 (6)			-0.1
Smallmouth Bass			9.52 (10)	14.07 (8)	16.50 (4)	18.93 (4)		19.25 (4)	19.60 (2)	21.00 (2)		19.90 (2)	20.40 (4)	22.00 (2)	-0.1
Yellow Perch	3.10 (2)														--