Silver Lake 2024 Fisheries Survey
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Introduction

Silver Lake is a 600-acre lake located in western Grand Traverse County, in the northwestern lower peninsula of Michigan, just north of the Village of Grawn (Figure 1). Silver Lake is fed by small seeps and springs and has no natural outlets. In 1986 riparian concerns over the high lake level resulted in Grand Traverse County (early in 1987) establishing a legal lake level and installing a new control structure. This system diverted overflow water from Silver Lake into the Silver Lake Drain, which flows into Beitner Creek (a Type 1 trout stream) and then into the Boardman River. An important stipulation of the control structure operation was at times of discharge surface water temperature must be at or below 68º F to protect cold-water habitat. The control structure blocks all fish movement in or out of Silver Lake. The morphometry of Silver Lake consists of a narrow and elongated, 2.85-mile-long basin with a maximum water depth of 98 feet, found in the central portion of the lake. Except for the south end of the lake, which is flat and reaches only 25 feet in depth, Silver Lake is characterized by deep water with steep drop-offs. Common shoreline features include several points, bays and islands. The bottom composition ranges from sand in depths of 10 feet or less to organic bottom in depths greater than 10 feet. Some limited marl deposits can be found, along with scattered areas of muck. Small gravel areas are also present. Near-shore habitat and cover consists of moderate numbers of submerged downed trees, many docks and a limited amount of concrete rip-rap. Aquatic vegetation consists of moderate amounts of coontail, abundant potamogeton and very abundant chara. Scattered beds of lily pads can be found in the shallow bays. Silver Lake has been subject to frequent chemical treatments to eradicate invasive aquatic vegetation. At times treatments have been too broad and overly aggressive. By consulting with the Silver Lake Improvement Association and the Office of Environment, Great Lakes, and Energy (EGLE), recent treatments have been more selective and targeted to control aquatic invasive species.

There is one lake association on the lake, the Silver Lake Improvement Association (SLIA). SLIA is active in promoting shoreline stewardship, coordinating invasive species treatments, protecting nesting loons, and hosts a kids fishing tournament each year.

Silver Lake has one public boat launch owed and maintained by the Michigan Department of Natural Resources (MDNR) that is located on the northeast shoreline of the lake. Silver Lake is a very popular lake for multiple types of recreation, particularly waterskiing, scuba diving, and Walleye fishing. Given its proximity to Traverse City, the shoreline is highly developed with homes and cottages.

History

Silver Lake has a long history of fisheries management dating back to the mid-1930's. Walleye have been stocked as far back as 1935. In 1955, 1956, 1957 and 1967 Rainbow Trout were stocked in the lake. Under the current stocking protocol, Silver Lake has been stocked with Walleye since 1990 (Table 1). Spring fingerlings have been stocked in most years, however when excess fry are available those have been stocked as well.

Prior fish community surveys were conducted in 1947, 1950, 1968, and 1982. For the past 30 years, most surveys conducted on Silver Lake have been evaluations of the Walleye stocking efforts (Table 2). Surveys were conducted by Fisheries Division in 1994, 2000, 2006, 2007, 2008, 2016, and 2023. The

2007 survey was a Status and Trends survey (Wehrly et al. 2009), that includes the use of trap nets, fyke nets, gillnets and electrofishing gear. Under this protocol the entire fish community is sampled. All other surveys have been Walleye stocking assessment surveys that use the Serns Index.

The most recent Walleye assessment of Silver Lake occurred on October 25, 2023. The survey consisted of an electrofishing effort targeting young of the year Walleye using the Serns Index survey protocol (Serns 1982, 1983). One adult Walleye was collected during this effort, a 22-inch-long fish that was Age 10 (Table 3). This corresponds with the 2013 stocking effort. Although only one Walleye was captured during the survey, we continue to receive positive comments about the Walleye fishery. Anglers report catching one or two Walleye per outing, but typically these Walleye are larger fish over 20 inches in length. Fishing reports indicate late evening fishing seems to be better than daytime fishing, which may be due to the amount of boating traffic and water clarity on the lake.

Methods and Materials

The 2024 fisheries survey was a fish community survey looking at all species present in the lake, along with a management evaluation of Walleye stocking. Unlike the fall Walleye assessment surveys, netting surveys will catch more older aged fish that spend time in deeper water. From June 3-6, fish were collected using three trap nets (nine total net nights), two experimental gill nets (two total net nights), one straight run gill net (one total net night), one large mesh fyke net (three total net nights), and one small mesh fyke net (one total net night).

On June 18, three seine hauls were conducted in randomly selected locations along the shoreline. In addition, four 600 second-long electrofishing stations were sampled using a boom electrofishing boat.

On June 20, shoreline habitat sampling was conducted according to protocols outlined in Wehrly et al. (2009). Data collected included the number of docks, submerged trees, and dwellings observed per kilometer of shoreline, as well as how much of the shoreline is armored or hardened with seawalls or riprap to prevent erosion. Silver Lake has approximately 10.05 miles, or 16.17 kilometers of shoreline, not counting any islands.

During each effort, fish collected in the sampling gear were measured to inch class, had an ageing structure such as scales or spines removed, and then released back into the lake. The total number of fish collected in all efforts can be seen in Table 4. Age and growth of the fish collected can be seen in Table 5.

Analysis

During the 2024 survey, a total of 3,511 fish were caught, representing 14 different species. Sand Shiner were the most frequently collected species, with a total of 2,298 caught. They represented 65.5% of the total catch by number and ranged from one to two inches in length. Other forage fish species collected included Bluntnose Minnow (164), White Sucker (36) and Johnny Darter (1). Panfish species collected included Bluegill (505), Rock Bass (317), and Pumpkinseed (47).

Game fish species caught in the 2024 survey primarily included Walleye and Smallmouth Bass. A total of 35 Walleye were caught, ranging from 14-27 inches. The Smallmouth Bass catch consisted of a broad range of fish, with 34 individuals from 7-18 inches. Of the Walleye sampled, 80% were of legal size. Other gamefish species caught in smaller numbers included 27 Largemouth Bass, nine Yellow Perch, and eight Northern Pike.

Overall, the forage base in Silver Lake appears to be good, and is adequately supporting growth rates. Bluegill, Pumpkinseed, and Walleye are all growing well over the State average length at age. Smallmouth Bass, Largemouth Bass, and Northern Pike are growing slightly below State average, but not enough to be concerning.

According to Wehrly et al (2015), residential development, measured as dwelling density (number of dwellings per kilometer of shoreline), provides an index of the potential influence of human activities on lake resources. The shoreline habitat sampling from this survey effort on Silver Lake concluded that there are currently 388 dwellings, 376 small docks, and 25 large docks. Overall Silver Lake averaged 24.8 docks, 43.0 dwellings, and 7.17 submerged trees (LWD) per kilometer of shoreline. Armoring structures and materials were present along 18.15% of the lake shoreline. This puts Silver Lake in the Highly Developed category (>10 houses/km and ~15 LWD/km, from Wehrly et al. 2015).

Management Direction

The Silver Lake Walleye fishery is very popular and must be supported by stocking at this time. Previous Serns surveys (Table 3) have not documented young of the year Walleye being produced in non-stocking years. Therefore, we should continue to stock Silver Lake with 30,000 (50/acre) spring fingerling Walleye every third year, with the next stocking in 2025. We should also continue to evaluate the Walleye stocking program through Serns surveys in both stocking and non-stocking years.
Fisheries Division should periodically conduct comprehensive fish community surveys on Silver Lake as determined by division and unit priorities.

Lakes that have dense residential development typically see higher littoral zone impacts which negatively affect fish, aquatic insects, and aquatic habitat. Monitoring the shoreline development and alteration of the littoral zone through the review of Department of Environment, Great Lakes, and Energy (EGLE) permit applications is highly important in protecting the lake against the cumulative impacts that gradually accrue over time. Both Fisheries Division and the Silver Lake Improvement Association should be actively reviewing EGLE permit applications.

References:

Serns, S. L. 1982. Relationship of walleye fingerling density and electrofishing catch per effort in northern Wisconsin lakes. North American Journal of Fisheries Management 2:38-44.

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Wehrly, K.E., G.S. Carter, and J.E. Breck. 2009 Draft. Standardized sampling methods for the inland lakes status and trends program. Chapter 27 in Manual of Fisheries Survey Methods. Michigan Department of Natural Resources, Fisheries Division internal document, Ann Arbor.

Wehrly, K. E., D. B. Hayes, and T. C. Wills. 2015. Status and trends of Michigan inland lake resources 2002-2007. Michigan Department of Natural Resources Fisheries Report 08. Institute for Fisheries Research, Ann Arbor.

Figure 1. Location of Silver Lake, Grand Traverse County.

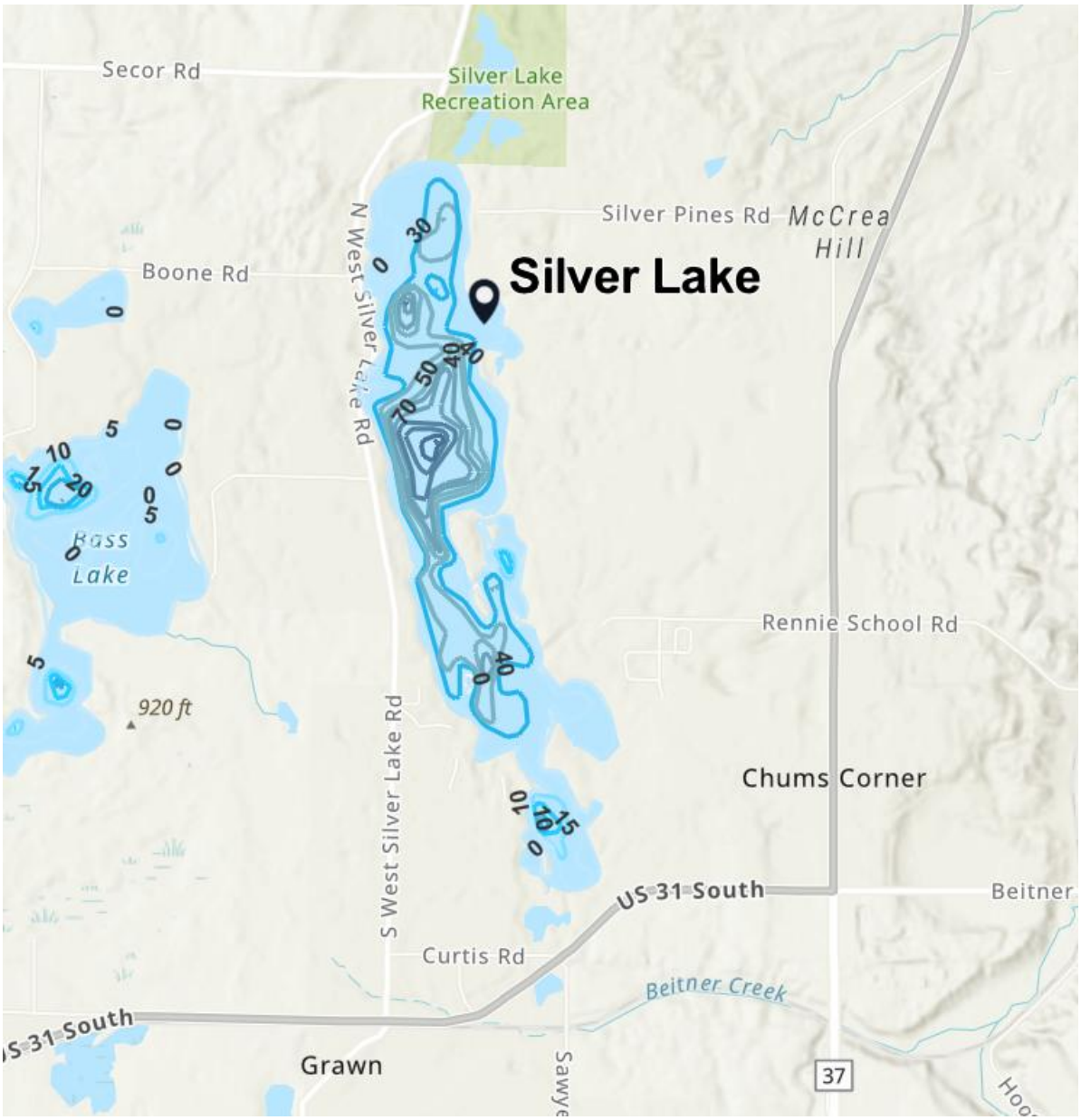

Table 1. Silver Lake Walleye Stocking, 1990-2025.

Year	Species	Number	Age
1990	Walleye	20,738	Spring fingerlings
1991	Walleye	23,523	Spring fingerlings
1992	Walleye	20,869	Spring fingerlings
1995	Walleye	2,764	Spring fingerlings
1997	Walleye	20,394	Spring fingerlings
2000	Walleye	24,277	Spring fingerlings
2003	Walleye	21,037	Spring fingerlings
2008	Walleye	35,002	Spring fingerlings
2013	Walleye	30,414	Spring fingerlings
2015	Walleye	1,184,800	Fry
2016	Walleye	32,399	Spring fingerlings
2018	Walleye	1,916,667	Fry
2019	Walleye	41,478	Spring fingerlings
2021	Walleye	150,000	Fry
2022	Walleye	30,185	Spring fingerlings
2023	Walleye	291,517	Fry
2024	Walleye	39,579	Spring fingerlings
2025	Walleye	450,000	Fry

Table 2. Silver Lake Surveys 1994- Present

Year	Survey Type	Month
1994	Walleye Stocking Evaluation	June
2000	Walleye Stocking Evaluation	September
2006	Walleye Stocking Evaluation	November
2007	Status and Trends	June
2008	Walleye Stocking Evaluation	September
2016	Walleye Stocking Evaluation	November
2023	Walleye Stocking Evaluation	October
2024	Fish Community/Management Evaluation	June

Table 3. Comparison of Silver Lake Serns Index survey data.

	# walleye captured	Catch Rate (# walleye/mile of shoreline sampled)	Year Class strength estimate	Serns Index (# walleye/surface acre)
2000				
Age 0 (2000*)	5	0.56	78	0.13
Age 3 (1997*)	4	0.44	***	***
2006				
Age 0 (2006*)	2	0.48	67	0.112
Age 3(2003*)	2		***	***
Age 4 (2002)	2		***	***
Age 5 (2001)	9		***	***
Age 6 (2000*)	2		***	***
Age 8 (1998)	1		***	***
2008				
Age 0	17	4.06	569.6	0.949
2016				
Age 0	0	0	0	0
2023				
Age 10 (2013*)	1	0.16	***	***

* Indicates a stocking year

*** No Serns constants for Ages 2-6

Table 4. Number, weight, and length of fish collected from Silver Lake with large mesh fyke nets, small mesh fyke nets, trap nets, gill nets, and electrofishing, June 2024.

Species	Number	Percent by Number	Weight (lbs)	Percent by Weight	Length Range	Percent Legal Size
Bluegill	505	14.4	13	4	1-10	5 (8")
Bluntnose Minnow	164	4.7	0.7	0.2	1-2	100
Brown Bullhead	15	0.4	13.9	4.2	10-14	100
White Sucker	36	1	3	0.9	1-19	100
Johnny Darter	1	0	0	0	1	100
Largemouth Bass	27	0.8	36.3	11	7-17	37 (14")
Northern Pike	8	0.2	18	5.5	18-25	13 (24")
Pumpkinseed	47	1.3	19.4	5.9	2-10	79 (7")
Rock Bass	317	9	87	26.4	2-11	58 (8")
Sand Shiner	2,298	65.5	10.1	3.1	1-2	100
Smallmouth Bass	34	1	38.7	11.8	7-18	32 (14")
Walleye	35	1	79.1	24	14-27	80 (15")
Yellow Perch	9	0.3	0.7	0.2	1-8	11 (8")
Yellow Bullhead	15	0.3	9.3	2.8	7-13	100
Total	3511	100	329.2	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 5. Age and Growth data for fish collected from Silver Lake, June 2024 survey.

Species	I	II	III	IV	V	VI	VII	VIII	IX	Mean Growth Index
Bluegill			6.48 (6)	5.63 (19)	8.18 (7)	9.07 (3)	10.67 (3)	8.70 (1)		+0.6
Largemouth Bass		8.30 (3)	11.15 (2)	11.30 (1)	13.79 (8)	14.36 (9)	16.50 (1)		17.25 (3)	-0.3
Northern Pike		18.80 (1)	21.18 (5)	22.10 (1)	25.30 (1)					-0.6
Pumpkinseed				4.15 (2)	7.14 (10)	8.19 (15)	9.12 (8)			+1.4
Smallmouth Bass		7.93 (6)	10.73 (8)	12.54 (9)	14.11 (7)	15.40 (1)	16.80 (6)	18.70 (1)		-0.6
Walleye		14.70 (1)	15.89 (15)	18.50 (7)	20.10 (2)	21.17 (3)	22.32 (6)	27.30 (1)		+1.8
Yellow Perch			6.01 (3)	6.60 (2)						N/A