

CSLAP 2013 Lake Water Quality Summary: Silver Lake

General Lake Information

Location	Town of Perry
County	Wyoming
Basin	Genesee River
Size	328.9 hectares (812.4 acres)
Lake Origins	Natural
Watershed Area	5,230 hectares (12,918 acres)
Retention Time	1.2 years
Mean Depth	7.2 meters
Sounding Depth	11.6 meters
Public Access?	cartop launch
Major Tributaries	Silver Lake Inlet
Lake Tributary To...	Silver Lake outlet to Genesee River to Lake Ontario
WQ Classification	A (potable water)
Lake Outlet Latitude	42.716
Lake Outlet Longitude	-78.020
Sampling Years	1986-1991, 1995-1997, 2006-2013
2013 Samplers	William Soules and F.V. and B.L. Bright
Main Contact	William Soules

Lake Map



Background

Silver Lake is an 810 acre, class A lake found in the Town of Castile in Wyoming County, just west of the Finger Lakes Region of New York State. It has been sampled as part of CSLAP periodically since 1986.

It is one of two CSLAP lakes among the more than 15 lakes found in Wyoming County, and one of three CSLAP lakes among the more than 35 lakes and ponds in the Genesee River drainage basin.

Lake Uses

Silver Lake is a Class A lake; this means that the best intended use for the lake is for potable water intake—drinking—as well as contact recreation—swimming and bathing, non-contact recreation—boating and fishing, aquatic life, and aesthetics. The lake is used by lake residents and visitors for power boating and swimming, through residential shoreline access to the lake and a state launch on the east side of the lake.

Silver Lake has been regularly stocked by New York state. About 4.2 million ½ inch walleye are stocked annually. Fish species found in the lake include black crappie, bluegill, brown bullhead, largemouth bass, northern pike, pumpkinseed sunfish, rock bass, walleye and yellow perch.

General statewide fishing regulations are applicable in Silver Lake. In addition, the open season for trout is April 1st to October 15th, with no minimum size of 12 inches, and a daily take limit of five, with no more than two trout to be greater than 12 inches.

There are no lake-specific fish consumption advisories on Silver Lake.

Historical Water Quality Data

CSLAP sampling was conducted on Silver Lake from 1986 to 1991, 1995 to 1997, and 2006 to 2013. The CSLAP reports for each of the past several years can be found on the NYSFOLA website at <http://nysfola.mylaketown.com>. The most recent CSLAP report and scorecard for Silver Lake can also be found on the NYSDEC web page at <http://www.dec.ny.gov/lands/77828.html>.

The lake was sampled as part of the state Lake Biomonitoring pilot project (as part of the state Lake Classification and Inventory study, or LCI) conducted by the NYSDEC in 2008. Most of these readings are comparable between the programs—conductivity readings were much higher in the LCI (but similar to those at other times of the year). The depth profiles show oxygen depletion below 7-8 meters, as expected given the highly elevated deepwater phosphorus readings. Chloride readings are high enough to indicate some runoff from road salting operations, but are well below the state water quality standards. The biological samples collected as part of this program have not yet been analyzed, and these results will be summarized in a separate report.

Silver Lake was sampled by New York State as part of the Biological Survey of the Genesee River basin conducted by the Conservation Department (the predecessor to the NYSDEC) on August 26, 1926. The majority of the water quality indicators evaluated as part of CSLAP were not included in this survey. pH readings in 1926 were slightly higher than the typical Silver Lake readings, but were within the range measured through CSLAP. Water clarity readings in 1926

were about 4.9 meters, higher than in all but a single CSLAP sampling session in 1989 (and much higher than in recent years in late summer). The lake was thermally stratified, with the transition from warm water to cold water occurring at a depth of about 20-25 feet. Deepwater oxygen levels were depressed near the lake bottom (readings about 1.7 ppm, versus about 8.4 ppm at the lake surface). The field notes from this survey indicated the following:

“Silver Lake is a typical, shallow, brown water lake characterized by a fair amount of muddy shoreline, an abundance of vegetation and a rich bottom of mud.... The lake apparently falls in the class of typical, brown water, non-bass (small mouthed) lakes.”

“Silver Lake, in Wyoming County, lies in a shallow valley with very gradual slopes. The surrounding hills rise only a few hundred feet above the lake, which is 1,356 feet above sea level. The lake is about three miles long and about three-quarters of a mile wide in its widest place. Its shores are mostly stony or gravelly, except that at the north and south ends, where swamps occur, the shore and bottom are muddy. The lake is fed by springs. A small inlet and the outlet of Silver Lake both occur at the north end.

The lake is shallow and the flat bottom is mostly about 25-35 feet deep. The deepest bottom found in the lake was 37 feet. The transparency of the water in Silver Lake is low as compared to Conesus Lake and may be termed "brown water". A white disc 10cm. in diameter lowered into the water at noon, August 26, 1926, disappeared from view 16 feet from the surface. On account of its shallowness and the low transparency of the water, Silver Lake shows no stratification in its plankton life. Rooted plants occur only in the shallow water near the shore and at the ends of the lake; none were observed below the 15-foot depth”.

The lake was surveyed in 1976 and 1979 as part of a DEC statewide water quality study. These data indicate conditions similar to those measured in the mid-1980s through CSLAP. Water quality monitoring has been conducted as part of state fisheries stocking activities; the results indicate slightly higher water clarity in the fisheries dataset, but the other data appeared to be comparable.

The lake has also been studied in the past by the Community College of the Finger Lakes (Dr. Bruce Gilman), SUNY Geneseo (Dr. Herman Forest) and others.

Neither the Silver Lake inlet nor outlet has been monitored through the NYSDEC Rotating Intensive Basins (RIBS) program. The outlet was sampled downstream of Perry (about 6 km downstream from the lake) through the state stream macroinvertebrate monitoring program in 1995 and 1999. The summary of this sampling was as follows:

“Based on macroinvertebrate sampling downstream of Perry in 1999, water quality was assessed as moderately impacted. The sample was dominated by filtering caddisfly larvae. The impact was likely a combination of impoundment effect and enrichment from the Perry sewage treatment facility. The stream was previously sampled in 1995, and was also determined to be slightly impacted”.

Lake Association and Management History

Silver Lake is served by the Silver Lake Association. The lake association is involved in a number of lake improvement and social activities.

The lake association maintains a web site at <http://www.silverlakeassociation.org/>

Summary of 2013 CSLAP Sampling Results

Evaluation of 2013 Annual and Monthly Results Relative to 2006-2012

The summer (mid-June through mid-September) average readings are compared to historical averages for all CSLAP sampling seasons in the “Lake Condition Summary” table, and are compared to individual historical CSLAP sampling seasons in the “Long Term Data Plots – Silver Lake” section in Appendix D.

Evaluation of Eutrophication Indicators

Both water clarity and algae (chlorophyll *a*) levels were lower than normal in 2013, but these differences were not statistically significant and phosphorus readings were close to normal. None of these indicators has exhibited any clear long-term trends. Lake productivity usually increases during the summer—water transparency decreases as nutrient and algae levels increase—and then decreases in the fall. This pattern was not apparent in 2013- the highest nutrient levels were measured in the fall, consistent with slightly elevated deepwater nutrient levels (although these were much lower than in many previous years).

The lake can be characterized as *mesoeutrophic*, or moderately to highly productive, based on water clarity (typical of *mesotrophic* lakes), total phosphorus and chlorophyll *a* readings (both typical of *eutrophic* lakes). However, all indicators were typical of *eutrophic* lakes in 2013. The trophic state indices (TSI) evaluation suggests that water clarity readings are usually higher than expected given the phosphorus and chlorophyll *a* readings in the lake, although this difference was less apparent than usual in 2012 and 2013. This discrepancy may be due to zebra mussels. Overall trophic conditions are summarized on the Lake Scorecard and Lake Condition Summary Table.

Evaluation of Potable Water Indicators

Algae levels are frequently high enough to render the lake susceptible to taste and odor compounds or elevated DBP (disinfection by product) compounds that could affect the potability of the water, although it is not known if this results in any actual impacts to drinking water (and this threat was lower than normal in 2012 and 2013). Deepwater phosphorus, ammonia, iron, manganese, and arsenic readings are higher than those measured at the lake surface, and these manganese levels exceed the state water quality standards, so deepwater intakes may not support potable water use. Potable water conditions, at least as measurable through CSLAP, are summarized in the Lake Scorecard and Lake Condition Summary Table.

Evaluation of Limnological Indicators

NO_x and color readings were slightly higher than normal in 2013, and color readings are now much higher than since CSLAP sampling began in 1986. However, all of the highest color readings have occurred after 2002, corresponding to the change in laboratories (and therefore this “increase” may be a laboratory artifact). Each of the other limnological indicators (ammonia, total nitrogen, pH, and conductivity) was close to normal in 2012, and none of these indicators has exhibited any clear long term trends. Overall limnological conditions are summarized in the Lake Scorecard and Lake Condition Summary Table.

Evaluation of Biological Condition

Limited macrophyte surveys have been conducted through CSLAP at Silver Lake. At least 5 aquatic plant species have been found, including at least one exotic plant species (*Myriophyllum spicatum*, Eurasian watermilfoil). The biological survey of the lake conducted by the Conservation Department in 1926 found at least 27 aquatic plant species, including at least one other exotic plant species (*Potamogeton crispus*, curly-leafed pondweed) and at least one protected plant species (*Megalodonta beckii*, water marigold). The modified floristic quality index (FQI) for the lake based on CSLAP data indicates that the quality of the aquatic plant community is “poor,” while the FQI based on the 1926 data indicates that the quality of the aquatic plant community is “fair.”

The 2008 macroinvertebrate survey of the lake found few macroinvertebrates, probably due to an incomplete collection of organisms rather than the lack of macroinvertebrates in the lake. The limited data indicate taxa mostly sensitive to water quality changes (typical of high water quality lakes) but no organisms associated with good water quality. Additional work will be required to fully evaluate these apparently contradictory results.

The composition of the fish community is comprised of at least five warmwater fish species, and at least four coolwater fish species. This suggests that the lake can most likely be characterized as a coolwater fishery.

Zooplankton have not been evaluated through CSLAP in Silver Lake. The fluoroprobe screening samples analyzed by SUNY ESF in 2012 and 2013 found relatively low algae levels and a low percentage of blue green algae. However, both overall algae and blue green algae levels increased in the fall, coincident with higher phosphorus readings. The higher algae levels and blue green algae levels in the fall are dominated by *Microcystis*, a blue green algae species capable of producing toxins. It is likely that the same blue green algae species have dominated shoreline blooms found previously in the lake, given the high toxin levels found previously in the lake.

Biological conditions in the lake are summarized in the Lake Scorecard and Lake Condition Summary Table.

Evaluation of Lake Perception

Water quality assessments, aquatic plant coverage, and recreational conditions were close to normal in 2013, perhaps reflecting both lower than normal water clarity readings and algae levels. Recreational assessments are affected by both weeds and algae, and have improved slightly since the mid 1990s, consistent with improved water quality assessments over the same period. Water quality and recreational assessments degrade over the typical summer, consistent with the seasonally increasing lake productivity and weed coverage (although plant coverage typically decreases in the fall). This seasonal change was not apparent in 2012 or 2013. Overall lake perception is summarized on the Lake Scorecard and Lake Condition Summary Table.

Evaluation of Local Climate Change

Water temperature readings in the summer index period were higher than normal in each of the last four years, and water temperature readings have increased slightly over time. It is not known if this is an indication of local climate change or if these changes cannot be well evaluated through CSLAP.

Evaluation of Algal Toxins

Algal toxin levels can vary significantly within blooms and from shoreline to lake, and the absence of toxins in a sample does not indicate safe swimming conditions. Phycocyanin readings are frequently above the levels indicating susceptibility for harmful algal blooms (HABs), although this was not as apparent from the 2012 or 2013 fluoroprobe samples collected during the summer (fall total and blue green algae levels are typically higher). An analysis of algae samples indicated microcystin levels below the levels needed to support safe swimming in the open water, but highly elevated readings are found in some shoreline blooms. Swimmers should avoid direct exposure to these shoreline blooms or any discolored water.

Lake Condition Summary

Category	Indicator	Min	86-13 Avg	Max	2013 Avg	Classification	2013 Change?	Long-term Change?
Eutrophication Indicators	Water Clarity	0.38	2.33	6.00	1.83	Mesotrophic	Within Normal Range	No Change
	Chlorophyll <i>a</i>	0.10	20.41	160.40	11.78	Eutrophic	Within Normal Range	No Change
	Total Phosphorus	0.014	0.041	0.140	0.044	Eutrophic	Within Normal Range	No Change
Potable Water Indicators	Hypolimnetic Ammonia	0.01	0.64	2.40	0.37	Highly Elevated Deepwater NH ₄	Lower Than Normal	Not known
	Hypolimnetic Arsenic	0.50	1.93	3.20		Elevated Deepwater As		Not known
	Hypolimnetic Iron	0.01	0.38	1.24		Elevated Deepwater Fe		Not known
	Hypolimnetic Manganese	0.38	1.83	2.99		Highly Elevated Deepwater Mn		Not known
Limnological Indicators	Hypolimnetic Phosphorus	0.020	0.249	0.928	0.058	Elevated Deepwater TP	Lower Than Normal	Not known
	Nitrate + Nitrite	0.00	0.11	0.86	0.17	Intermediate NO _x	Within Normal Range	No Change
	Ammonia	0.00	0.03	0.10	0.03	Low Ammonia	Within Normal Range	No Change
	Total Nitrogen	0.45	0.76	1.20	0.77	Intermediate Total Nitrogen	Within Normal Range	No Change
	pH	6.48	7.99	8.75	7.86	Alkaline	Within Normal Range	No Change
	Specific Conductance	77	283	364	277	Hardwater	Within Normal Range	No Change
	True Color	3	18	82	32	Intermediate Color	Higher than Normal	Increasing Significantly
Lake Perception	Calcium	16.2	36.4	50.5		Highly Susceptible to Zebra Mussels		No Change
	WQ Assessment	1	2.5	5	2.7	Not Quite Crystal Clear	Within Normal Range	Slightly Improving
	Aquatic Plant Coverage	1	2.7	4	2.7	Surface Plant Growth	Within Normal Range	No Change
Biological Condition	Recreational Assessment	1	2.5	4	2.3	Slightly Impaired	Within Normal Range	Slightly Improving
	Phytoplankton					Not measured through CSLAP	Not known	Not known
	Macrophytes					Poor quality of the aquatic plant community	Not known	Not known
	Zooplankton					Not measured through CSLAP	Not known	Not known
	Macroinvertebrates					Contradictory results	Not known	Not known
	Fish					Coolwater fishery	Not known	Not known
Local Climate Change	Invasive Species					Zebra mussels, rudd, Eurasian watermilfoil, curly-leaved pondweed	Not known	Not known
	Air Temperature	10	21.7	37	22.7		Within Normal Range	No Change
	Water Temperature	10	21.0	27	23.2		Higher Than Normal	Increasing Slightly

Category	Indicator	Min	86-13 Avg	Max	2013 Avg	Classification	2013 Change?	Long-term Change?
Harmful Algal Blooms	Open Water Phycocyanin	3	122	700	46	Most readings indicate high risk of BGA	Not known	Not known
	Open Water FP Chl.a	1	8	22	12	Few readings indicate high algae levels	Not known	Not known
	Open Water FP BG Chl.a	0	3	13	4	Few readings indicate high BGA levels	Not known	Not known
	Open Water Microcystis	<DL	0.6	7.2	0.2	Mostly undetectable open water MC-LR	Not known	Not known
	Open Water Anatoxin a	<DL	<DL	<DL	<DL	Open water Anatoxin-a not detectable	Not known	Not known
	Shoreline Phycocyanin					No shoreline blooms sampled for PC	Not known	Not known
	Shoreline FP Chl.a					No shoreline blooms sampled for FP	Not known	Not known
	Shoreline FP BG Chl.a					No shoreline blooms sampled for FP	Not known	Not known
	Shoreline Microcystis	1.9	259.5	815.1		Very high shoreline bloom MC-LR	Not known	Not known
	Shoreline Anatoxin a	<DL	<DL	<DL		Shoreline bloom Anatoxin-a not detectable	Not known	Not known

Evaluation of Lake Condition Impacts to Lake Uses

Silver Lake is presently among the lakes listed on the Genesee River Basin Priority Waterbody List (2002). Water supply is identified as *impaired*, and public bathing, recreation, and aesthetics are listed as *stressed*. The PWL listing for Silver Lake is listed in Appendix C.

Potable Water (Drinking Water)

The CSLAP dataset at Silver Lake, including water chemistry data, physical measurements, and volunteer samplers' perception data, is inadequate to evaluate the use of the lake for potable water. The moderate to high algae levels indicate that potable water use from the surface waters of the lake may be *impaired*, and elevated deepwater manganese readings may *impair* potable water use of the lake through deep intakes.

Contact Recreation (Swimming)

The CSLAP dataset at Silver Lake, including water chemistry data, physical measurements, and volunteer samplers' perception data, suggests that swimming and contact recreation may be *impaired* by excessive algae, shoreline algae blooms, and poor water clarity, although lake productivity was lower in the last three years, reducing the likelihood of these impacts. Additional information about bacterial levels is needed to evaluate the safety of the water for swimming.

Non-Contact Recreation (Boating and Fishing)

The CSLAP dataset on Silver Lake, including water chemistry data, physical measurements, and volunteer samplers' perception data, suggest that non-contact recreation should be supported, although this at times are *stressed* by excessive weeds, particularly Eurasian watermilfoil.

Aquatic Life

The CSLAP dataset on Silver Lake, including water chemistry data, physical measurements, and volunteer samplers' perception data, suggest that aquatic life may be *stressed* by hypolimnetic hypoxia (depressed deepwater oxygen readings) and the presence of invasive species, although additional data are needed to evaluate the food and habitat conditions for aquatic organisms in the lake.

Aesthetics

The CSLAP dataset on Silver Lake, including water chemistry data, physical measurements, and volunteer samplers' perception data, suggest that aesthetics may be *stressed* by excessive algae, particularly the presence of shoreline blue green algae blooms.

Fish Consumption

There are no fish consumption advisories posted for Silver Lake.

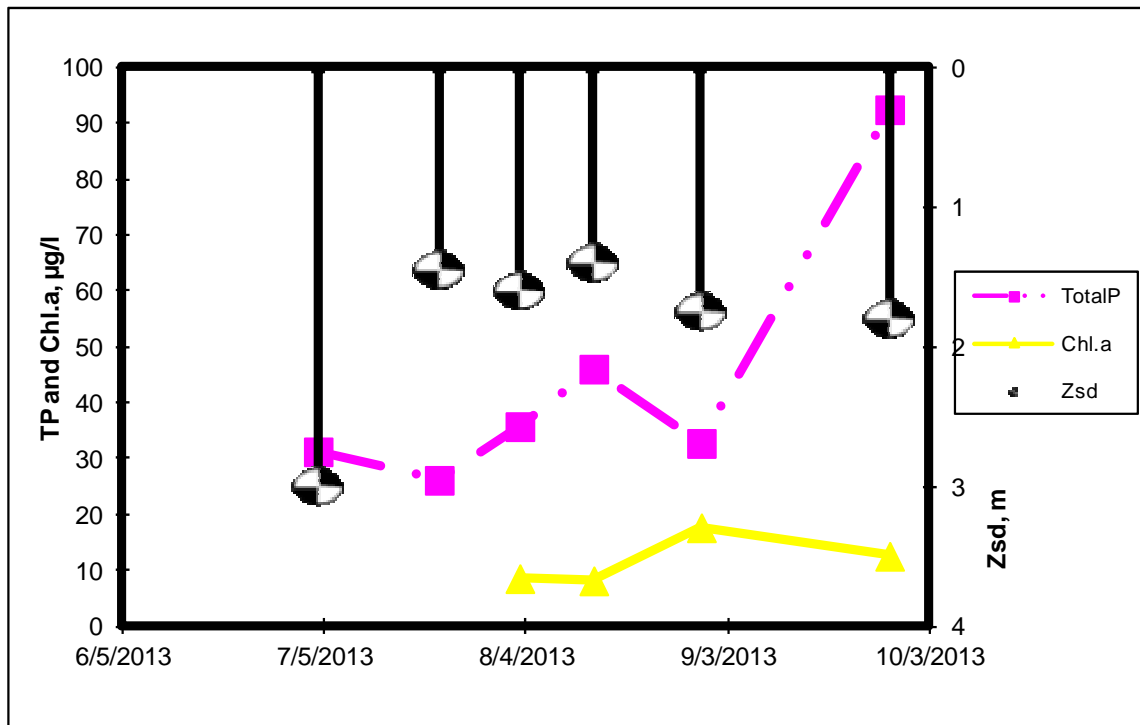
Additional Comments and Recommendations

Additional aquatic plant survey data may help to determine if the aquatic plant community is dominated by exotic plants, or if the occasional management of the nuisance weed problems in the lake has resulted in a shift to dominance by native plant species. Lake residents should report and avoid direct exposure to any shoreline algae blooms.

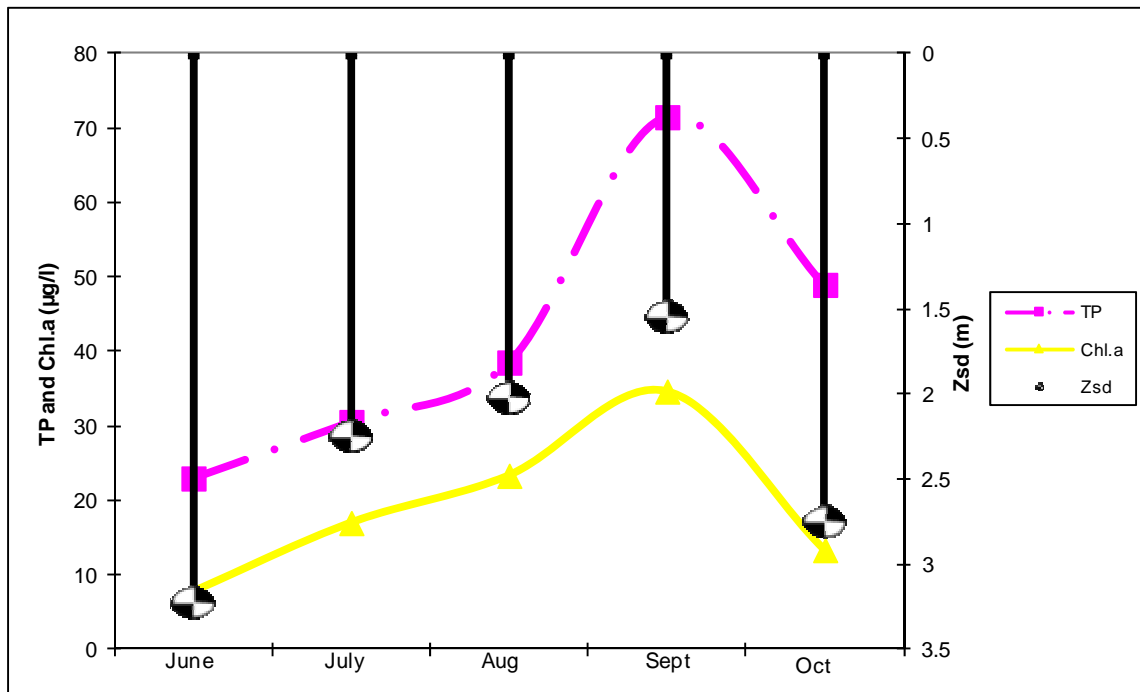
Aquatic Plant IDs-2013

None submitted for identification in 2013.

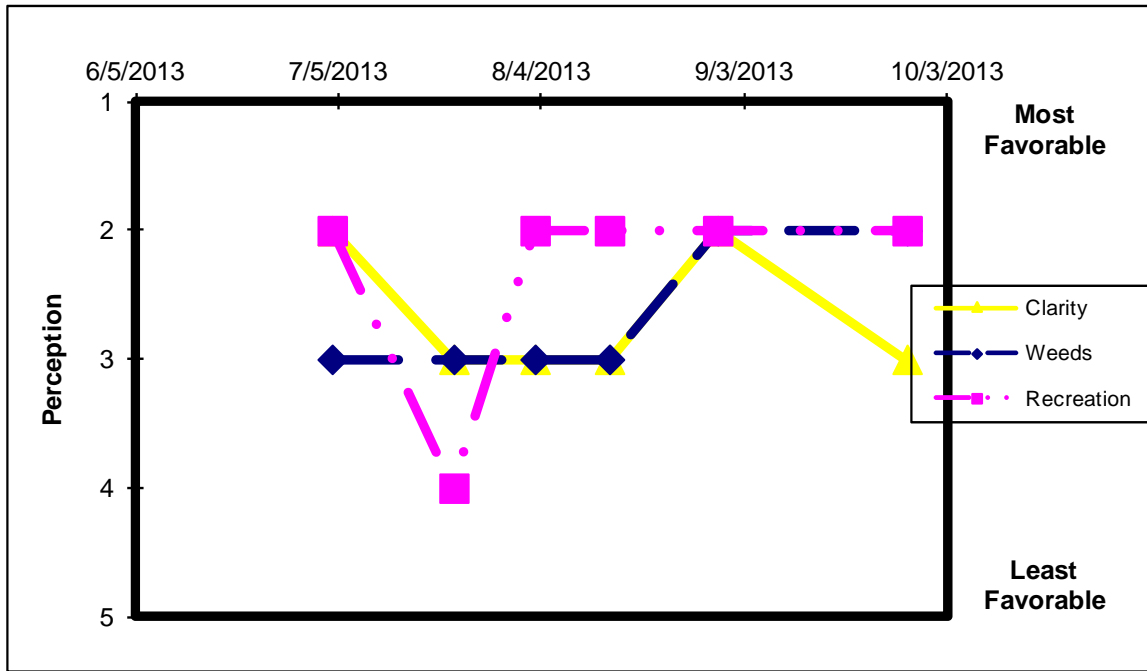
Time Series: Trophic Indicators, 2013



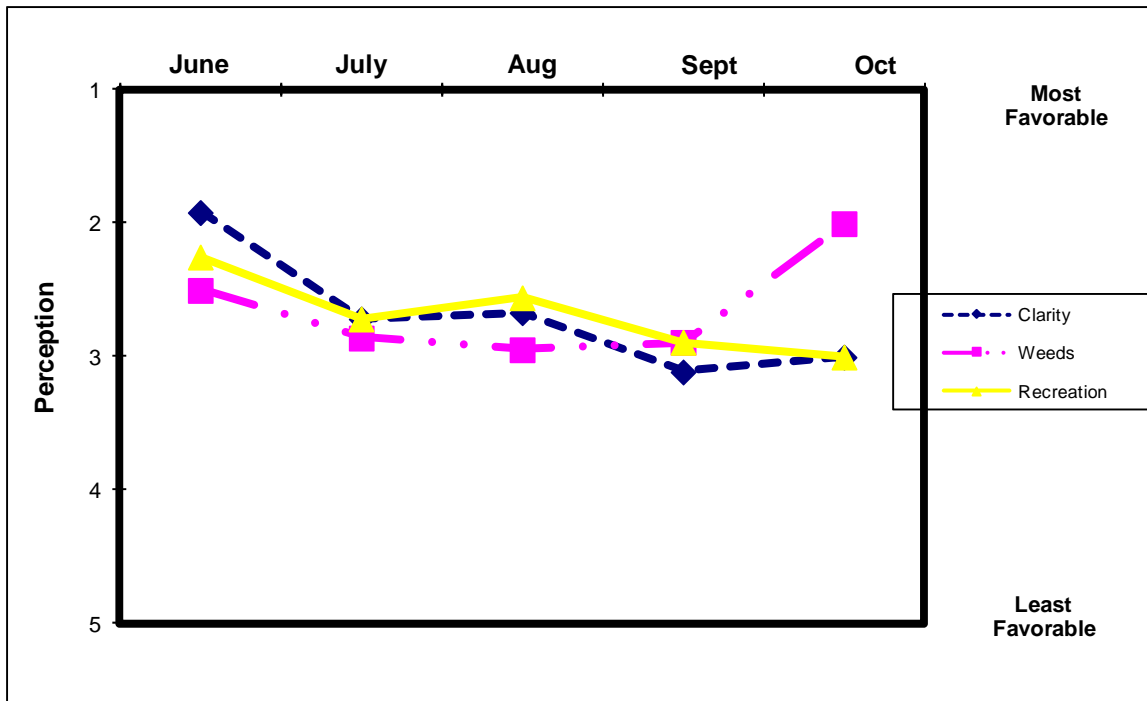
Time Series: Trophic Indicators, Typical Year (1986-2013)



Time Series: Lake Perception Indicators, 2013



Time Series: Lake Perception Indicators, Typical Year (1986-2013)



Appendix A- CSLAP Water Quality Sampling Results for Silver Lake

LNum	PName	Date	Zbot	Zsd	Zsamp	Tot.P	NO3	NH4	TDN	TN/TP	TColor	pH	Cond25	Ca	Chl.a
25	Silver L (W)	6/13/1986	10.0		1.5	0.023	0.47				5	7.94	304		11.80
25	Silver L (W)	6/19/1986		2.50	1.5	0.018	0.43				5	7.94	311		4.74
25	Silver L (W)	6/25/1986		2.13	1.5	0.025	0.36				5	8.14	311		3.92
25	Silver L (W)	7/3/1986	10.0	2.50	1.5	0.027	0.34				10	8.13	310		3.18
25	Silver L (W)	7/9/1986	10.0	2.50	1.5	0.027	0.24				8	8.39	307		4.34
25	Silver L (W)	7/16/1986	10.0	2.50	1.5	0.035	0.21				8	8.30	307		5.25
25	Silver L (W)	7/23/1986	10.5	2.00	1.5	0.037	0.03					8.67	300		18.40
25	Silver L (W)	7/31/1986	10.5	1.25	1.5	0.043	0.03				8	8.50	275		14.80
25	Silver L (W)	8/4/1986	10.0	1.50	1.5	0.050	0.03				6	8.52	283		19.20
25	Silver L (W)	8/11/1986	11.0	1.00	1.5	0.067	0.03				25	8.55	273		22.20
25	Silver L (W)	8/20/1986	11.0	1.00	1.5	0.077	0.03				16	8.11	287		30.30
25	Silver L (W)	8/29/1986	11.0	1.00	1.5	0.100	0.03				8	7.76	300		23.70
25	Silver L (W)	9/3/1986	11.0	1.00	1.5	0.110	0.03				15	8.23	294		16.30
25	Silver L (W)	9/9/1986	10.0	1.50	1.5	0.100	0.03				10	8.25	295		12.30
25	Silver L (W)	9/17/1986	10.0	1.38	1.5	0.094	0.03				10	7.67	299		15.30
25	Silver L (W)	6/10/1987	10.0	2.50	1.5	0.022	0.11				15	8.23	257		12.50
25	Silver L (W)	6/15/1987	9.7	3.50	1.5	0.024	0.11				8	8.48	308		6.20
25	Silver L (W)	6/23/1987	9.8	2.00	1.5	0.029	0.01				10	8.46	300		16.30
25	Silver L (W)	6/29/1987	10.0	1.50	1.5	0.036	0.05				10	8.12	303		22.90
25	Silver L (W)	7/7/1987	10.0	1.33	1.5	0.039	0.01				14	7.98	304		54.80
25	Silver L (W)	7/15/1987	10.0	1.50	1.5	0.035	0.01				11	7.96	291		35.50
25	Silver L (W)	7/22/1987	10.0	1.38	1.5	0.040	0.01				10	8.05	287		45.10
25	Silver L (W)	7/29/1987	9.5	0.75	1.5	0.045	0.02				13	7.69	266		72.50
25	Silver L (W)	8/1/1987	10.0	0.88	1.5	0.056	0.01				11	7.44	278		151.00
25	Silver L (W)	8/10/1987	10.0	1.00	1.5	0.055	0.01				14	7.58	279		123.00
25	Silver L (W)	8/17/1987	9.5	2.63	1.5	0.036	0.01				15	7.90	284		17.00
25	Silver L (W)	8/25/1987	10.0	1.25	1.5	0.071	0.01				9	7.74	275		
25	Silver L (W)	9/4/1987	10.0	1.13	1.5	0.120	0.01				3	7.76	281		66.00
25	Silver L (W)	9/10/1987	9.5	0.38	1.5	0.140	0.01				12	7.64	294		125.00
25	Silver L (W)	6/21/1988	9.5	2.25	1.5	0.021	0.01				6	8.36	302		19.20
25	Silver L (W)	6/28/1988	10.0	2.00	1.5	0.024	0.01				10	8.46	323		17.20
25	Silver L (W)	7/5/1988	9.8	1.50	1.5	0.027	0.01				11	8.53	347		10.10
25	Silver L (W)	7/13/1988	9.5	2.00	1.5	0.039	0.01				10	8.45	312		16.80
25	Silver L (W)	7/19/1988	10.0	1.75	1.5	0.033	0.01				5	8.28	310		40.00
25	Silver L (W)	7/29/1988	10.0	1.50	1.5	0.030	0.01				8	7.15	320		16.50
25	Silver L (W)	8/5/1988	10.0	1.75	1.5	0.029	0.01				11	7.66	299		17.50
25	Silver L (W)	8/12/1988	9.8	1.00	1.5	0.030	0.01				6	8.50	279		35.50
25	Silver L (W)	8/16/1988	7.5	1.00	1.5	0.021	0.01				6	8.62	262		45.90
25	Silver L (W)	8/23/1988	10.0	0.75	1.5	0.052	0.01				6	8.56	238		50.30
25	Silver L (W)	8/30/1988	9.0	1.25	1.5	0.053	0.01				3	7.62	310		20.00
25	Silver L (W)	9/8/1988	10.0	1.50	1.5	0.067	0.01				6	8.08	302		19.20
25	Silver L (W)	9/16/1988	10.0	1.00	1.5	0.090	0.01				8	7.93	309		51.80
25	Silver L (W)	9/21/1988	9.0	1.25	1.5	0.064	0.01					7.77	305		25.20
25	Silver L (W)	9/28/1988	10.0	1.38	1.5	0.085	0.02				6	8.31	278		33.30
25	Silver L (W)	6/23/1989	10.1	3.50	1.5	0.022	0.49				10	7.74	339		6.03
25	Silver L (W)	7/5/1989	10.0	4.63	1.5	0.018	0.39				15	8.30	332		2.85
25	Silver L (W)	7/18/1989	10.0	2.50	1.5	0.015	0.27				9	8.55	329		9.02
25	Silver L (W)	7/28/1989	10.0	2.50	1.5	0.053	0.16					8.49	320		6.90
25	Silver L (W)	8/4/1989	10.0	2.50	1.5	0.058	0.17				5	6.77	320		6.14
25	Silver L (W)	8/11/1989	9.1	4.00	1.5	0.038					12	8.36	324		3.92
25	Silver L (W)	8/15/1989	9.5	4.50	1.5	0.014	0.10				6	6.48	321		3.92
25	Silver L (W)	8/22/1989	10.0	6.00	1.5	0.019	0.08				5	8.35	320		3.77
25	Silver L (W)	8/30/1989	10.0	4.00	1.5	0.016					8	8.42	317		7.74
25	Silver L (W)	9/6/1989	10.0	2.00	1.5	0.030					10	8.22	322		12.70
25	Silver L (W)	9/13/1989	10.0	2.00	1.5	0.022					6	8.41	318		25.30
25	Silver L (W)	9/20/1989	10.0	1.50	1.5	0.080	0.01				9	7.89	334		45.30
25	Silver L (W)	7/5/1990	9.8	2.10	1.5	0.019	0.10				8	8.31	330		16.80
25	Silver L (W)	7/18/1990	10.0	2.25	1.5	0.021	0.01				3	8.10	323		19.80
25	Silver L (W)	8/4/1990	10.0	2.00	1.5	0.030	0.01				3	8.35	308		15.60
25	Silver L (W)	8/16/1990	10.0	2.15	1.5	0.029	0.01				5	8.12	309		13.00
25	Silver L (W)	8/28/1990	9.7	2.00	1.5	0.047	0.01				11	7.94	314		11.60
25	Silver L (W)	9/12/1990	9.5	1.25	1.5	0.067	0.01				13	8.45	316		29.00
25	Silver L (W)	10/8/1990	9.5	1.50	1.5	0.053	0.01					8.38	289		15.20

LNum	PName	Date	Zbot	Zsd	Zsamp	Tot.P	NO3	NH4	TDN	TN/TP	TColor	pH	Cond25	Ca	Chl.a
25	Silver L (W)	6/3/1991	10.0	2.50											
25	Silver L (W)	6/15/1991	10.0	2.50											
25	Silver L (W)	7/11/1991	10.0	1.70											
25	Silver L (W)	8/12/1991	9.4	1.60											
25	Silver L (W)	9/13/1991	9.4	1.80											
25	Silver L (W)	8/14/1996		2.73	1.5	0.022	0.01				10	8.75	282		19.50
25	Silver L (W)	8/28/1996				0.017	0.01				10	8.35	279		7.30
25	Silver L (W)	9/18/1996				0.084	0.01				10	7.62	283		12.20
25	Silver L (W)	6/25/1997		4.50	1.8	0.025	0.39				25	8.19	336		5.08
25	Silver L (W)	7/9/1997		3.25	4.6	0.016	0.28				10	8.11	336		17.10
25	Silver L (W)	7/30/1997		4.00	3.0	0.014					6	7.07	331		6.25
25	Silver L (W)	10/8/1997		4.00	1.5	0.045	0.01				6	8.30	320		11.60
25	Silver L (W)	6/15/2006	11.3	4.60		0.018	0.30	0.02	0.98	54.23	20	7.91	279	16.2	0.55
25	Silver L (W)	6/30/2006		3.35	1.5	0.022	0.22	0.03	0.85	38.75	27	7.65	267		6.41
25	Silver L (W)	7/14/2006		3.75		0.026	0.11	0.03	0.83	32.31	33	8.38	253		5.80
25	Silver L (W)	7/28/2006	3.3	3.30	1.5	0.022	0.03	0.03	0.70	31.43	48	7.41	228		5.81
25	Silver L (W)	8/11/2006		2.20	1.5	0.021	0.03	0.02	0.90	43.33	39	7.70	283	36.5	8.02
25	Silver L (W)	8/25/2006		3.10	1.5	0.017	0.02	0.02	0.98	56.48	39	8.21	318		7.15
25	Silver L (W)	9/8/2006		2.30	1.5	0.049	0.01	0.01	0.64	13.03	19	7.09	211		23.26
25	Silver L (W)	9/21/2006		2.30	1.5	0.043	0.02	0.05	0.91	21.13	14	7.31	248		13.48
25	Silver L (W)	7/19/2007	11.3	1.55		0.028	0.16	0.05	0.75	59.94		8.04	271	39.3	
25	Silver L (W)	7/28/2007	11.0	1.00		0.031	0.01	0.03	0.80	57.47	32	8.07	247		20.72
25	Silver L (W)	8/8/2007				0.025	0.01	0.02	0.65	57.67	15	7.74	265		8.51
25	Silver L (W)	8/20/2007	10.9	2.50		0.030	0.19	0.04	0.98	72.91	20	7.78	193		8.77
25	Silver L (W)	9/1/2007	11.0	2.28		0.034	0.01	0.02	0.85	56.51	29	8.32	77	34.6	15.38
25	Silver L (W)	6/13/2008	11.0	2.35		0.042	0.11	0.07	0.95	50.47	9	7.49	233		0.74
25	Silver L (W)	6/24/2008	11.2	4.20	1.0	0.038	0.08	0.05	1.01	58.92	10	8.28	233	37.5	5.17
25	Silver L (W)	7/17/2008	11.4	4.60	1.0	0.033	0.04	0.00	0.48	32.14	8	7.61	183		9.38
25	Silver L (W)	7/24/2008		1.65	1.0	0.060	0.02	0.10	0.56	20.53	15	7.86	301		32.86
25	Silver L (W)	8/12/2008	11.2	1.93	1.0	0.043	0.01	0.04	0.51	26.27	30	8.24	330	33.8	4.75
25	Silver L (W)	8/28/2008	11.3	1.70	1.0	0.054	0.00	0.01	0.62	25.47	46	8.72	257		
25	Silver L (W)	9/12/2008	11.6	1.30	1.0	0.075	0.01	0.02	0.70	20.76	32	7.98	259		12.74
25	Silver L (W)	06/10/2009	11.4	3.40	1.0	0.022	0.26	0.06	0.79	77.98	49	7.94	210		6.20
25	Silver L (W)	06/22/2009	11.5	3.05	1.0	0.027	0.14	0.06	0.53	43.02	32	7.59	290		6.28
25	Silver L (W)	07/05/2009	10.9	2.65	1.0	0.023	0.08	0.03	0.48	46.24	49	7.70	183	36.2	8.16
25	Silver L (W)	07/20/2009	11.3	1.20	1.0	0.057	0.03	0.07	0.73	28.00	67	7.59	217		19.85
25	Silver L (W)	08/03/2009	11.4	0.95	1.0	0.063	0.02	0.04	0.45	15.73	38	7.96	217	36.7	22.00
25	Silver L (W)	08/16/2009	11.1	1.20	1.0	0.043	0.01	0.02	0.55	28.22	52	8.46	158		17.70
25	Silver L (W)	08/29/2009	11.5	1.75	1.0	0.039	0.01	0.03	0.53	30.26	41			29.7	26.50
25	Silver L (W)	09/10/2009	11.2	1.20	1.0	0.131	0.04	0.02	1.19	19.97	82	8.67	105	25.3	160.40
25	Silver L (W)	10/04/2009													
25	Silver L (W)	5/15/2010	11.7	4.25	1.0	0.016	0.37	0.04			13	7.80	290	49.6	4.00
25	Silver L (W)	5/30/2010	11.5	5.00	1.0	0.015	0.23	0.04	0.93	134.30	6	8.17	288		2.80
25	Silver L (W)	6/11/2010	11.5	5.75	1.0	0.024	0.26	0.07	0.76	69.58	10	8.33	364		0.10
25	Silver L (W)	6/26/2010	11.5	2.70	1.0	0.031	0.34	0.02			12	7.95	290		16.90
25	Silver L (W)	7/10/2010	11.4	2.00	1.0	0.033	0.01	0.09	0.65	44.13	15	7.94		37.9	16.90
25	Silver L (W)	8/6/2010	11.3	0.85	1.0	0.032	0.01	0.02	0.92	63.17	14	8.43	267		34.80
25	Silver L (W)	8/21/2010	11.2	1.25	1.0	0.030	0.02	0.04	0.78	57.70	10	8.11	305		33.00
25	Silver L (W)	9/2/2010	11.4	1.65	1.0	0.029	0.01	0.02	0.70	52.59	17	7.68	266		21.80
25	Silver L (W)	10/8/2010													
25	Silver L (W)	5/25/2011	11.6	5.65	1.0	0.026	0.86	0.08	1.20	100.34	53	7.43	302	50.5	2.90
25	Silver L (W)	6/10/2011	11.5	4.88	1.0	0.020	0.50	0.06	0.82	90.08	9	7.23	332		2.70
25	Silver L (W)	6/30/2011	11.3	3.50	1.0	0.025	0.39	0.04	0.96	85.51	65	7.55	225		0.70
25	Silver L (W)	7/13/2011	11.1	3.10	1.0	0.026	0.29	0.03	0.80	69.28	43	7.38	260		6.90
25	Silver L (W)	7/13/2011	grab	bloom											
25	Silver L (W)	7/27/2011	10.7	1.80	1.5	0.032	0.06	0.02	0.71	48.21	41	8.26	276	37.7	14.30
25	Silver L (W)	8/9/2011	grab	bloom											
25	Silver L (W)	8/17/2011	11.0	2.65	1.5										
25	Silver L (W)	8/31/2011	11.4	1.78	1.0	0.047	0.01	0.01	0.85	39.92	15	7.75	274		40.50
25	Silver L (W)	9/14/2011	10.9	1.40	1.0	0.065	0.01	0.03	1.00	33.88	16	7.59	278		40.10
25	Silver L (W)	9/14/2011	grab	bloom											
25	Silver L (W)	9/23/2011	grab	bloom											
25	Silver L (W)	10/22/2011	grab	bloom											
25	Silver L (W)	5/31/2012	11.1	5.80	1.5	0.016	0.54	0.05			42	7.44	185	47.5	3.40
25	Silver L (W)	6/15/2012	11.2	4.60	1.5	0.018	0.46	0.05	0.94	114.13	27	7.51	342		2.80
25	Silver L (W)	6/25/2012	11.4	3.65	1.5	0.021	0.35	0.02	0.80	85.53	34	7.59	311		4.80

LNum	PName	Date	Zbot	Zsd	Zsamp	Tot.P	NO3	NH4	TDN	TN/TP	TColor	pH	Cond25	Ca	Chl.a
25	Silver L (W)	7/19/2012	11.2	2.30	1.5	0.030	0.01	0.02	0.59	43.12	31	8.00	300		5.10
25	Silver L (W)	8/1/2012	11.1	2.20	1.5	0.027	0.01	0.01	0.49	39.99	22	8.23	279	33.8	3.90
25	Silver L (W)	8/19/2012	11.2	3.55	1.5	0.029	0.01	0.01	0.50	38.42	6	7.93	284		7.10
25	Silver L (W)	8/30/2012	11.2	3.10	1.5	0.021	0.01	0.03	0.47	50.14	10	7.59	256		6.00
25	Silver L (W)	9/13/2012	11.2	2.30	1.5	0.045	0.01	0.04	0.61	29.62	8	8.04	253		8.80
25	Silver L (W)	7/4/2013	11.4	3.00	1.5	0.031	0.50	0.02	1.12	78.58	31	7.95	309		
25	Silver L (W)	7/22/2013	11.4	1.45	1.5	0.026			0.77	64.55	27	8.10	232		
25	Silver L (W)	8/3/2013	10.8	1.60	1.5	0.036	0.01	0.02	0.58	35.70	22	7.50	302		8.60
25	Silver L (W)	8/14/2013	11.3	1.40	1.5	0.046			0.74	35.34	59	7.58	229		8.20
25	Silver L (W)	8/30/2013	11.0	1.75	1.0	0.033	0.01	0.04	0.65	43.33	29	8.24	285		17.70
25	Silver L (W)	9/27/2013	11.2	1.80	1.0	0.093			0.76	18.03	22	7.79	306		12.60
LNum	PName	Date	Zbot	Zsd	Zsamp	Tot.P	NO3	NH4				Fe	Mn	As	NO2
25	Silver L (W)	6/15/2006	11.3		9.5	0.045									
25	Silver L (W)	6/30/2006			9.5	0.020									
25	Silver L (W)	7/14/2006			9.5	0.273									
25	Silver L (W)	7/28/2006	3.3		9.5	0.379									
25	Silver L (W)	8/11/2006			9.5	0.261									
25	Silver L (W)	8/25/2006			9.5	0.622									
25	Silver L (W)	9/8/2006			9.0	0.335									
25	Silver L (W)	9/21/2006			9.5	0.044									
25	Silver L (W)	7/19/2007	11.3		11.0	0.407									
25	Silver L (W)	7/28/2007	11.0		10.4	0.131									
25	Silver L (W)	8/8/2007				0.442									
25	Silver L (W)	8/20/2007	10.9		10.7	0.730									
25	Silver L (W)	9/1/2007	11.0		11.0	0.590									
25	Silver L (W)	6/13/2008	11.0		11.0	0.093									
25	Silver L (W)	6/24/2008	11.2		11.0	0.042									
25	Silver L (W)	7/17/2008	11.4		11.4	0.280									
25	Silver L (W)	7/24/2008			10.0	0.245									
25	Silver L (W)	8/12/2008	11.2		10.0	0.404									
25	Silver L (W)	8/28/2008	11.3		10.0	0.505									
25	Silver L (W)	9/12/2008	11.6		10.0	0.216									
25	Silver L (W)	06/10/2009	11.0		11.0	0.114		0.30							
25	Silver L (W)	06/22/2009	10.5		10.5	0.057		0.28							
25	Silver L (W)	07/05/2009	10.0		10.0	0.083		0.31							
25	Silver L (W)	07/20/2009	10.0		10.0	0.269		0.68							
25	Silver L (W)	08/03/2009	10.0		10.0	0.269		0.60			0.26	1.65	2.30		
25	Silver L (W)	08/16/2009	10.0		10.0	0.531		0.81			0.56	2.06			
25	Silver L (W)	08/29/2009	10.5		10.5	0.703		1.67			1.08	2.16	3.20		
25	Silver L (W)	09/10/2009	10.0		10.0	0.807		0.01							
25	Silver L (W)	5/15/2010	11.7		11.0	0.036		0.03							
25	Silver L (W)	5/30/2010	11.5		10.5	0.033		0.08							
25	Silver L (W)	6/11/2010	11.5		10.5	0.097		0.19							
25	Silver L (W)	6/26/2010	11.5		10.5	0.067		0.29							
25	Silver L (W)	7/10/2010	11.4		10.0	0.104		0.41			0.03	1.06			
25	Silver L (W)	8/6/2010	11.3		10.5	0.164		0.70			0.31	1.63	1.90		
25	Silver L (W)	8/21/2010	11.2		10.0	0.415		2.35			0.27	2.00	2.50		
25	Silver L (W)	9/2/2010	11.4		10.5	0.177		0.86			0.26	2.36			
25	Silver L (W)	5/25/2011	11.6		10.5	0.045		0.19							
25	Silver L (W)	6/10/2011	11.5		10.5	0.082		0.40							
25	Silver L (W)	6/30/2011	11.3		10.5	0.255		0.56							
25	Silver L (W)	7/11/2011	10.7		10.0	0.045		0.37							
25	Silver L (W)	7/13/2011	11.1		10.0	0.049		0.41			0.01	1.14			0.01
25	Silver L (W)	8/17/2011	11.0		10.0	0.727		1.72			1.24	2.99	1.00		0.01
25	Silver L (W)	8/31/2011	11.4		10.0	0.154		0.56			0.01	1.78			0.01
25	Silver L (W)	9/14/2011	10.9		10.0	0.135		0.50			0.15	1.02	2.00		0.01
25	Silver L (W)	5/31/2012			10.0	0.027	0.16	0.16			0.03	0.38			
25	Silver L (W)	7/19/2012			10.0						0.49	1.95			
25	Silver L (W)	8/1/2012			10.0	0.425		1.23							
25	Silver L (W)	8/19/2012			9.5						0.49	2.81	2.00		
25	Silver L (W)	8/30/2012			10.0	0.928		2.40							
25	Silver L (W)	9/13/2012			10.0						0.60	2.51	0.50		
25	Silver L (W)	7/4/2013			10.0	0.060		0.29							
25	Silver L (W)	7/22/2013			10.0	0.020									
25	Silver L (W)	8/3/2013			9.0	0.044		0.55							
25	Silver L (W)	8/14/2013			10.0	0.042									

LNum	PName	Date	Zbot	Zsd	Zsamp	Tot.P	NO3	NH4				Fe	Mn	As	NO2
25	Silver L (W)	8/30/2013			10.0	0.088		0.26							
25	Silver L (W)	9/27/2013			10.5	0.091									

LNum	PName	Date	Site	TAir	TH20	QA	QB	QC	QD	QE	QF	QG	AQ-PC	AQ-Chla	MC-LR	Ana-a	Cylin	FP-Chl	FP-BG	HAB form	Shore HAB	
25	Silver L (W)	6/13/1986	epi																			
25	Silver L (W)	6/19/1986	epi	20	18																	
25	Silver L (W)	6/25/1986	epi	12	17																	
25	Silver L (W)	7/3/1986	epi	17	20																	
25	Silver L (W)	7/9/1986	epi	23	22																	
25	Silver L (W)	7/16/1986	epi	19	21																	
25	Silver L (W)	7/23/1986	epi	21	23																	
25	Silver L (W)	7/31/1986	epi	18	22																	
25	Silver L (W)	8/4/1986	epi	20	22																	
25	Silver L (W)	8/11/1986	epi	15	19																	
25	Silver L (W)	8/20/1986	epi	15	20																	
25	Silver L (W)	8/29/1986	epi	13	17																	
25	Silver L (W)	9/3/1986	epi	19	17																	
25	Silver L (W)	9/9/1986	epi	17	16																	
25	Silver L (W)	9/17/1986	epi	12	15																	
25	Silver L (W)	6/10/1987	epi	13	15																	
25	Silver L (W)	6/15/1987	epi	22	18																	
25	Silver L (W)	6/23/1987	epi	22	20																	
25	Silver L (W)	6/29/1987	epi	21	19																	
25	Silver L (W)	7/7/1987	epi	23	21																	
25	Silver L (W)	7/15/1987	epi	12	20																	
25	Silver L (W)	7/22/1987	epi	21	22																	
25	Silver L (W)	7/29/1987	epi	15	17																	
25	Silver L (W)	8/1/1987	epi	22	21																	
25	Silver L (W)	8/10/1987	epi	21	21																	
25	Silver L (W)	8/17/1987	epi	24	26																	
25	Silver L (W)	8/25/1987	epi	18	19																	
25	Silver L (W)	9/4/1987	epi	17	17																	
25	Silver L (W)	9/10/1987	epi	22	20																	
25	Silver L (W)	6/21/1988	epi	28	22																	
25	Silver L (W)	6/28/1988	epi	15	19																	
25	Silver L (W)	7/5/1988	epi	29	22																	
25	Silver L (W)	7/13/1988	epi	22	24																	
25	Silver L (W)	7/19/1988	epi	22	23																	
25	Silver L (W)	7/29/1988	epi	24	23																	
25	Silver L (W)	8/5/1988	epi	23	24																	
25	Silver L (W)	8/12/1988	epi	28	25																	
25	Silver L (W)	8/16/1988	epi	25	25																	
25	Silver L (W)	8/23/1988	epi	19	22																	
25	Silver L (W)	8/30/1988	epi	19	19																	
25	Silver L (W)	9/8/1988	epi	22	19																	
25	Silver L (W)	9/16/1988	epi	17	17																	
25	Silver L (W)	9/21/1988	epi	14	12																	
25	Silver L (W)	9/28/1988	epi	12	10																	
25	Silver L (W)	6/23/1989	epi	22	19																	
25	Silver L (W)	7/5/1989	epi	21	22																	
25	Silver L (W)	7/18/1989	epi	21	22																	
25	Silver L (W)	7/28/1989	epi	18	22																	
25	Silver L (W)	8/4/1989	epi	25	22																	
25	Silver L (W)	8/11/1989	epi	17	20																	
25	Silver L (W)	8/15/1989	epi	29	22																	
25	Silver L (W)	8/22/1989	epi	24	22																	
25	Silver L (W)	8/30/1989	epi	23	20																	
25	Silver L (W)	9/6/1989	epi	24	20																	
25	Silver L (W)	9/13/1989	epi	20	19																	
25	Silver L (W)	9/20/1989	epi	21	19																	
25	Silver L (W)	7/5/1990	epi	21	19																	

LNum	PName	Date	Site	TAir	TH20	QA	QB	QC	QD	QE	QF	QG	AQ-PC	AQ-Chla	MC-LR	Ana-a	Cylin	FP-Chl	FP-BG	HAB form	Shore HAB
25	Silver L (W)	7/18/1990	epi	23	21																
25	Silver L (W)	8/4/1990	epi	20	22																
25	Silver L (W)	8/16/1990	epi	19	21																
25	Silver L (W)	8/28/1990	epi	25	22																
25	Silver L (W)	9/12/1990	epi	24	20																
25	Silver L (W)	10/8/1990	epi	13	13																
25	Silver L (W)	6/3/1991	epi	25	22																
25	Silver L (W)	6/15/1991	epi	24	20																
25	Silver L (W)	7/11/1991	epi	20	22																
25	Silver L (W)	8/12/1991	epi	19	20																
25	Silver L (W)	9/13/1991	epi	22	20																
25	Silver L (W)	8/14/1996	epi	27	24	3	3	4	346												
25	Silver L (W)	6/25/1997	epi	29	17																
25	Silver L (W)	7/9/1997	epi	17	21																
25	Silver L (W)	7/30/1997	epi	27	20																
25	Silver L (W)	10/8/1997	epi	24	17	3	2	3	13												
25	Silver L (W)	6/15/2006	epi	16	14	2	2	2	2												
25	Silver L (W)	6/30/2006	epi	21	22	2	2	2	2												
25	Silver L (W)	7/14/2006	epi	22	24	3	3	3	2												
25	Silver L (W)	7/28/2006	epi	24	25	3	3	2	25												
25	Silver L (W)	8/11/2006	epi	22	25	3	3	2	2												
25	Silver L (W)	8/25/2006	epi	18	22	3	3	2	2												
25	Silver L (W)	9/8/2006	epi	16	20	3	3	3	2												
25	Silver L (W)	9/21/2006	epi	10	17	3	3	3	12												
25	Silver L (W)	6/13/2008	epi	24	15	3	1	2	0												
25	Silver L (W)	6/24/2008	epi	21	21	2	2	2	0												
25	Silver L (W)	7/17/2008	epi	32	25	2	3	3	25												
25	Silver L (W)	7/24/2008	epi	27	25	4	3	4	123												
25	Silver L (W)	8/12/2008	epi	20	22	2	2	3	258												
25	Silver L (W)	8/28/2008	epi	18	16	3	4	4	24												
25	Silver L (W)	9/12/2008	epi	18	20	3	3	4	125												
25	Silver L (W)	06/10/2009	epi	21	19	1	2	1	0												
25	Silver L (W)	06/22/2009	epi	22	21	2	1	2	0												
25	Silver L (W)	07/05/2009	epi	23	22	2	2	2	0												
25	Silver L (W)	07/20/2009	epi	28	22	3	3	3	13												
25	Silver L (W)	08/03/2009	epi	26	23	3	3	3	0												
25	Silver L (W)	08/16/2009	epi	30	26	3	3	2	7						0.22						
25	Silver L (W)	08/29/2009	epi	25	23	3	3	2	0												
25	Silver L (W)	09/10/2009	epi	23	22	3	3	3	1				328.3		0.25						
25	Silver L (W)	10/04/2009	epi												0.24						
25	Silver L (W)	5/15/2010	epi	14	13	1	1	1	5	0	0										
25	Silver L (W)	5/30/2010	epi	30	22	1	2	2	6	5	0										
25	Silver L (W)	6/11/2010	epi	33	22	1	3	2	2	0	0										
25	Silver L (W)	6/26/2010	epi	21	22	2	4	3	234	0	0										
25	Silver L (W)	7/10/2010	epi	37	27	2	3	2	2	0	0										
25	Silver L (W)	8/6/2010	epi	23	25	4	2	3	15	7	0	182.50									
25	Silver L (W)	8/21/2010	epi	24	24							428.30									
25	Silver L (W)	9/2/2010	epi	32	26	3	3	2	0	0	0	533.80									
25	Silver L (W)	10/8/2010										700.00			0.34						
25	Silver L (W)	5/25/2011	epi	25	19	2	1	2	0	5	5										
25	Silver L (W)	6/10/2011	epi	26	23	2	2	2	0	0	0	16.70	3.00								
25	Silver L (W)	6/30/2011	epi	20	22	2	3	4	2	0	5	12.20	2.10								
25	Silver L (W)	7/13/2011	epi	26	26	2	4	4	2	0	0	31.60	4.80	0.63	<0.5	<0.1					
25	Silver L (W)	7/13/2011	bloom											1.43	<440	0.00					
25	Silver L (W)	7/27/2011	epi	24	26	3	3	3	2	0	0	38.50	11.20	0.41	<0.4	<0.1					
25	Silver L (W)	8/9/2011	bloom											158.53	<0.8	<0.1					
25	Silver L (W)	8/17/2011	epi	25	25	2	3	3	2	0	0										
25	Silver L (W)	8/31/2011	epi	24	22	2	3	2	0	0	0	183.80	4.50	0.46	<0.4	<0.1					
25	Silver L (W)	9/14/2011	epi	19	22	3	3	3	2	0	0	382.70	9.70	2.62							
25	Silver L (W)	9/14/2011	bloom											59.82	<0.8	0.00					
25	Silver L (W)	9/23/2011	bloom											101.63							

LNum	PName	Date	Site	TAir	TH20	QA	QB	QC	QD	QE	QF	QG	AQ-PC	AQ-Chla	MC-LR	Ana-a	Cylin	FP-Chl	FP-BG	HAB form	Shore HAB
25	Silver L (W)	10/22/2011	bloom																		
25	Silver L (W)	5/31/2012	epi	15	21	1	2	1	0	0	0		3.80	0.20	<0.30	<0.417		0.9	0.5		
25	Silver L (W)	6/15/2012	epi	27	22	2	4	2	2	0	0		3.40	0.50	<0.30	<0.413		1.1	0.3		
25	Silver L (W)	6/25/2012	epi	26	22	2	4	3	2	7	7		7.40	0.40	0.43	<0.392		6.1	2.2		
25	Silver L (W)	7/19/2012	epi	28	26	3	3	2	2	0	0		13.50	0.90	<0.30	<0.292		6.4	0.9		
25	Silver L (W)	8/1/2012	epi	30	26	2	3	2	2	0	0		34.80	0.60	<0.30	<0.330		3.9	0.7		
25	Silver L (W)	8/19/2012	epi	27	24	2	3	2		0	0		6.60	0.90	<0.30	<0.552		4.6	1.3		
25	Silver L (W)	8/30/2012	epi	23	23	2	3	2	2	0	0		16.70	2.10	<0.30	<0.725		8.2	1.7		
25	Silver L (W)	9/13/2012	epi	28	23	2	3	2	0	4	0		56.90	0.70	0.47	<3.299		7.6	5.2		
25	Silver L (W)	7/4/2013	epi	25	24	2	3	2	0	0	0		26.80	3.90	<0.30	<0.510		6.5	0.5		
25	Silver L (W)	7/22/2013	epi	27	27	3	3	4	12	4	4		21.70	2.80	<0.30	<0.400		7.1	1.6		
25	Silver L (W)	8/3/2013	epi	21	23	3	3	2	0	0	0		35.40	15.20	0.62	<0.390		15.0	0.0		
25	Silver L (W)	8/14/2013	epi	21	23	3	3	2	5	0	0		55.60	4.20	<0.30	<0.390		9.6	4.1		
25	Silver L (W)	8/30/2013	epi	23	24	2	2	2	1	0	0		94.60	4.40	<0.30	<1.100		21.8	13.4		
25	Silver L (W)	9/27/2013	epi	20	19	3	2	2	0	0	0		42.20	3.90	<0.30	<10.600		9.3	3.3		
25	Silver L (W)	7/28/2006	hypo		16																
25	Silver L (W)	8/11/2006	hypo		15																
25	Silver L (W)	7/28/2007	hypo		18																
25	Silver L (W)	9/1/2007	hypo		17																
25	Silver L (W)	6/24/2008	hypo		13																
25	Silver L (W)	7/17/2008	hypo		15																
25	Silver L (W)	7/24/2008	hypo		16																
25	Silver L (W)	8/12/2008	hypo		16																
25	Silver L (W)	8/28/2008	hypo		21																
25	Silver L (W)	9/12/2008	hypo		19																
25	Silver L (W)	06/10/2009	hypo		16																
25	Silver L (W)	06/22/2009	hypo		17																
25	Silver L (W)	07/05/2009	hypo		18																
25	Silver L (W)	07/20/2009	hypo		18																
25	Silver L (W)	08/03/2009	hypo		19																
25	Silver L (W)	08/16/2009	hypo		19																
25	Silver L (W)	08/29/2009	hypo		19																
25	Silver L (W)	09/10/2009	hypo		18																
25	Silver L (W)	5/15/2010	hypo		12																
25	Silver L (W)	5/30/2010	hypo		14																
25	Silver L (W)	6/11/2010	hypo		15																
25	Silver L (W)	6/26/2010	hypo		15																
25	Silver L (W)	7/10/2010	hypo		15																
25	Silver L (W)	8/6/2010	hypo		17																
25	Silver L (W)	8/21/2010	hypo		16																
25	Silver L (W)	9/2/2010	hypo		21																
25	Silver L (W)	5/25/2011	hypo		13																
25	Silver L (W)	6/10/2011	hypo		14																
25	Silver L (W)	6/30/2011	hypo		14																
25	Silver L (W)	7/11/2011	hypo		19																
25	Silver L (W)	7/13/2011	hypo		17																
25	Silver L (W)	8/17/2011	hypo		16																
25	Silver L (W)	8/31/2011	hypo		20																
25	Silver L (W)	9/14/2011	hypo		20																
25	Silver L (W)	5/31/2012	hypo		14																
25	Silver L (W)	7/19/2012	hypo		16																
25	Silver L (W)	8/1/2012	hypo		15																
25	Silver L (W)	8/19/2012	hypo		18																
25	Silver L (W)	8/30/2012	hypo		16																
25	Silver L (W)	9/13/2012	hypo		19																
25	Silver L (W)	7/4/2013	hypo		19																
25	Silver L (W)	7/22/2013	hypo		20																
25	Silver L (W)	8/3/2013	hypo		19																
25	Silver L (W)	8/14/2013	hypo		22																
25	Silver L (W)	8/30/2013	hypo		21																
25	Silver L (W)	9/27/2013	hypo		19																

Legend Information

<i>Indicator</i>	<i>Description</i>	<i>Detection Limit</i>	<i>Standard (S) / Criteria (C)</i>
General Information			
Lnum	lake number (unique to CSLAP)		
Lname	name of lake (as it appears in the Gazetteer of NYS Lakes)		
Date	sampling date		
Field Parameters			
Zbot	lake depth at sampling point, meters (m)		
Zsd	Secchi disk transparency or clarity	0.1m	1.2m (C)
Zsamp	water sample depth (m) (epi = epilimnion or surface; bot = bottom)	0.1m	none
Tair	air temperature (C)	-10C	none
TH20	water temperature (C)	-10C	none
Laboratory Parameters			
Tot.P	total phosphorus (mg/l)	0.003 mg/l	0.020 mg/l (C)
NOx	nitrate + nitrite (mg/l)	0.01 mg/l	10 mg/l NO3 (S), 2 mg/l NO2 (S)
NH4	total ammonia (mg/l)	0.01 mg/l	2 mg/l NH4 (S)
TN	total nitrogen (mg/l)	0.01 mg/l	none
TN/TP	nitrogen to phosphorus (molar) ratio, = (TKN + NOx)*2.2/TP		none
TCOLOR	true (filtered) color (ptu, platinum color units)	1 ptu	none
pH	powers of hydrogen (S.U., standard pH units)	0.1 S.U.	6.5, 8.5 S.U. (S)
Cond25	specific conductance, corrected to 25C (umho/cm)	1 umho/cm	none
Ca	calcium (mg/l)	1 mg/l	none
Chl.a	chlorophyll a (ug/l)	0.01 ug/l	none
Fe	iron (mg/l)	0.1 mg/l	1.0 mg/l (S)
Mn	manganese (mg/l)	0.01 mg/l	0.3 mg/l (S)
As	arsenic (ug/l)	1 ug/l	10 ug/l (S)
AQ-PC	Phycocyanin (aquafior) (unitless)	1 unit	none
AQ-Chl	Chlorophyll a (aquafior) (ug/l)	1 ug/l	none
MC-LR	Microcystis-LR (ug/l)	0.01 ug/l	1 ug/l potable (C) 20 ug/l swimming (C)
Ana	Anatoxin-a (ug/l)	variable	none
Cyl	Cylindrospermopsin (ug/l)	0.1 ug/l	none
FP-Chl, FP-BG	Fluoroprobe total chlorophyll, fluoroprobe blue-green chlorophyll (ug/l)	0.1 ug/l	none
Lake Assessment			
QA	water quality assessment; 1 = crystal clear, 2 = not quite crystal clear, 3 = definite algae greenness, 4 = high algae levels, 5 = severely high algae levels		
QB	aquatic plant assessment; 1 = no plants visible, 2 = plants below surface, 3 = plants at surface, 4 = plants dense at surface, 5 = surface plant coverage		
QC	recreational assessment; 1 = could not be nicer, 2 = excellent, 3 = slightly impaired, 4 = substantially impaired, 5 = lake not usable		
QD	reasons for recreational assessment; 1 = poor water clarity, 2 = excessive weeds, 3 = too much algae, 4 = lake looks bad, 5 = poor weather, 6 = litter/surface debris, 7 = too many lake users, 8 = other		
QF, QG	Health and safety issues today (QF) and past week (QG); 0 = none, 1 = taste/odor, 2 = GI illness humans/animals, 3 = swimmers itch, 4 = algae blooms, 5 = dead fish, 6 = unusual animals, 7 = other		
HAB form, Shore HAB	HAB evaluation; A = spilled paint, B = pea soup, C = streaks, D = green dots, E = bubbling scum, F = green/brown tint, G = duckweed, H = other, I = no bloom		

Appendix B- Monthly Evaluation of Silver Lake Data, 2006-2013

June Data

	2006	2007	2008	2009	2010	2011	2012	2013
Zsd	NORMAL		NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	
TP	LOW		NORMAL	NORMAL	NORMAL	NORMAL	LOW	
Chl.a	NORMAL		NORMAL	NORMAL	NORMAL	LOW	NORMAL	
NOx	NORMAL		NORMAL	NORMAL	NORMAL	HIGH	HIGH	
NH4	NORMAL		NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	
TN	NORMAL		HIGH	NORMAL	NORMAL	NORMAL	NORMAL	
pH	NORMAL		NORMAL	NORMAL	NORMAL	LOW	NORMAL	
SpCond	NORMAL		NORMAL	NORMAL	HIGH	NORMAL	HIGH	
Color	NORMAL		LOW	NORMAL	NORMAL	NORMAL	NORMAL	
Ca	LOW		NORMAL					
QA	NORMAL		NORMAL	LOW	LOW	NORMAL	NORMAL	
QB	NORMAL		NORMAL	NORMAL	HIGH	NORMAL	HIGH	
QC	NORMAL		NORMAL	LOW	NORMAL	NORMAL	NORMAL	
TH20	NORMAL		NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	

High = average monthly reading > 90th percentile reading for lake, 2000-2010

Low = average monthly reading < 10th percentile reading for lake, 2000-2010

Normal = average monthly reading between 10th and 90th percentile reading for lake, 2000-2010

July Data

	2006	2007	2008	2009	2010	2011	2012	2013
Zsd	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
TP	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
Chl.a	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	
NOx	NORMAL	NORMAL	NORMAL	NORMAL	LOW	NORMAL	LOW	HIGH
NH4	NORMAL	NORMAL	NORMAL	NORMAL	HIGH	NORMAL	NORMAL	NORMAL
TN	NORMAL	NORMAL	LOW	NORMAL	NORMAL	NORMAL	NORMAL	HIGH
pH	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
SpCond	NORMAL	NORMAL	NORMAL	NORMAL		NORMAL	NORMAL	NORMAL
Color	NORMAL	NORMAL	NORMAL	HIGH	NORMAL	NORMAL	NORMAL	NORMAL
Ca		NORMAL		NORMAL	NORMAL	NORMAL		
QA	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
QB	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	HIGH	NORMAL	NORMAL
QC	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
TH20	NORMAL	NORMAL	NORMAL	NORMAL	HIGH	HIGH	HIGH	HIGH

High = average monthly reading > 90th percentile reading for lake, 2000-2010

Low = average monthly reading < 10th percentile reading for lake, 2000-2010

Normal = average monthly reading between 10th and 90th percentile reading for lake, 2000-2010

August Data

	2006	2007	2008	2009	2010	2011	2012	2013
Zsd	NORMAL	NORMAL	NORMAL	NORMAL	LOW	NORMAL	NORMAL	NORMAL
TP	LOW	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
Chl.a	NORMAL	NORMAL	NORMAL	NORMAL	HIGH	HIGH	NORMAL	NORMAL
NOx	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	LOW	LOW	
NH4	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	LOW	LOW	NORMAL
TN	NORMAL	NORMAL	NORMAL	LOW	NORMAL	NORMAL	LOW	NORMAL
pH	NORMAL	NORMAL	HIGH	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
SpCond	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
Color	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
Ca	NORMAL		NORMAL	NORMAL			NORMAL	
QA	NORMAL	NORMAL	NORMAL	NORMAL	HIGH	NORMAL	NORMAL	NORMAL
QB	NORMAL	HIGH	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
QC	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
TH20	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL

High = average monthly reading > 90th percentile reading for lake, 2000-2010

Low = average monthly reading < 10th percentile reading for lake, 2000-2010

Normal = average monthly reading between 10th and 90th percentile reading for lake, 2000-2010

September Data

	2006	2007	2008	2009	2010	2011	2012	2013
Zsd	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
TP	NORMAL	NORMAL	HIGH	HIGH	NORMAL	HIGH	NORMAL	HIGH
Chl.a	NORMAL	NORMAL	NORMAL	HIGH	NORMAL	HIGH	NORMAL	NORMAL
NOx	NORMAL	NORMAL	LOW	NORMAL	NORMAL	NORMAL	LOW	
NH4	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	
TN	NORMAL	NORMAL	NORMAL	HIGH	NORMAL	HIGH	NORMAL	
pH	LOW	NORMAL	NORMAL	HIGH	NORMAL	NORMAL	NORMAL	NORMAL
SpCond	NORMAL	LOW	NORMAL	LOW	NORMAL	NORMAL	NORMAL	HIGH
Color	NORMAL	NORMAL	NORMAL	HIGH	NORMAL	NORMAL	LOW	NORMAL
Ca		NORMAL		LOW				
QA	NORMAL	HIGH	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
QB	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
QC	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
TH20	NORMAL	NORMAL	NORMAL	NORMAL	HIGH	NORMAL	NORMAL	NORMAL

High = average monthly reading > 90th percentile reading for lake, 2000-2010

Low = average monthly reading < 10th percentile reading for lake, 2000-2010

Normal = average monthly reading between 10th and 90th percentile reading for lake, 2000-2010

Appendix C- Priority Waterbody Listing for Silver Lake

Silver Lake (0403-0002)

Impaired Seg

Waterbody Location Information

Revised: 10/28/02

Water Index No:	Ont 117- 70-P115	Drain Basin:	Genesee River
Hydro Unit Code:	04130002/160	Str Class:	A
Waterbody Type:	Lake	Reg/County:	9/Wyoming Co. (61)
Waterbody Size:	812.7 Acres (Eutrophic)	Quad Map:	CASTILE (K-08-2)
Seg Description:	entire lake		

Water Quality Problem/Issue Information (CAPS indicate MAJOR Use Impacts/Pollutants/Sources)

Use(s) Impacted	Severity	Problem Documentation
WATER SUPPLY	Impaired	Known
Public Bathing	Stressed	Known
Recreation	Stressed	Known
Aesthetics	Stressed	Known

Type of Pollutant(s)

Known: ALGAL/WEED GROWTH (algal growth), NUTRIENTS, Pesticides, Silt/Sediment
 Suspected: ---
 Possible: Pathogens

Source(s) of Pollutant(s)

Known: AGRICULTURE, Streambank Erosion
 Suspected: Construction
 Possible: Failing On-Site Syst

Resolution/Management Information

Issue Resolvability:	2 (Strategy Exists, Needs Funding/Resources)		
Verification Status:	5 (Management Strategy has been Developed)		
Lead Agency/Office:	ext/WQCC	Resolution Potential:	Medium
TMDL/303d Status:	3 (Waters Requiring Re-Assessment Based on New Methodology)		

Further Details

The drinking water supply as well as public bathing/recreational uses and aesthetics of Silver Lake are impacted by nutrients (phosphorus) and algal growth that reduce clarity. Agricultural activities in the watershed are the primary source of nutrient loads. On-site septic systems are also an issue.

Turbidity (clarity) standards/guidance values are regularly not met in the lake and in finished waters from the drinking water treatment plant. The plant has experienced additional costs in order to meet existing standards; potential new (lower) standards are under consideration and raise concerns about the need for additional filtering. (DEC/DOW, Region 9, April 2001)

CSLAP volunteer monitoring of the lake conducted from 1986 through 1997 has documented elevated phosphorus and algal levels and reduced clarity. During the summer, lake clarity does not meet minimum recommendations (based on recommendations for siting new bathing beaches). Conditions are typical of stressed recreational uses. Although no data

is currently available, THM formation may be an issue given the algal densities in the lake. (DEC/DOW, BWM/Lake Services, April 2001)

Much of the area surrounding the lake is agricultural with high concentrations of dairy farming activity. Improper manure management (spreading on frozen or snow covered ground adjacent to the lake) and fertilizer use are the primary sources of nutrient loads to the lake. There are many on-going programs to install agricultural BMPs. Many area dairy farms fall under CAFO regulation and are working on plans to reduce and/or eliminate nutrient runoff over the next five years. Cropland soil erosion and pesticide/herbicide use are also concerns. A recent USGS study and report found pesticides to be present in the watershed, but at concentrations within applicable standards. (Wyoming County WQCC, April 2001)

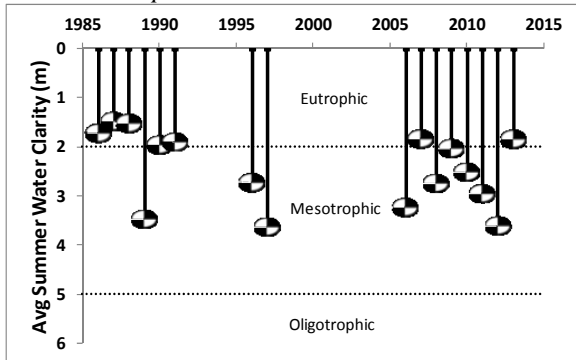
Inadequate and/or failing on-site septic systems serving the many cottages around the lake are also a suspected source of nutrients. Algal blooms appear to be less of a problem since sanitary sewers were installed in the more densely populated areas (Silver Lake and Fairview) in the mid-1980s. However, not all cottages are connected to the lake sewer district and it is suspected that many have sub-standard and failing septic systems. Construction of new residences and the use fertilizers, herbicides and pesticides on lawns (and golf courses) bordering the lake are also a concern. The Wyoming County Soil and Water Conservation District and Water Quality Committee are undertaking studies to implement non-point source BMP's, such as the construction of a sediment trap on the lake inlet. (Wyoming County WQCC, April 2001)

The lake is included on the NYS 2002 Section 303(d) List of Impaired Waters. The lake is included on Part 3 of the List as a Water Previously Listed But Requiring Re-Assessment Based on New Assessment/List Methodology.

Appendix D- Long Term Trends: Silver Lake

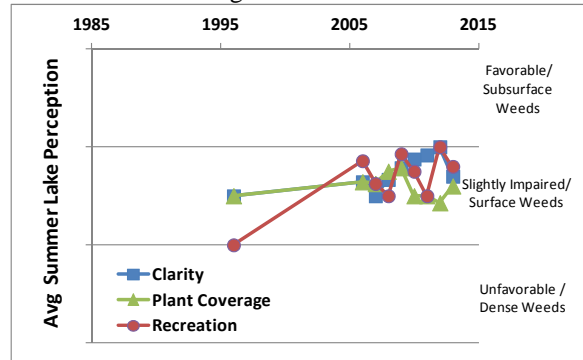
Long Term Trends: Water Clarity

- No trends apparent; variable year to year
- Most readings typical of *mesotrophic* to *eutrophic* lakes



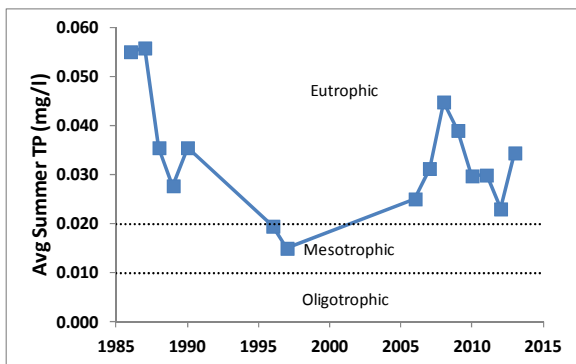
Long Term Trends: Lake Perception

- Recreational and WQ perceptions improving
- Recreational perception linked to both excessive algae and excessive weeds



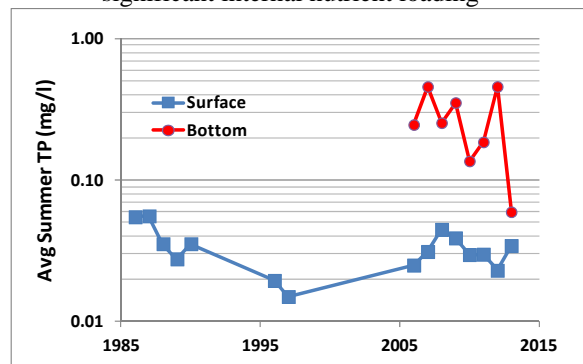
Long Term Trends: Phosphorus

- No trends apparent; highly variable
- Most readings typical of *eutrophic* lakes



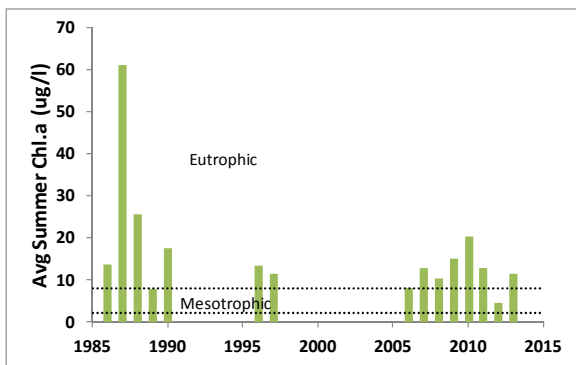
Long Term Trends: Bottom Phosphorus

- Deepwater TP levels higher than surface
- 2013 deepwater TP readings indicates weak significant internal nutrient loading



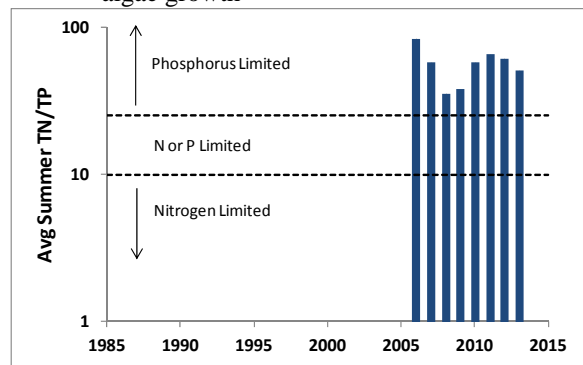
Long Term Trends: Chlorophyll a

- No trends apparent; less variability after '87
- Most readings typical of *eutrophic* lakes



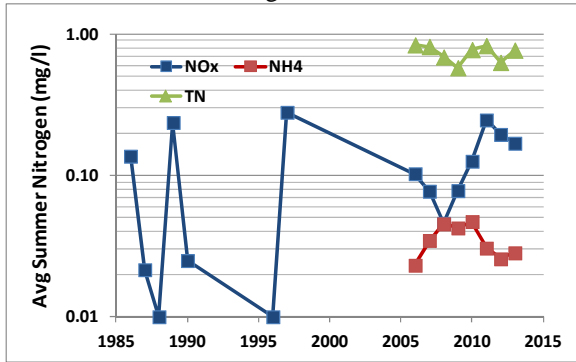
Long Term Trends: N:P Ratio

- No trends apparent
- Most readings indicate phosphorus limits algae growth



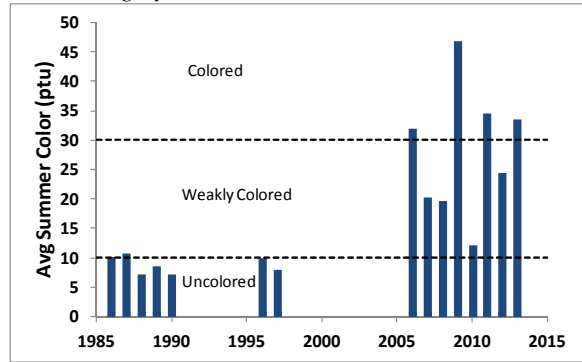
Long Term Trends: Nitrogen

- NOx readings highly variable year to year
- Elevated total nitrogen usually associated with elevated algae levels



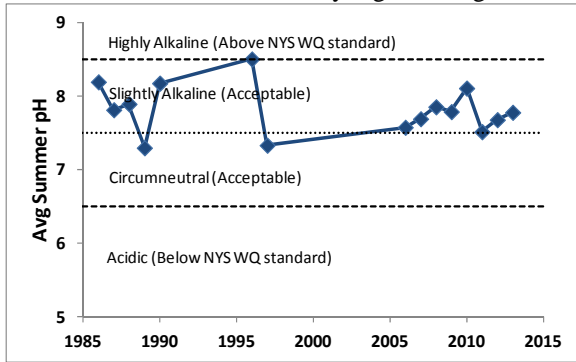
Long Term Trends: Color

- Color readings rose after 2002 shift in labs
- Most readings typical of *weakly colored* to *highly colored* lakes



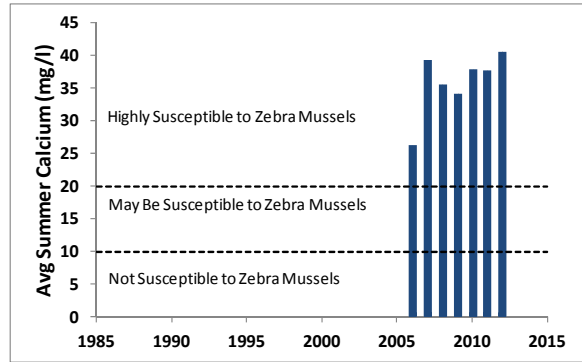
Long Term Trends: pH

- No trends apparent
- Most readings typical of *slightly alkaline* lakes with occasionally high readings



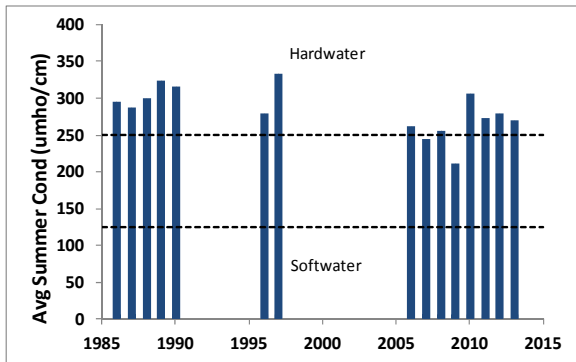
Long Term Trends: Calcium

- No trends apparent
- Data indicates high susceptibility to zebra mussels, which have been found in lake



Long Term Trends: Conductivity

- No trends apparent, though recently lower
- Most readings typical of *hardwater* to *intermediate hardness* lakes



Long Term Trends: Water Temperature

- Slightly increasing surface temperatures
- Bottom temperatures indicate thermal stratification usually weak

