

Song Lake Questions and Answers, 2015 CSLAP

Q1. What is the condition of our lake this year?

A1. Conditions in Song Lake were probably close to normal in 2014 and 2015. Algae levels were slightly lower than usual, but phosphorus and Secchi disk transparency were similar to previous readings. Shoreline algae blooms were again reported in 2015, again at the north end of the lake.

Q2. Is there anything new that showed up in the testing this year?

A2. Chloride sampling results are typical of lakes with low to moderate impacts from road salt runoff, although no impacts have been reported or measured..

Q3. How does the condition of our lake this year compare with other lakes in the area?

A3. Song Lake had similar water clarity, but slightly lower nutrient levels and algae levels, than other nearby lakes. Aquatic plant coverage was slightly lower than in nearby lakes.

Q4. Are there any trends in our lake's condition?

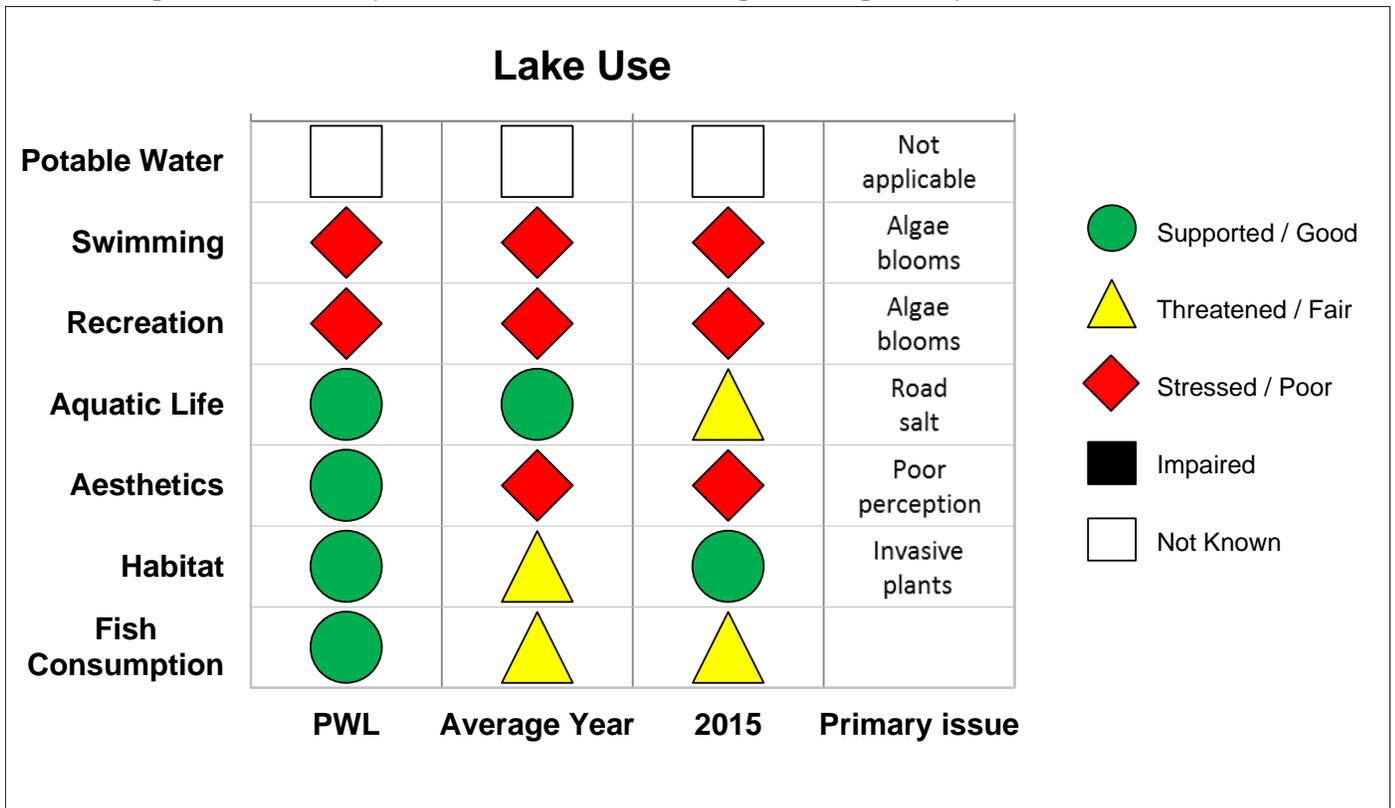
A4. Blue green algae blooms have been very common in recent years, but it is not yet known if this represents a recent increase. pH readings have been much lower than in the late 1980s, but recent data has been stable.

Q5. Should we be concerned about the condition of our lake? Are we close to a tipping point?

A5. Song Lake continues to be susceptible to widespread and shoreline blue green algae blooms. It is not known if a reduction in lake phosphorus levels would improve this situation, since open water nutrient levels in Song Lake are not particularly high. Song Lake and other CSLAP data continue to be evaluated to determine the cause of these blooms.

Q6. Are any actions indicated, based on the trends and this year's results?

A6. Individual stewardship activities such as pumping your septic system, growing a buffer of native plants next to the water bodies, and reducing erosion from shoreline properties and runoff into the lake will help to improve lake health by reducing nutrient and sediment loading to the lake. Visiting boats should be inspected to reduce the risk of new invasive species, since nearby lakes harbor several invasive plants not presently found in the lake.

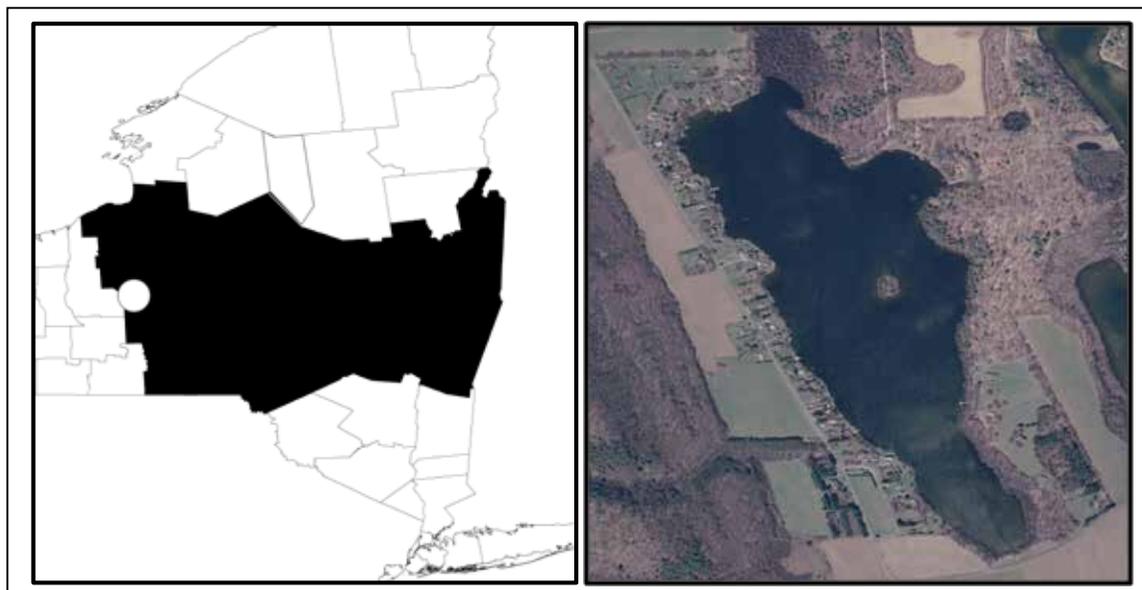


CSLAP 2015 Lake Water Quality Summary: Song Lake

General Lake Information

Location	Town of Preble
County	Cortland
Basin	Susquehanna River
Size	44 hectares (108.7 acres)
Lake Origins	Natural
Watershed Area	255.4 hectares (630.8 acres)
Retention Time	1.1 years
Mean Depth	4.0 meters
Sounding Depth	8.6 meters
Public Access?	no (some public access prior to 1988)
Major Tributaries	no named tribs
Lake Tributary To...	groundwater feed to West Branch Tioughnioga River to East Branch Tioughnioga River to Tioughnioga River to Chenango River to Susquehanna River
WQ Classification	B (contact recreation = swimming)
Lake Outlet Latitude	42.762
Lake Outlet Longitude	-76.143
Sampling Years	2007-2012, 2014-2015
2015 Samplers	Tony George, Carl Grillo, and Tarki Heath,
Main Contact	Tony George

Lake Map



Background

Song Lake is a 109 acre, class B lake found in the Town of Preble in Cortland County, in the central region of New York State. Song Lake was first sampled as part of CSLAP in 1988, and again in 2007.

It is one of five CSLAP lakes among the more than 65 lakes and ponds found in Cortland County, and one of 25 CSLAP lakes among the nearly 900 lakes and ponds in the Susquehanna River drainage basin.

Lake Uses

Song Lake is a Class B lake; this means that the best intended use for the lake is for contact recreation—swimming and bathing, non-contact recreation—boating and fishing, aquatic life, and aesthetics. The lake is used by lake residents and invited guests for boating and swimming. There is no public access to the lake.

Song Lake is not stocked by the state. It is not known by the report authors if private fish stocking occurs in Song Lake. Fish species in the lake include black crappie, brown bullhead, chain pickerel, largemouth bass, pumpkinseed sunfish, rock bass, white sucker, and yellow perch.

General statewide fishing regulations are applicable in Song Lake. In addition, open season for trout lasts from April 1st through October 15th, with no size limits and a daily take limit of five fish, with no more than two fish greater than 12 inches and five brook trout under eight inch in length.

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

Historical Water Quality Data

CSLAP sampling was conducted on Song Lake from 1998, 2007 to 2012, and 2014 to 2015. 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 Song Lake can also be found on the NYSDEC web page at <http://www.dec.ny.gov/lands/77876.html>.

Song Lake was sampled in 2001 by the Cortland County SWCD; the report summarizing the results references water quality monitoring conducted in the early 1990s. Water clarity, nutrients, pH, and conductivity readings were comparable to those measured through CSLAP. The report indicated that

“Song Lake appears to be relatively healthy, with no major problems identified. Sampling results from 2011 are consistent with results from 10 years ago as well as being consistent with other lakes in the region”

Song Lake has not been sampled through any of the statewide water quality monitoring programs prior to CSLAP. It is not known if local monitoring has been conducted as a fisheries management tool, or to evaluate swimming conditions in the lake. Several studies have been conducted by students through SUNY ESF.

The major Song Lake tributaries are not officially named, and have not been monitored through the NYSDEC Rotating Intensive Basins (RIBS) program. No sites have been sampled through the state stream macroinvertebrate monitoring program. The lake has also not been sampled through any of the state fisheries monitoring programs.

Lake Association and Management History

Song Lake is served by the Song Lake Property Owners Association. The lake association conducts a variety of lake management and educational activities, including:

- development of a lake water budget with the Cortland County SWCD
- groundwater monitoring in cooperation with the county and EPA
- leadership in the Cortland-Onondaga Federation of Kettle Lake Associations, Inc
- writing a watershed-based newsletter
- coordinating student research on the lake through SUNY ESF
- grass carp stocking for nuisance weed control

The lake association maintains a website at www.songlakewatershed.org.

Summary of 2015 CSLAP Sampling Results

Evaluation of 2015 Annual Results Relative to 1998-2014

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 – Song Lake” section in Appendix C.

Evaluation of Eutrophication Indicators

Algae levels (as measured by chlorophyll *a*) were slightly lower than normal, at least in the open water, in 2014 and 2015, but phosphorus and water clarity readings were close to normal for the lake. Phosphorus and chlorophyll *a* levels have decreased slightly over the last decade, although these changes have not been statistically significant. The lake continues to suffer from periodic shoreline blooms throughout the summer.

Lake productivity is usually stable in June and July, and then increases slightly from July through September, as manifested in slightly increasing nutrient and algae levels and slightly decreasing water clarity. Productivity increases substantially in the fall, probably due to the effects of lake turnover. These trends were also apparent in 2015.

The lake can be characterized as *mesotrophic*, or moderately unproductive, based on water clarity, total phosphorus and chlorophyll *a* readings (all typical of *mesotrophic* lakes). The trophic state indices (TSI) evaluation suggests that each of these trophic indicators is “internally consistent”—each of these indicators is in the expected range given the readings of the other indicators. Overall trophic conditions are summarized on the Lake Scorecard and Lake Condition Summary Table.

Evaluation of Potable Water Indicators

Algae levels may at times be 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, especially for any intakes near shoreline blooms, but the lake is not intended for use

for drinking water. Deepwater ammonia and phosphorus readings are only slightly higher than those measured at the lake surface, suggesting that deepwater intakes may support “unofficial” potable water use. Deepwater ammonia was higher than normal, and deepwater phosphorus levels were lower than normal. Potable water conditions, at least as measurable through CSLAP, are summarized in the Lake Scorecard and Lake Condition Summary Table.

Evaluation of Limnological Indicators

Calcium levels and color readings decreased in 2015 and have dropped slightly in recent years. pH has dropped significantly since the late 1980s, but these data have been more stable in the last few years. The other limnological indicators have not varied significantly in the last few years.

Chloride levels in the 2015 samples, collected for the first time through CSLAP and cited in Appendix A, ranged from 14 to 16 mg/l. These values fall within the range of “minor” to “moderate” road salt runoff levels cited by the New Hampshire DES. These readings are well below the state potable water quality standard of 250 mg/l and below the range of values found in most NYS lakes. These readings suggest a low to moderate likelihood of biological impacts from road salt. Additional data will help to determine if these represent normal readings for the lake.

Overall limnological conditions are summarized in the Lake Scorecard and Lake Condition Summary Table.

Evaluation of Biological Condition

The fluoroprobe data from SUNY ESF found a mix of algae species, particularly green algae, in open water samples, at levels well below the threshold for harmful algae blooms (HABs). However, shoreline bloom samples are regularly reported (and sampled) and are dominated by blue green algae. These occur at various times during the sampling season, but algae levels increase slightly during the summer.

SUNY ESF students studied zooplankton communities at several depths in the lake, and found eight different zooplankton taxa. A separate SUNY ESF student project looked at macroinvertebrate communities, and evaluation metrics indicated species composition associated with good water quality.

The 2001 study of the lake reported that Eurasian watermilfoil (*Myriophyllum spicatum*) was present in the lake, although it was not the dominant plant. Although this has not been confirmed through CSLAP, given the presence of this plant in most nearby lakes, it is assumed that this exotic plant species is found in the lake. A recent SUNY ESF student project identified at least 10 different aquatic plant species in the lake; these would likely result in a floristic quality index (FQI) evaluation as a “fair” diversity of aquatic plants.

The fish community is comprised of at least five warmwater fish species, and at least three coolwater fish species. This suggests that the lake can most likely be characterized as a coolwater fishery, although the inventory of fish species in the lake may be incomplete. The weight of smallmouth bass, largemouth bass, and yellow perch surveyed by the NYSDEC was lower than expected. A recent SUNY ESF student project indicated that the fish community has shifted since the introduction of grass carp for macrophyte control.

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

Evaluation of Lake Perception

Water quality assessments were slightly more favorable than normal in 2015, but no long term trends have been apparent in water quality or recreational assessments. Aquatic plant coverage has also not exhibited any clear long-term trends. 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 usual in 2015, and these readings have increased slightly over the last two decades. It is not known if this is an indication of local climate change or if these changes can 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. Fluoroprobe readings have been below the thresholds for harmful algal blooms (HABs) in open water samples. However, cyanobacterial shoreline blooms are very common, particularly at the north end of the lake, and these blooms at times exhibit microcystin levels well above thresholds associated with safe swimming. Lake residents are strongly advised to stay out of shoreline blooms or discolored water.

Lake Condition Summary

Category	Indicator	Min	Annual Avg	Max	2015 Avg	Classification	2015 Change?	Long-term Change?
Eutrophication Indicators	Water Clarity	1.40	2.98	5.40	3.04	Mesotrophic	Within Normal Range	No Change
	Chlorophyll <i>a</i>	0.35	5.84	33.16	4.75	Mesotrophic	Within Normal Range	No Change
	Total Phosphorus	0.004	0.017	0.031	0.015	Mesotrophic	Within Normal Range	No Change
Potable Water Indicators	Hypolimnetic Ammonia	0.00	0.23	1.02	0.09	Elevated Deepwater NH4	Lower Than Normal	Not known
	Hypolimnetic Arsenic							
	Hypolimnetic Iron							
	Hypolimnetic Manganese							
Limnological Indicators	Hypolimnetic Phosphorus	0.016	0.049	0.170	0.047	Close to Surface TP Readings	Within Normal Range	Not known
	Nitrate + Nitrite	0.00	0.01	0.07	0.01	Low NOx	Within Normal Range	No Change
	Ammonia	0.01	0.03	0.11	0.04	Low Ammonia	Within Normal Range	No Change
	Total Nitrogen	0.22	0.47	1.02	0.45	Low Total Nitrogen	Within Normal Range	No Change
	pH	7.02	7.75	9.01	7.79	Alkaline	Within Normal Range	Decreasing Significantly
	Specific Conductance	104	189	291	178	Intermediate Hardness	Within Normal Range	No Change
	True Color	5	16	58	12	Intermediate Color	Within Normal Range	No Change
	Calcium	19.1	28.9	34.1	21.7	Highly Susceptible to Zebra Mussels	Lower Than Normal	Decreasing Slightly
Lake Perception	WQ Assessment	1	1.8	4	2.1	Not Quite Crystal Clear	Within Normal Range	No Change
	Aquatic Plant Coverage	1	2.0	3	1.9	Subsurface Plant Growth	Within Normal Range	No Change
	Recreational Assessment	1	1.9	5	1.8	Excellent	Within Normal Range	No Change
Biological Condition	Phytoplankton					Open water-low blue green algae biomass; Shoreline-high blue green algae in bloom	Not known	Not known
	Macrophytes					Fair quality of the aquatic plant community	Not known	Not known
	Zooplankton					Studied by SUNY ESF- 8 different taxa identified	Not known	Not known
	Macroinvertebrates					Studied by SUNY ESF- indicative of good WQ	Not known	Not known
	Fish					Not known	Not known	Not known
	Invasive Species					Eurasian watermilfoil	Not known	Not known
Local Climate Change	Air Temperature	9	22.9	33	21.8		Within Normal Range	No Change
	Water Temperature	15	23.6	30	25.3		Within Normal Range	Increasing Slightly

Category	Indicator	Min	Annual Avg	Max	2015 Avg	Classification	2015 Change?	Long-term Change?
Harmful Algal Blooms	Open Water Phycocyanin	0	19	75	12	No readings indicate high risk of BGA	Not known	Not known
	Open Water FP Chl.a	0	3	7	3	No readings indicate high algae levels	Not known	Not known
	Open Water FP BG Chl.a	0	1	5	0	No readings indicate high BGA levels	Not known	Not known
	Open Water Microcystis	<DL	0.8	18.5	<DL	Mostly undetectable open water MC-LR	Not known	Not known
	Open Water Anatoxin a	<DL	<DL	0.0	<DL	Open water Anatoxin-a at times detectable	Not known	Not known
	Shoreline Phycocyanin					No shoreline blooms sampled for PC	Not known	Not known
	Shoreline FP Chl.a	11.2	12402.8	74781.3	17426.4	Most readings indicate high algae levels	Not known	Not known
	Shoreline FP BG Chl.a	2.9	12150.2	74781.3	17238.7	Most readings indicate high BGA levels	Not known	Not known
	Shoreline Microcystis	<DL	61.4	305.4	34.6	Very high shoreline bloom MC-LR	Not known	Not known
	Shoreline Anatoxin a	<DL	<DL	<DL	<DL	Shoreline bloom Anatoxin-a consistently not detectable	Not known	Not known

Evaluation of Lake Condition Impacts to Lake Uses

Song Lake is presently among the lakes listed on the Susquehanna River drainage basin Priority Waterbody List (2009), with public bathing and recreation listed as *stressed* due to excessive weeds. The PWL listing for Song Lake is listed in Appendix B.

Potable Water (Drinking Water)

The CSLAP dataset at Song Lake, including water chemistry data, physical measurements, and volunteer samplers' perception data, is inadequate to evaluate the use of the lake for potable water, and the lake is not used for this purpose. Any "unofficial" use of the lake for this purpose would be stressed by the occasional production of shoreline algal blooms.

Public Bathing

The CSLAP dataset at Song Lake, including water chemistry data, physical measurements, and volunteer samplers' perception data, suggests that public bathing, if conducted at a public swimming beach, would be *stressed* by shoreline algal blooms, although additional information about bacterial levels is needed to evaluate the safety of the water for swimming.

Recreation (Swimming and Non-Contact Uses)

The CSLAP dataset on Song Lake, including water chemistry data, physical measurements, and volunteer samplers' perception data, suggest that recreation would be *stressed* by shoreline algae blooms.

Aquatic Life

The CSLAP dataset on Song Lake, including water chemistry data, physical measurements, and volunteer samplers' perception data, suggest that aquatic life may be *threatened* by road salt runoff, invasive species, and shoreline algae blooms. Additional data are needed to evaluate the food and habitat conditions for aquatic organisms in the lake.

Aesthetics and Habitat

The CSLAP dataset on Song Lake, including water chemistry data, physical measurements, and volunteer samplers' perception data, suggest that aesthetics may be *poor* due to occasional algal

blooms and poor lake perception, although this may not be apparent in all locations or in every year. Habitat is at times *fair* due to invasive plants.

Fish Consumption

There are no fish consumption advisories posted for Song Lake.

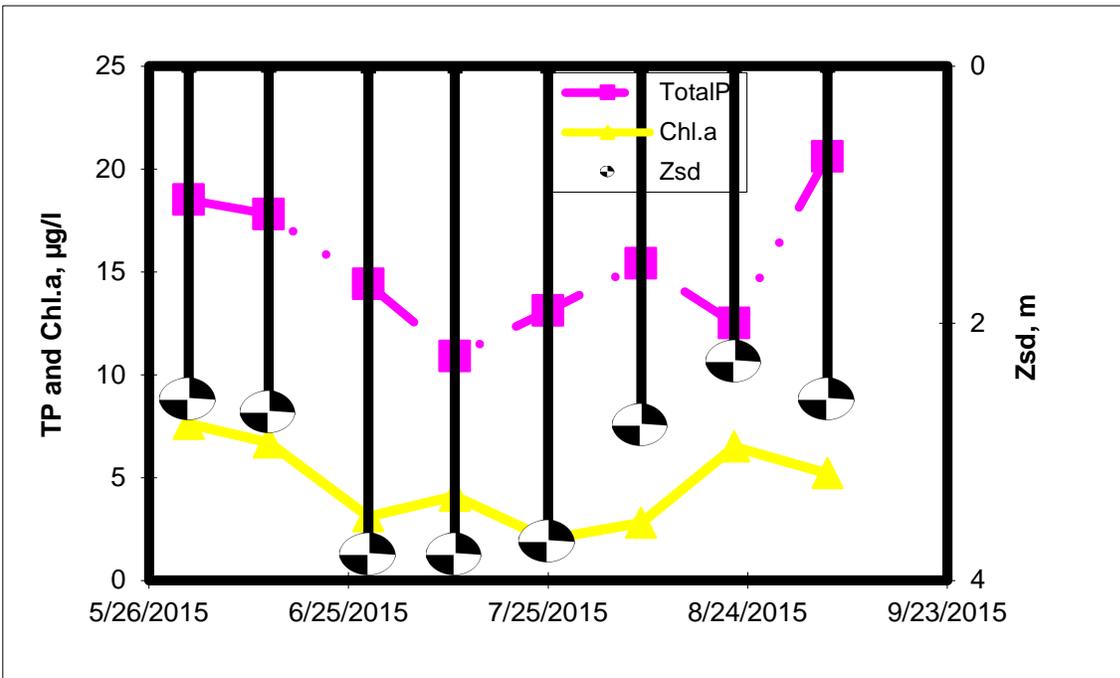
Additional Comments and Recommendations

Aquatic plant survey data will help to determine if the lake is threatened (or presently impacted) by invasive species, such as Eurasian watermilfoil, common to other lakes in the area. Additional water quality monitoring data will help to determine if the existing Priority Waterbody Listings for the lake are warranted, and will help to better evaluate the cause of the persistent harmful algal blooms (HABs) that regularly occur at the lake.

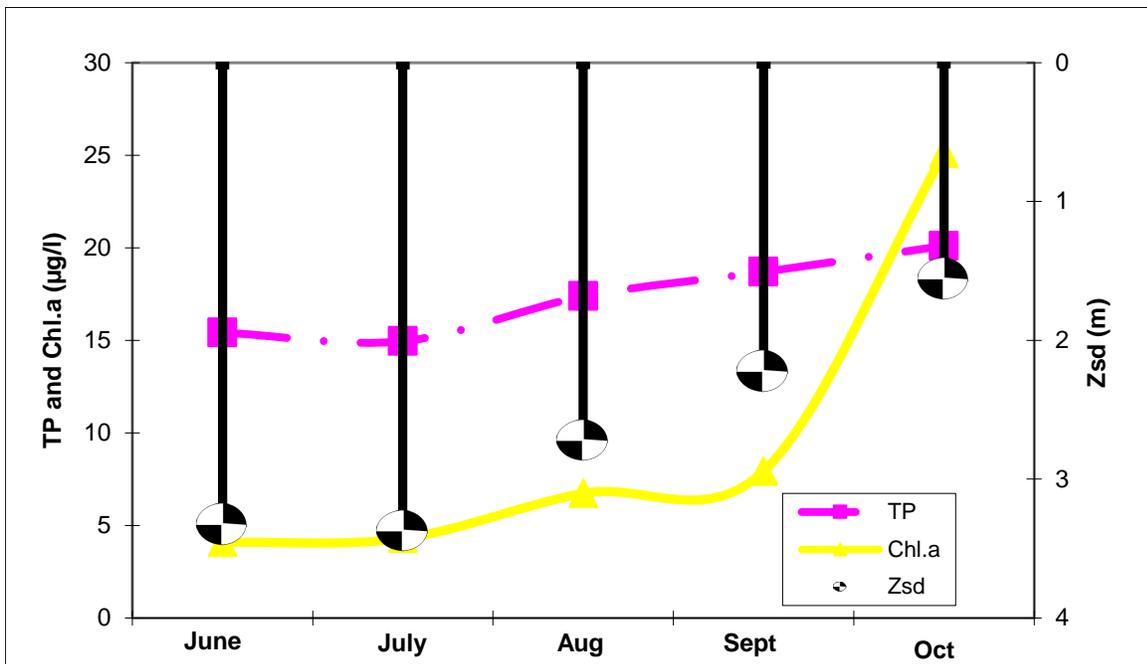
Aquatic Plant IDs-2015

None submitted for identification.

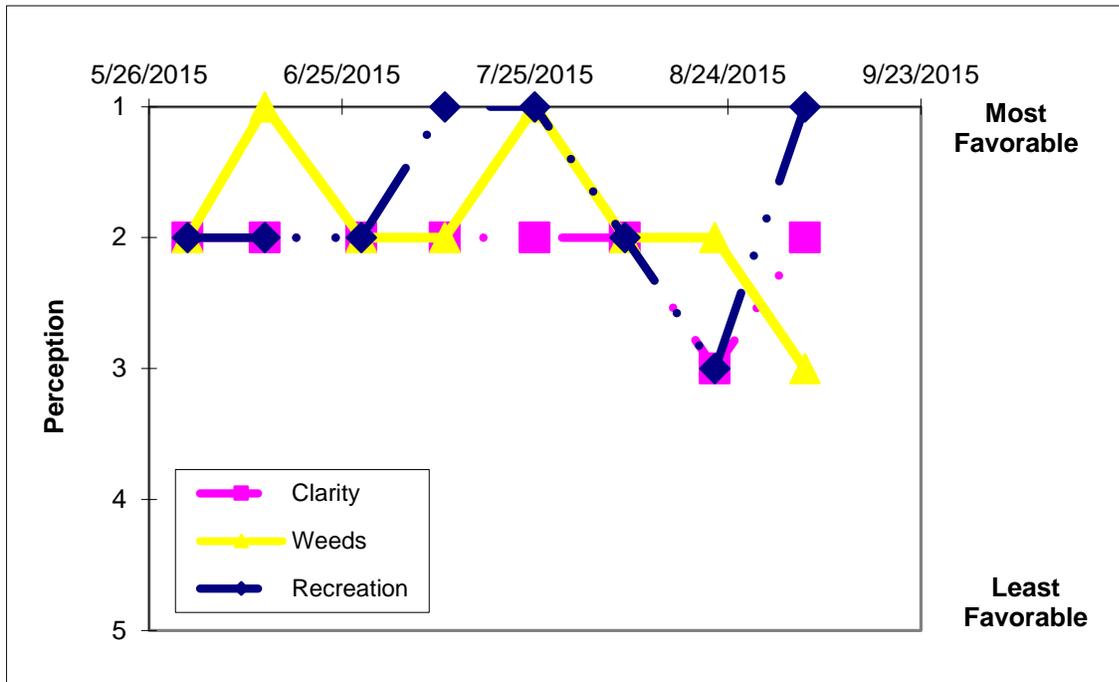
Time Series: Trophic Indicators, 2015



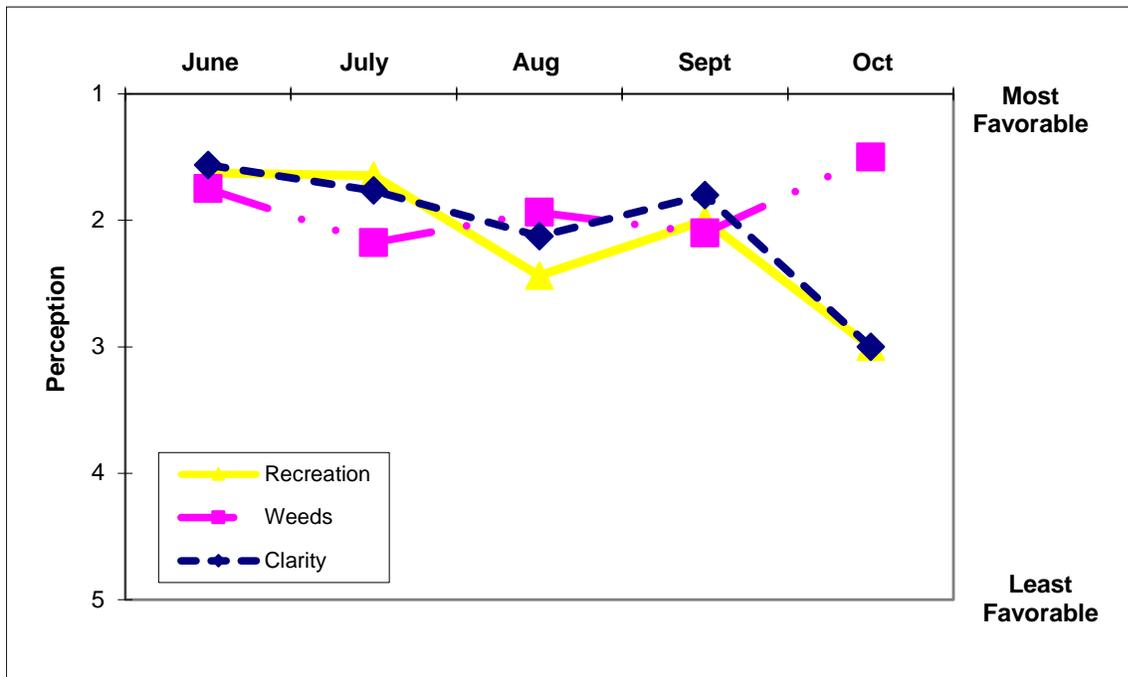
Time Series: Trophic Indicators, Typical Year (1988-2015)



Time Series: Lake Perception Indicators, 2015



Time Series: Lake Perception Indicators, Typical Year (1988-2015)



Appendix A- CSLAP Water Quality Sampling Results for Song Lake

LNum	PName	Date	Zbot	Zsd	Zsamp	Tot.P	NO3	NH3	TDN	TN/TP	TColor	pH	Cond25	Ca	Chl.a	Cl
212	Song L	7/3/1988	7.3	4.04	1.5	0.010	0.01				10	8.39	186		7.18	
212	Song L	7/10/1988	7.2	4.05	1.5	0.008	0.01				5	8.31	181		2.52	
212	Song L	7/17/1988	7.3	3.20	1.5	0.010	0.01				5	8.32	177		4.74	
212	Song L	7/25/1988	8.2	2.71	1.5	0.013	0.01				8	7.98	171		6.96	
212	Song L	8/1/1988	7.5	2.96	1.5	0.012	0.01				5	8.72	168		4.88	
212	Song L	8/8/1988	7.8	2.64	1.5	0.011	0.01				7	8.39	175		5.33	
212	Song L	8/15/1988	7.2	3.14	1.5	0.004	0.01				7	8.61	178		4.81	
212	Song L	8/23/1988	7.6	2.56	1.5	0.011	0.07				8	8.04	172		5.33	
212	Song L	8/28/1988	7.8	2.29	1.5	0.019	0.01				7	7.96	170		5.03	
212	Song L	9/6/1988	7.9	2.82	1.5	0.016	0.01				7	8.14	171		6.36	
212	Song L	9/11/1988	7.6	2.96	1.5	0.014	0.01				5	8.25	169		1.42	
212	Song L	9/18/1988	8.0	3.77	1.5	0.015	0.01				8	8.08	173		2.96	
212	Song L	9/25/1988			1.5	0.012	0.01				13	8.26	181		3.26	
212	Song L	9/26/1988			1.5	0.021	0.01				7	8.29	180		2.66	
212	Song L	7/17/2007	8.3	3.30	1.5	0.016	0.01	0.02	0.59	80.09	26	7.44	180	30.1	4.88	
212	Song L	7/31/2007	8.4	3.38	1.0	0.018	0.01	0.01	0.45	56.50	22	7.87	197		3.01	
212	Song L	8/11/2007	8.3	2.90	1.0	0.028	0.01	0.01	0.68	54.51	29	7.47	177		15.97	
212	Song L	8/25/2007	8.3	3.40	1.0	0.023	0.02	0.01	0.86	81.17	30	7.48	291		7.18	
212	Song L	9/8/2007	8.2	2.80	1.0	0.020	0.00	0.01	0.66	71.99	34	7.62	136	30.0	10.24	
212	Song L	9/22/2007	7.6	2.58	1.0	0.019	0.01	0.01	0.65	76.94		7.28	169		8.54	
212	Song L	10/6/2007	7.7	1.55	1.0	0.020	0.01	0.02	0.73	81.98	27	7.47	222		17.01	
212	Song L	10/20/2007	8.0	1.57	1.0	0.021	0.03	0.08	1.02	110.15	32	7.53	190		33.16	
212	Song L	6/14/2008	7.5	3.70	1.0	0.017	0.00	0.01	0.38	50.30	31	8.25	152	30.3	2.88	
212	Song L	6/28/2008	8.6	2.70		0.015	0.01	0.05	0.22	31.60	24	7.54	164		5.45	
212	Song L	7/12/2008	8.5	2.30	1.0	0.015	0.01	0.01	0.39	56.23	58	7.98	179		4.79	
212	Song L	7/26/2008	8.3	1.45	1.0	0.021	0.01	0.08			24	7.96	144		17.74	
212	Song L	8/9/2008	8.4	1.40	1.0	0.023	0.01	0.06	0.36	35.14	17	7.27	198	28.9	22.12	
212	Song L	8/23/2008	8.4	2.25	1.0	0.024	0.00	0.04	0.49	44.85	21	7.77	201		10.20	
212	Song L	9/6/2008	8.2	1.85	1.0	0.019	0.00	0.01	0.47	53.89	24	7.24	162		10.55	
212	Song L	9/20/2008	8.2	2.40	1.0	0.019	0.02	0.05	0.51	58.48	17	7.31	190		7.86	
212	Song L	06/06/2009	8.7	3.23	1.0	0.016	0.01	0.02	0.43	57.46	18	7.02	201	31.6	3.73	
212	Song L	06/20/2009	8.8	3.55	1.0	0.013	0.02	0.02	0.41	69.68	20	8.19	210		9.81	
212	Song L	07/05/2009	8.7	4.50	1.0	0.011	0.06	0.05	0.37	71.65	9	7.34	217		0.35	
212	Song L	07/19/2009		1.79	1.0	0.031	0.01	0.04	0.35	24.88	20	7.42			5.67	
212	Song L	08/01/2009	8.5	3.30	1.0	0.013	0.03	0.02	0.35	59.45	27	7.36	158	32.2	3.98	
212	Song L	08/15/2009	8.6	3.00	1.0	0.018	0.01	0.01	0.34	41.92	25	7.82	162		4.40	
212	Song L	08/29/2009	8.6	2.50	1.0	0.017	0.03	0.03	0.32	41.31	28	7.69	174		5.30	
212	Song L	09/12/2009		2.40	1.0	0.020	0.01	0.01	0.33	36.81	46	7.35	149		6.70	
212	Song L	5/22/2010	8.8	2.76	1.0	0.009	0.02	0.02	0.86	202.73	29	7.62	213	32.3	2.80	
212	Song L	6/5/2010	8.6	3.90	1.0	0.016	0.01	0.02			26	7.42	219		1.40	
212	Song L	6/19/2010	8.4	3.45	1.0	0.015	0.02	0.05	0.47	68.33	12	7.61	220		2.70	
212	Song L	7/3/2010	8.6	5.40		0.012	0.02	0.04	0.34	61.49	6	7.72	217		1.30	
212	Song L	7/17/2010	8.3	3.45	1.0	0.013	0.02	0.11	0.35	61.07	13	8.09	243	30.2	4.20	
212	Song L	7/31/2010	8.2	3.50	1.0	0.019	0.01	0.01	0.36	41.11	11	7.31	215		3.80	
212	Song L	8/13/2010	8.2	2.91	1.0	0.018	0.02	0.03	0.29	35.84	7	7.64	219		4.10	
212	Song L	8/30/2010	8.2	2.35	1.0	0.020	0.01	0.02	0.42	45.41	11	8.01	221		5.80	
212	Song L	6/11/2011	8.6	2.16	1.0	0.016	0.02	0.02	0.26	36.29	9	7.64	210	30.3	4.50	
212	Song L	6/25/2011	8.9	3.50	1.0	0.022	0.03	0.04	0.42	41.89	12	7.30	217		1.80	
212	Song L	7/9/2011	8.7	4.05	1.0	0.013	0.02	0.03	0.36	62.54	17	7.20	197		2.50	
212	Song L	7/23/2011	8.7	4.00	1.0	0.013	0.02	0.02	0.42	73.51	16	8.59	223		2.70	
212	Song L	8/6/2011	8.4	2.73	1.0	0.018	0.01	0.02	0.60	74.16	19	8.06	234	34.1	3.40	
212	Song L	8/20/2011				0.012	0.02	0.04	0.53	99.66	26	9.01	198		5.60	
212	Song L	9/3/2011	8.2	2.35	1.0	0.015	0.01	0.01	0.48	69.59	18	7.93	199		7.80	
212	Song L	9/12/2011			bloom											
212	Song L	9/19/2011	8.2	2.40	1.0	0.024	0.03	0.05	0.49	45.67	16	7.62	205		9.90	
212	Song L	6/2/2012	9.0	3.83	1.0	0.014	0.02	0.02	0.44	70.62	21	7.71	158	29.1	3.80	
212	Song L	6/10/2012			bloom											
212	Song L	6/16/2012	8.7	4.10	1.0	0.012	0.01	0.03	0.75	133.24	13	7.28	190		1.60	
212	Song L	6/30/2012	8.6	3.55	1.0	0.013	0.01	0.03	0.42	69.69	14	7.56	210		2.30	
212	Song L	7/14/2012	8.5	3.45	1.0	0.019	0.01	0.03	0.45	52.63	11	7.67	190		2.80	
212	Song L	7/28/2012	8.5	3.30	1.0	0.017	0.01	0.02	0.50	63.72	10	7.31	185	28.8	4.70	
212	Song L	8/11/2012	8.2	2.25	1.0	0.027	0.01	0.03	0.50	40.29	8	7.62	207		6.50	
212	Song L	8/24/2012			bloom											

LNum	PName	Date	Zbot	Zsd	Zsamp	Tot.P	NO3	NH3	TDN	TN/TP	TColor	pH	Cond25	Ca	Chl.a	Cl
212	Song L	8/25/2012	8.3	2.48	1.0	0.021	0.01	0.02	0.50	52.32	14	7.13	178		4.80	
212	Song L	9/2/2012			bloom											
212	Song L	9/8/2012	8.3	2.20	1.0	0.028	0.02	0.03	0.57	45.20	12	7.26	219		8.20	
212	Song L	9/30/2012			bloom											
212	Song L	10/3/2012			bloom											
212	Song L	10/20/2012			bloom											
212	Song L	6/7/2014	8.7	3.30	1.0	0.014	0.01	0.02	0.44	68.50	17	7.72	190	24.6	4.00	
212	Song L	6/21/2014	8.8	3.20	1.0	0.013			0.47	80.90	12	7.55	167		3.90	
212	Song L	7/5/2014	8.8	2.28	1.0	0.015	0.01	0.04	0.47	68.35	11	7.66	191		5.50	
212	Song L	7/11/2014			bloom											
212	Song L	7/19/2014	8.6	3.20	1.0	0.017			0.43	56.72	11	7.66	196		3.00	
212	Song L	7/19/2014			bloom											
212	Song L	8/2/2014	8.4	2.65	1.0	0.019	0.01	0.02	0.46	54.41	6	7.83	195	26.1	4.80	
212	Song L	8/16/2014	8.6	3.68	1.0	0.014			0.41	65.04	13	7.29	185		2.50	
212	Song L	8/29/2014	8.6	3.45	1.0	0.020	0.01	0.02	0.48	51.33	13	7.37	173		5.30	
212	Song L	8/29/2014			bloom											
212	Song L	9/14/2014			bloom											
212	Song L	9/19/2014			bloom											
212	Song L	9/24/2014			bloom											
212	Song L	10/10/2014			bloom											
212	Song L	9/14/2014	8.5	2.29	1.0	0.018			0.52	63.57	12	7.05	196		4.30	
212	Song L	6/1/2015	8.9	2.60	1.0	0.019	0.01	0.02	0.33	17.62	10	7.70	187	24.2	7.60	
212	Song L	6/13/2015	8.8	2.70	1.5	0.018			0.40	22.53	10	7.71	198		6.70	
212	Song L	6/28/2015	8.8	3.80	1.0	0.014	0.02	0.04	0.39	26.94	10	7.72	188		3.10	14.8
212	Song L	7/11/2015	8.8	3.80	1.5	0.011			0.55	50.83	12	7.51	104		4.10	
212	Song L	7/25/2015	8.7	3.70	1.0	0.013	0.01	0.03	0.45	34.50	13	7.68	172	19.1	2.00	
212	Song L	8/8/2015	8.9	2.80	1.0	0.015			0.50	32.27	15	7.96	199		2.80	
212	Song L	8/22/2015	8.4	2.30	1.5	0.013	0.00	0.05	0.44	35.12	12	7.75	200		6.50	15.7
212	Song L	6/1/2015			bloom											
212	Song L	8/11/2015			bloom											
212	Song L	9/16/2015			bloom											
212	Song L	9/29/2015			bloom											
212	Song L	10/5/2015			bloom											
212	Song L	9/5/2015	8.2	2.60	1.0	0.021			0.55	26.65	10	8.26	179		5.20	
212	Song L	7/17/2007	8.3		7.0	0.051										
212	Song L	7/31/2007	8.4		7.0	0.016										
212	Song L	8/11/2007	8.3		7.0	0.091										
212	Song L	8/25/2007	8.3		7.0	0.073										
212	Song L	9/8/2007	8.2		7.2	0.140										
212	Song L	10/6/2007	7.7		6.7	0.020										
212	Song L	10/20/2007	8.0		7.0	0.030										
212	Song L	6/14/2008			6.5	0.035										
212	Song L	6/28/2008				0.031										
212	Song L	7/12/2008			7.5	0.045										
212	Song L	7/26/2008			7.3	0.069										
212	Song L	8/9/2008			7.3	0.054										
212	Song L	8/23/2008			7.4	0.092										
212	Song L	9/6/2008			7.3	0.058										
212	Song L	9/20/2008			7.2	0.027										
212	Song L	06/06/2009	8.7		7.7	0.020		0.14								
212	Song L	06/20/2009	8.8		7.8	0.029										
212	Song L	07/05/2009	8.7		7.7	0.063		0.09								
212	Song L	07/19/2009			7.6	0.055										
212	Song L	08/01/2009	8.5		7.5	0.053		0.03								
212	Song L	08/15/2009	8.6		7.6	0.051										
212	Song L	08/29/2009	8.6		7.6	0.140		0.73								
212	Song L	09/12/2009	0.4		7.4	0.021										
212	Song L	5/22/2010	8.8		7.8	0.020		0.03								
212	Song L	6/19/2010	8.4		7.4	0.024		0.00								
212	Song L	7/17/2010	8.3		7.3	0.029		0.05								
212	Song L	8/13/2010	8.2		7.2	0.046		0.04								
212	Song L	6/11/2011	8.6		7.6	0.031		0.24								
212	Song L	7/9/2011				0.053		0.27								
212	Song L	8/6/2011	8.4		7.4	0.097		0.30								
212	Song L	9/3/2011	8.2		7.2	0.067		0.48								
212	Song L	6/2/2012			8.0	0.018		0.23								

LNum	PName	Date	Zbot	Zsd	Zsamp	Tot.P	NO3	NH3	TDN	TN/TP	TColor	pH	Cond25	Ca	Chl.a	Cl
212	Song L	6/30/2012			7.6	0.027		0.04								
212	Song L	7/28/2012			7.5	0.031		0.04								
212	Song L	8/25/2012			7.3	0.170		1.02								
212	Song L	6/7/2014			7.7	0.023		0.16								
212	Song L	6/21/2014			7.8	0.019										
212	Song L	7/5/2014			7.8	0.018		0.13								
212	Song L	7/19/2014			7.6	0.045										
212	Song L	8/2/2014			7.4	0.054		0.56								
212	Song L	8/16/2014			7.6	0.075										
212	Song L	8/29/2014			7.6	0.018		0.65								
212	Song L	9/14/2014			7.5	0.019										
212	Song L	6/1/2015			7.9	0.041		0.20								
212	Song L	6/13/2015			7.8	0.028										
212	Song L	6/28/2015			7.8	0.043		0.05								
212	Song L	7/11/2015			7.8	0.037										
212	Song L	7/25/2015			7.7	0.062		0.03								
212	Song L	8/8/2015			7.0	0.073										
212	Song L	8/22/2015			7.6	0.041		0.06								
212	Song L	9/5/2015			7.2	0.049										

LNum	LName	Date	Zsamp	TAir	TH2O	QA	QB	QC	QD	QF	QG	AQ-PC	AQ-Chla	MC-LR	Ana-a	Cyl	FP-Chl	FP-BG	HAB form	Shore HAB
212	Song L	7/3/1988	epi	20	18															
212	Song L	7/10/1988	epi	26	25															
212	Song L	7/17/1988	epi	24	23															
212	Song L	7/25/1988	epi	20	23															
212	Song L	8/1/1988	epi	22	24															
212	Song L	8/8/1988	epi	22	23															
212	Song L	8/15/1988	epi	24	26															
212	Song L	8/23/1988	epi	16	20															
212	Song L	8/28/1988	epi	25	21															
212	Song L	9/6/1988	epi	9	16															
212	Song L	9/11/1988	epi	14	18															
212	Song L	9/18/1988	epi	24	17															
212	Song L	7/17/2007	epi	24	23	1	2	1	8											
212	Song L	7/31/2007	epi	23	25	1	2	1	0											
212	Song L	8/11/2007	epi	33	27	3	2	2	6											
212	Song L	8/25/2007	epi	31	24	1	1	1	0											
212	Song L	9/8/2007	epi	27	25	1	2	1	8											
212	Song L	9/22/2007	epi	22	21	1	2	1	8											
212	Song L	10/6/2007	epi		20	3	2	4	368											
212	Song L	10/20/2007	epi	16	15	3	1	2	5											
212	Song L	6/14/2008	epi	29	27	1	2	2	8											
212	Song L	6/28/2008	epi	31	26	1	2	1	0											
212	Song L	7/12/2008	epi	32	27	3	2	3	38											
212	Song L	7/26/2008	epi	23	26	4	2	4	1234											
212	Song L	8/9/2008	epi	22	25	4	2	4	134											
212	Song L	8/23/2008	epi	20	23	2	2	2	8											
212	Song L	9/6/2008	epi	22	22	3	2	3	5											
212	Song L	9/20/2008	epi	16	21	2	2	2	6											
212	Song L	06/06/2009	epi	19	20	2	1	2	0											
212	Song L	06/20/2009	epi	20	22	2	2	1	0											
212	Song L	07/05/2009	epi	24	23	1	2	1	0											
212	Song L	07/19/2009	epi	23	24	2	3	2	0											
212	Song L	08/01/2009	epi	22	24	2	3	3	8											
212	Song L	08/15/2009	epi	25	26	2	2	3	3											
212	Song L	08/29/2009	epi	20	22	2	2	2	0											
212	Song L	09/12/2009	epi	17	22	2	2	2	5											
212	Song L	5/22/2010	epi	22	19	1	1	1	0	0	4									
212	Song L	6/5/2010	epi	24	24	1	2	1	0	0	0									
212	Song L	6/19/2010	epi	23	22	1	2	1	0	0	0									
212	Song L	7/3/2010	epi	21	23	1	2	1	0	0	0									
212	Song L	7/17/2010	epi	27	26	2	3	2	8	34	4									
212	Song L	7/31/2010	epi	24	26	2	3	2	0	4	4									
212	Song L	8/13/2010	epi	32	27	1	2	2	0	4	4									
212	Song L	8/30/2010	epi	19	23	1	3	1	0	0	0									

LNum	LName	Date	Zsamp	TAir	TH2O	QA	QB	QC	QD	QF	QG	AQ-PC	AQ-Chla	MC-LR	Ana-a	Cyl	FP-Chl	FP-BG	HAB form	Shore HAB
212	Song L	6/11/2011	epi	24	25	1	1	1	0	0	0	28.20	5.70							
212	Song L	6/25/2011	epi	25	25	2	2	2	0	4	4	17.30	4.10							
212	Song L	7/9/2011	epi	24	26	1	2	1	0	0		11.90	2.50							
212	Song L	7/23/2011	epi	30	29	1	2	1	0	0	0	21.70	2.99							
212	Song L	8/6/2011	epi	23	27	1	2	2	0	0		32.50	5.30	0.35						
212	Song L	8/20/2011	bloom									49.80	5.10							
212	Song L	9/3/2011	epi	23	23	1	2	2	5	0	4	35.20	3.20							
212	Song L	9/12/2011	bloom											181.27	<2	<0.2				
212	Song L	9/19/2011	epi	16	19	2	2	3	15	0	4	72.10	4.00	0.15						
212	Song L	9/19/2011	bloom											305.43	<0.8	<0.1				
212	Song L	10/8/2011	bloom											18.51						
212	Song L	6/2/2012	epi	19	22	1	1	1	0	0	0	4.10	0.40	<0.30	<0.417		0.00	0.00		I
212	Song L	6/10/2012	bloom											27.11	<0.715		11870	11820		
212	Song L	6/16/2012	epi	25	24	1	1	1	0	0	4	5.50	0.40	<0.30	<0.413		1.74	0.61		
212	Song L	6/30/2012	epi	28	27	2	2	2	0	4	4	10.70	0.30	<0.30	<0.423		2.13	0.97		I
212	Song L	7/14/2012	epi	29	28	2	3	1	0	4	4	11.00	0.40	<0.30	<0.328		2.50	1.40		H
212	Song L	7/28/2012	epi	24	27	1	1	2	0	0	0	19.30	0.60	<0.30	<0.292		4.86	2.61		I
212	Song L	8/11/2012	epi	30	29	2	1	2	0	0	0	16.60	0.60	<0.30	<0.223		4.73	2.86		I
212	Song L	8/24/2012	bloom											11.70	<0.300		3823.	3695.		
212	Song L	8/25/2012	epi	31	30	3	2	3	8	0	0	14.90	0.60	<0.30	<0.642		4.42	1.77		F
212	Song L	9/2/2012	bloom											79.23	<1.038		3026.	2759.		
212	Song L	9/8/2012	epi	22	24	2	2	2	5	0	4	37.70	1.00	<0.30	<0.642		7.08	4.93		I
212	Song L	9/30/2012	bloom											35.06	<1.106		5483	5281.		
212	Song L	10/3/2012	bloom											89.71	<5.361		52527	52527		
212	Song L	10/20/2012	bloom											0.81	<6.409		858.5	811.5		
212	Song L	6/7/2014	epi	20	23	2	2	3	1	0	0	0.40	2.90	<1.83	<0.17	<0.001	3.18	0.00		
212	Song L	6/21/2014	epi	22	24	2	3	2	0	0	0	3.10	0.60	<0.58	<0.44	<0.002	2.13	0.00		i
212	Song L	7/5/2014	epi	25	25	2	3	2	0	0	0	5.00	0.60	<0.40	<0.48	<0.001	3.04	0.00		i
212	Song L	7/11/2014	bloom											12.44	<0.96	<0.003	627.25	321.50		
212	Song L	7/19/2014	epi	23	25	2	2	2	0	4	4	4.20	0.50	<0.39	<0.21	<0.003	2.99	0.54		i
212	Song L	7/19/2014	bloom											<1.43	<0.96	<0.003	11.16	2.85		
212	Song L	8/2/2014	epi	27	25	2	1	2	0	0	0	7.90	0.60	<0.39	<0.03	<0.001	2.75	0.00		i
212	Song L	8/16/2014	epi	19	23							4.70	0.30	<0.39	<0.03	<0.001	0.99	0.29		i
212	Song L	8/29/2014	epi	26	25	3	2	5	134	4	4	8.20	0.30	<0.29	<0.14	<0.002	2.04	0.66		b
212	Song L	8/29/2014	bloom											35.97	<0.32	<0.004	6234.3	6083.25		
212	Song L	9/14/2014	bloom											<0.48	<0.05	<0.002	87.07	81.69		
212	Song L	9/19/2014	bloom											22.41	<0.08	<0.002	16925	16587.5		
212	Song L	9/24/2014	bloom											130.67	<0.47	<0.005	7994.2	7607.3		
212	Song L	10/10/2014	bloom											19.86	<0.50	<0.003	26650	24930		
212	Song L	9/14/2014	epi	13	21	2	2	3	8	47	0	17.00	0.30	<0.28	<0.03	<0.001	4.41	1.35		i
212	Song L	6/1/2015	epi	14	22	2	2	2	5	45	45	5.90	1.00	<0.56	<0.119	<0.706	2.64	0.00		I C
212	Song L	6/13/2015	epi	21	24	2	1	2	6	0	0	3.80	0.90	<0.86	<0.027	<0.318	1.18	0.00		I I
212	Song L	6/28/2015	epi	16	23	2	2	2	5	0	0	8.70	0.50	<1.01	<0.007	<0.040	2.89	0.05		I I
212	Song L	7/11/2015	epi	32	27	2	2	1	0	0	0	14.40	0.40	<0.30	<0.005	<0.028	1.88	0.46		I I
212	Song L	7/25/2015	epi	26	27	2	1	1	0	0	0	6.30	0.50	<0.19	<0.002	<0.014	1.26	0.08		I I
212	Song L	8/8/2015	epi	20	27	2	2	2	1	4	0	9.40	1.00	<1.13	<0.002	<0.014	3.58	0.00		I I
212	Song L	8/22/2015	epi	21	26	3	2	3	1	4	4	36.00	1.10	<0.21	<0.003	<0.010	3.67	0.00		I CD
212	Song L	6/1/2015	bloom											<1.33	<0.626	<3.123	1288.3	1259.00		
212	Song L	8/11/2015	bloom											2.80	<0.017	<0.042	3237.8	2564.00		
212	Song L	9/16/2015	bloom											131.09	<0.028	<0.064	7550.0	7316.25		
212	Song L	9/29/2015	bloom											<1.20	<0.164	<0.032	274.72	272.86		
212	Song L	10/5/2015	bloom											38.69	<0.046	<0.027	74781	74781		
212	Song L	9/5/2015	epi	24	26	2	3	1	0	0	0			<0.50	0.00	<0.040	3.76	0.00		I I
212	Song L	7/17/2007	hypo		16															
212	Song L	7/31/2007	hypo		25															
212	Song L	8/11/2007	hypo		19															
212	Song L	8/25/2007	hypo		21															
212	Song L	9/8/2007	hypo		21															
212	Song L	9/22/2007	hypo		20															
212	Song L	10/6/2007	hypo		19															
212	Song L	10/20/2007	hypo		17															
212	Song L	6/14/2008	hypo		19															
212	Song L	6/28/2008	hypo		18															
212	Song L	7/12/2008	hypo		18															
212	Song L	7/26/2008	hypo		18															

LNum	LName	Date	Zsamp	TAir	TH2O	QA	QB	QC	QD	QE	QF	QG	AQ-PC	AQ-Chla	MC-LR	Ana-a	Cyl	FP-Chl	FP-BG	HAB form	Shore HAB		
212	Song L	8/9/2008	hypo		20																		
212	Song L	8/23/2008	hypo		29																		
212	Song L	9/6/2008	hypo		20																		
212	Song L	9/20/2008	hypo		20																		
212	Song L	06/06/2009	hypo		18																		
212	Song L	06/20/2009	hypo		18																		
212	Song L	07/05/2009	hypo		18																		
212	Song L	07/19/2009	hypo		22																		
212	Song L	08/01/2009	hypo		21																		
212	Song L	08/15/2009	hypo		22																		
212	Song L	08/29/2009	hypo		21																		
212	Song L	09/12/2009	hypo		21																		
212	Song L	7/17/2010	hypo		18																		
212	Song L	8/13/2010	hypo		23																		
212	Song L	6/11/2011	hypo		16																		
212	Song L	8/6/2011	hypo		17																		
212	Song L	9/3/2011	hypo		21																		
212	Song L	6/2/2012	hypo		15																		
212	Song L	6/30/2012	hypo		19																		
212	Song L	7/28/2012	hypo		20																		
212	Song L	8/25/2012	hypo		22																		
212	Song L	6/7/2014	hypo		16																		
212	Song L	6/21/2014	hypo		18																		
212	Song L	7/5/2014	hypo		16																		
212	Song L	7/19/2014	hypo		18																		
212	Song L	8/2/2014	hypo		17																		
212	Song L	8/16/2014	hypo		20																		
212	Song L	8/29/2014	hypo		20																		
212	Song L	9/14/2014	hypo		20																		
212	Song L	6/1/2015	hypo		13																		
212	Song L	6/13/2015	hypo		15																		
212	Song L	6/28/2015	hypo		15																		
212	Song L	7/11/2015	hypo		17																		
212	Song L	7/25/2015	hypo		17																		
212	Song L	8/8/2015	hypo		17																		
212	Song L	8/22/2015	hypo		19																		
212	Song L	9/5/2015	hypo		21																		

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, Cl	calcium, chloride (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- Priority Waterbody Listing for Song Lake

Song Lake (0602-0019)

MinorImpacts

Waterbody Location Information

Revised: 07/02/2009

Water Index No:	SR- 44-14-60-P68-P72	Drain Basin:	Susquehanna River
Hydro Unit Code:	02050102/080	Str Class:	B
Waterbody Type:	Lake (Unknown Trophic)	Reg/County:	7/Cortland Co. (12)
Waterbody Size:	105.4 Acres	Quad Map:	OTISCO VALLEY (J-16-4)
Seg Description:	entire lake		

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

Use(s) Impacted	Severity	Problem Documentation
Public Bathing	Stressed	Suspected
Recreation	Stressed	Suspected

Type of Pollutant(s)

Known: ---
 Suspected: ALGAL/WEED GROWTH (aquatic vegetation), NUTRIENTS (phosphorus)
 Possible: ---

Source(s) of Pollutant(s)

Known: ---
 Suspected: AGRICULTURE
 Possible: On-Site/Septic Syst

Resolution/Management Information

Issue Resolvability:	1 (Needs Verification/Study (see STATUS))	
Verification Status:	4 (Source Identified, Strategy Needed)	
Lead Agency/Office:	ext/WQCC	Resolution Potential: Medium
TMDL/303d Status:	n/a	

Further Details

Overview

Public Bathing and other recreational uses in Song Lake are thought to experience minor impacts due to elevated nutrient levels that contribute to algal and weed growth. Agricultural activities and other nonpoint sources in the watershed are the likely source of the pollutants.

Water Quality Sampling

Song Lake was sampled as part of the NYSDEC Citizen Statewide Lake Assessment Program (CSLAP) in 2007. Prior to that, the lake was sampling through CSLAP in 1988. An Interpretive Summary report of the findings of this sampling was published in 2008. These data indicate that the lake continues to be best characterized as mesoeutrophic, or moderately productive. Phosphorus levels in the lake occasionally exceeded the state guidance values indicating impacted/stressed recreational uses. Corresponding transparency measurements typically exceed what is the recommended minimum for swimming beaches. Measurements of pH are somewhat high but typically fall within the state water quality range of 6.5 to 8.5. The lake water is slightly colored, but color does not limit water transparency. (DEC/DOW, BWAM/CSLAP, January 2008)

Recreational Assessment

Public perception of the lake and its uses is also evaluated as part of the CSLAP program. This assessment indicates recreational suitability of the lake to be mostly favorable in 2008. The recreational suitability of the lake is described most frequently as "could not be nicer" or "excellent." The lake itself is most often described as "not quite crystal clear" or having "definite algal greenness," an assessment that is somewhat more favorable than occurs in lakes with similar water quality. Assessments have noted that aquatic plants do not grow to the lake surface. (DEC/DOW, BWAM/CSLAP, January 2008)

Lake Uses

This lake waterbody is designated class B, suitable for use as a public bathing beach, general recreation and aquatic life support, but not as a public water supply. Water quality monitoring by NYSDEC focuses primarily on support of general recreation and aquatic life. Samples to evaluate the bacteriological condition and bathing use of the lake or to evaluate contamination from organic compounds, metals or other inorganic pollutants have not been collected as part of the CSLAP monitoring program. Monitoring to assess potable water supply and public bathing use is generally the responsibility of state and/or local health departments.

Previous Assessment

Based on previous CSLAP sampling in 1988, recreational uses in Song Lake were assessed as possibly being stressed. However impacts to the lake were noted as needing verification. The more recent sampling suggests impacts to uses are present but fairly minor. (DEC/DOW, BWM/Lake Services, January 2008).

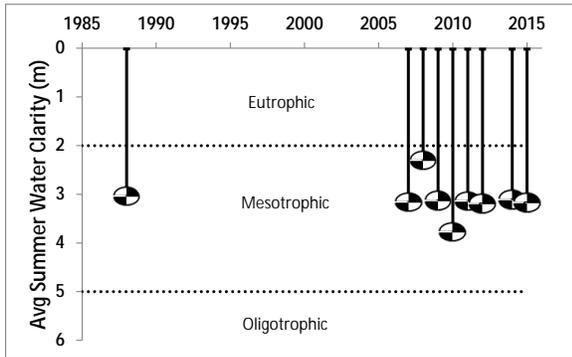
Segment Description

This segment includes the total area of the lake.

Appendix C- Long Term Trends: Song Lake

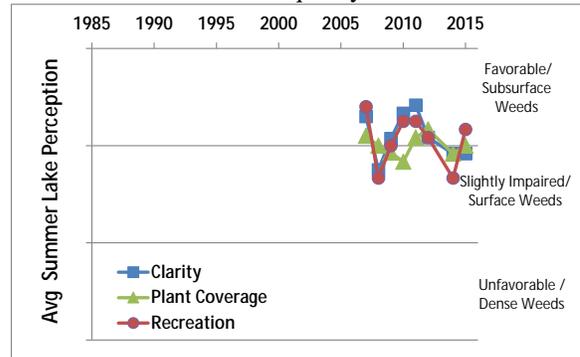
Long Term Trends: Water Clarity

- No long term trend
- Most readings typical of *mesotrophic* lakes



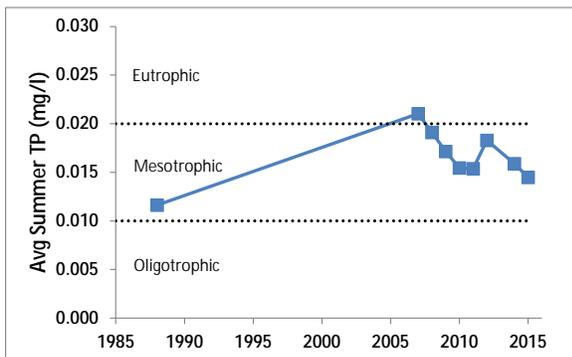
Long Term Trends: Lake Perception

- No trends; degrading last few years
- Recreational perception connected to both weeds and water quality



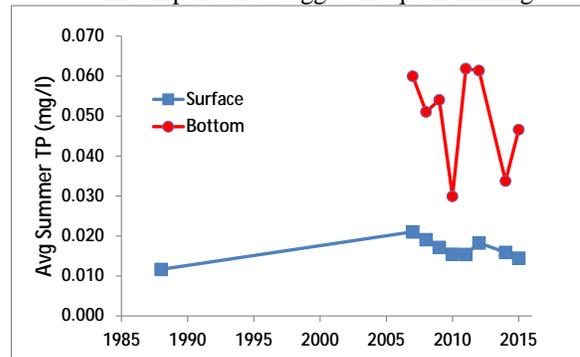
Long Term Trends: Phosphorus

- Recent decrease after rise from '90 to '06
- Most readings typical of *mesotrophic* lakes



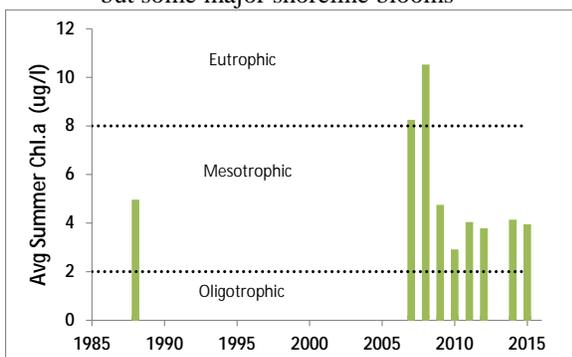
Long Term Trends: Bottom Phosphorus

- Deepwater readings higher than surface
- Difference in readings relative to difference in temperatures suggest frequent mixing



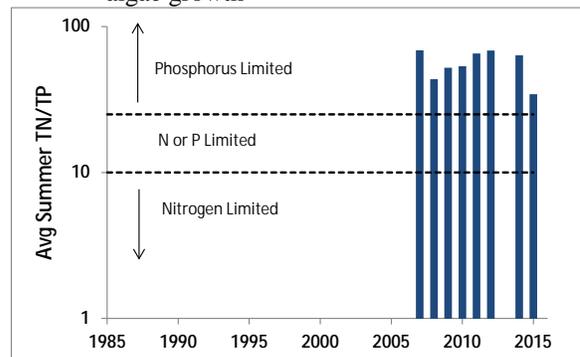
Long Term Trends: Chlorophyll a

- No trends; open water chl lower 08-15
- Most readings typical of *mesotrophic* lakes, but some major shoreline blooms



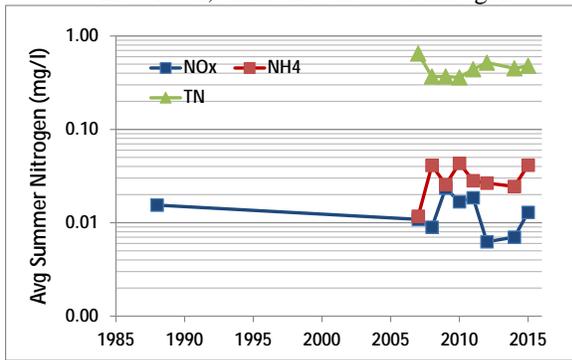
Long Term Trends: N:P Ratio

- No long term trend; recent decrease
- Most readings indicate phosphorus limits algae growth



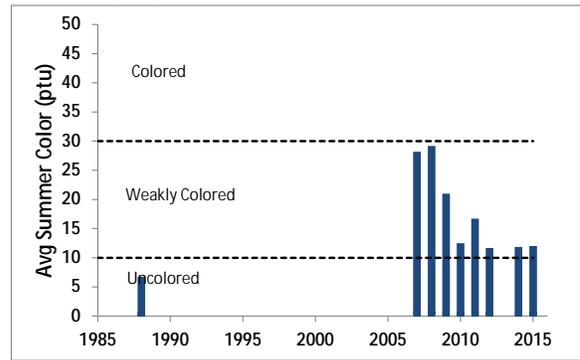
Long Term Trends: Nitrogen

- No long term trends for any of the nitrogen indicators; slight rise ammonia
- Low NOx, ammonia and total nitrogen



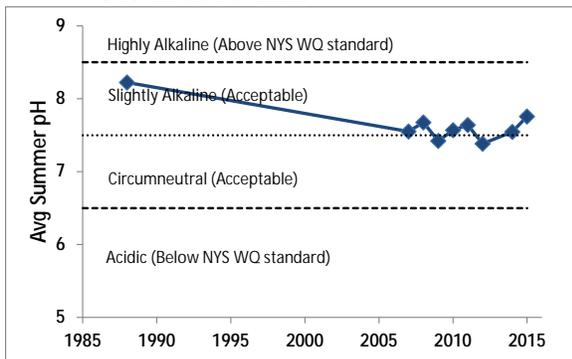
Long Term Trends: Color

- Decreasing 2008-15
- Most readings typical of *weakly colored* lakes



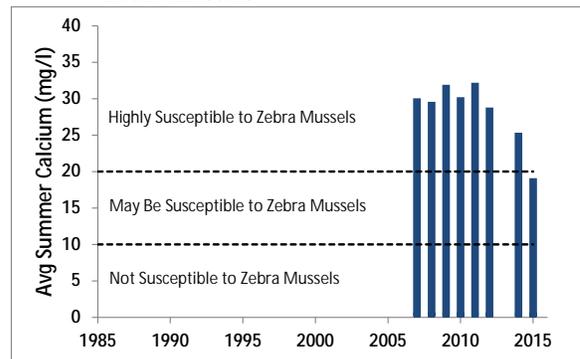
Long Term Trends: pH

- pH ↓ 1988-2012; recent increase
- Most readings typical of *slightly alkaline* to *circumneutral* lakes



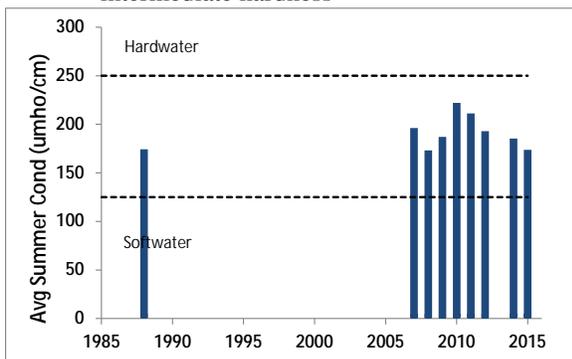
Long Term Trends: Calcium

- No long term trend; lower in 2014 and 2015
- Most readings indicate high susceptibility to zebra mussels



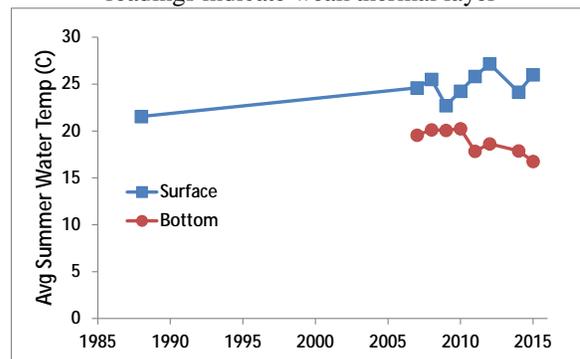
Long Term Trends: Conductivity

- No long term trends
- Most readings typical of lakes with intermediate hardness



Long Term Trends: Water Temperature

- Surface T rising as bottom T decreasing
- Similar deepwater and surface temperature readings indicate weak thermal layer



Appendix D: Algae Testing Results from SUNY ESF Study

Most algae are harmless, naturally present, and an important part of the food web. However excessive algae growth can cause health, recreational, and aesthetic problems. Some algae can produce toxins that can be harmful to people and animals. High quantities of these algae are called harmful algal blooms (HABs). CSLAP lakes have been sampled for a variety of HAB indicators since 2008. This was completed on selected lakes as part of a NYS DOH study from 2008-2010. In 2011, enhanced sampling on all CSLAP lakes was initiated through an EPA-funded project that has continued through the current sampling season. This study has evaluated a number of HAB indicators as follows:

- Algae types - blue green, green, diatoms, and "other"
- Algae densities
- Microscopic analysis of bloom samples
- Algal toxin analysis

Some of these results are reported in other portions of these reports. This appendix the seasonal change in blue green algae, other algae types, and the primary algal toxin (microcystin-LR, a liver toxin). Analysis was completed on open water samples and, for some lakes, shoreline samples that were collected when visual evidence of blooms were apparent. Results are compared to the DEC criteria of 25-30 ug/l blue green chlorophyll a and 20 ug/l microcystin-LR (based on the World Health Organization (WHO) threshold for unsafe swimming conditions) and the WHO provisional criteria for long-term protection of treated water supplies (= 1 ug/l microcystin-LR). The data for algae types are drawn from a high end fluorometer used by SUNY ESF. While these results are useful for timely approximation of lake conditions, they are not as accurate as the total chlorophyll results measured as a regular part of CSLAP since 1986 in all open water samples. Therefore these results are used judiciously in the assessment of sampled waterbodies.

Two separate samples are evaluated. A sample is taken at the CSLAP sample point at the deepest point of the lake at every sample session. In addition, shoreline samples can be taken when a bloom is visible. It should be noted that shoreline conditions can vary significantly over time and from one location to another. The shoreline bloom sampling results summarized below are not collected as routinely as open water samples, and therefore represent snapshots in time. It is assumed that sampling results showing high blue green algae and/or toxin levels indicate that algae blooms may be common and/or widespread on these lakes. However, the absence of elevated blue green algae and toxin levels does not assure the lack of shoreline blooms on these lakes. Elevated open water readings may indicate a higher likelihood of shoreline blooms, but in some lakes, these shoreline blooms have not been (well) documented.

The results from these samples are summarized within the CSLAP report for the lake.

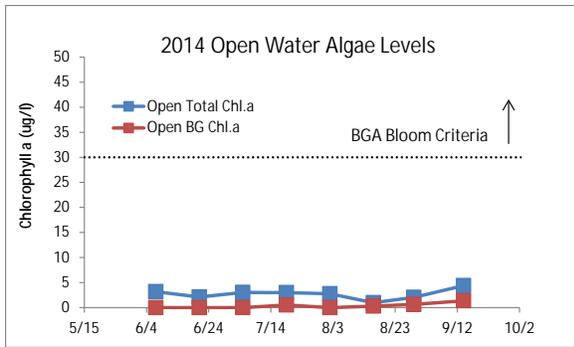


Figure D1:
2014 Open Water Total and BGA Chl.a

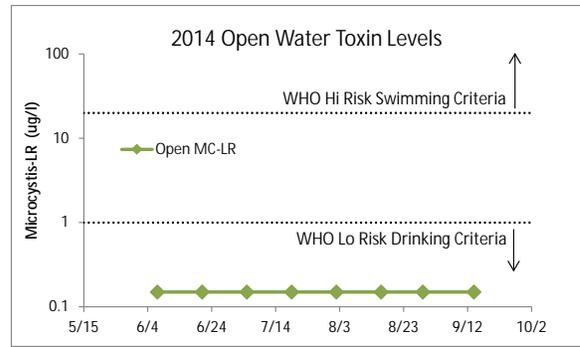


Figure D2:
2014 Open Water Microcystin-LR

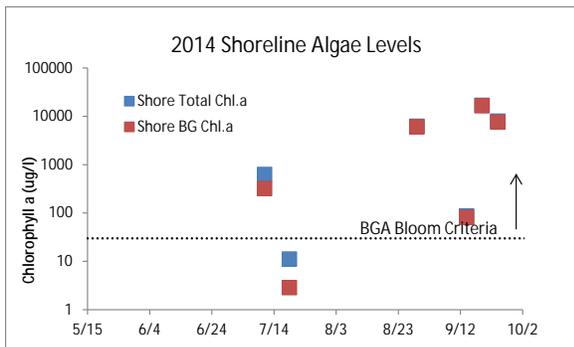


Figure D3:
2014 Shoreline Total and BGA Chl.a

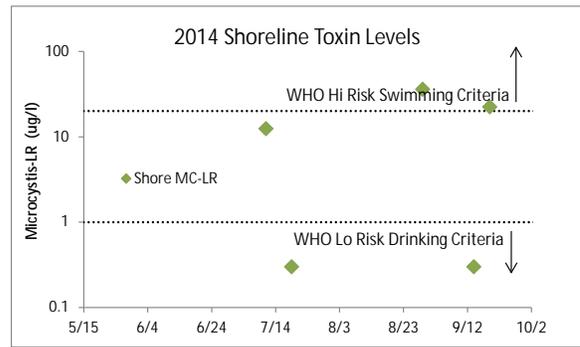


Figure D4:
2014 Shoreline Microcystin-LR

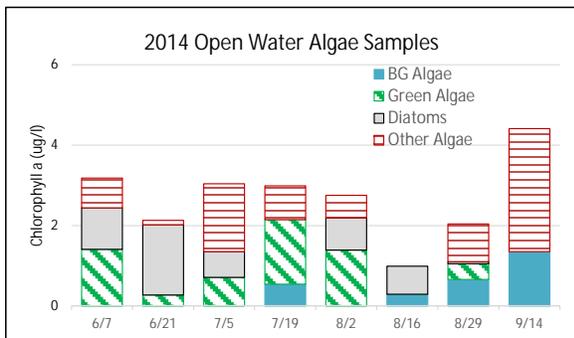


Figure D5:
2014 Open Water Algae Types

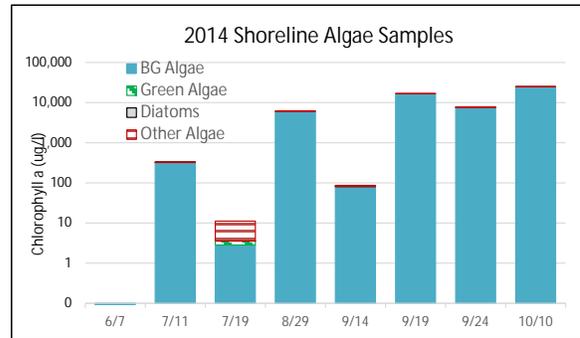


Figure D6:
2014 Shoreline Algae Types

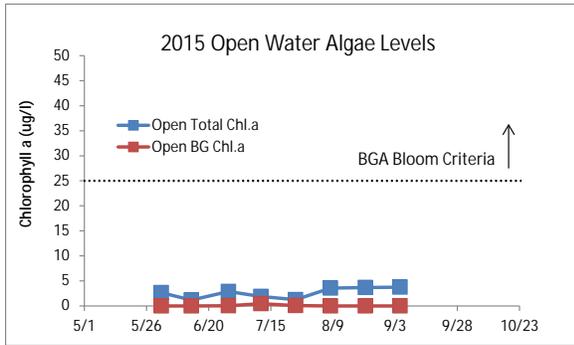


Figure D7:
2015 Open Water Total and BGA Chl.a

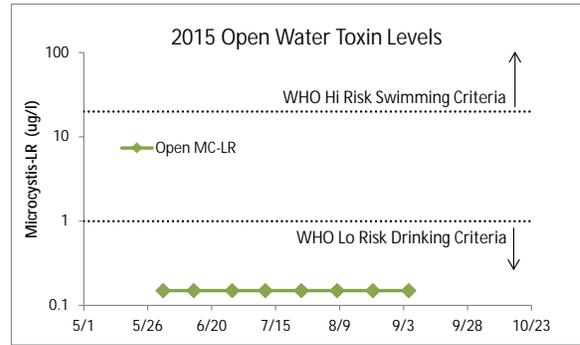


Figure D8:
2015 Open Water Microcystin-LR

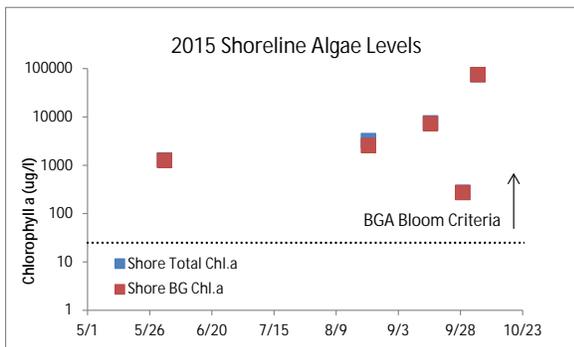


Figure D9:
2015 Shoreline Total and BGA Chl.a

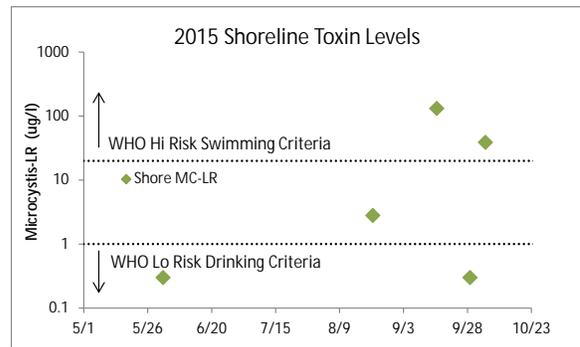


Figure D10:
2015 Shoreline Microcystin-LR

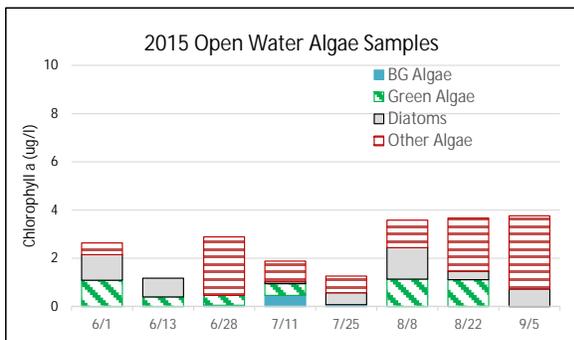


Figure D11:
2015 Open Water Algae Types

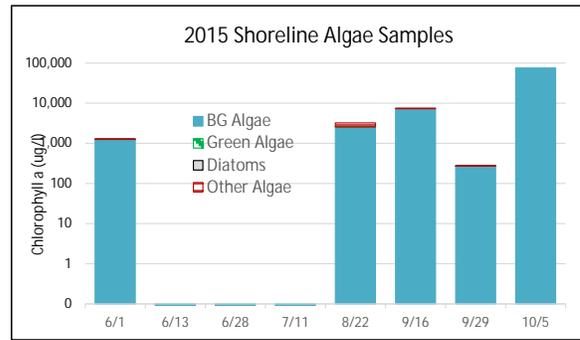


Figure D12:
2015 Shoreline Algae Types

Appendix E: AIS Species in Cortland County

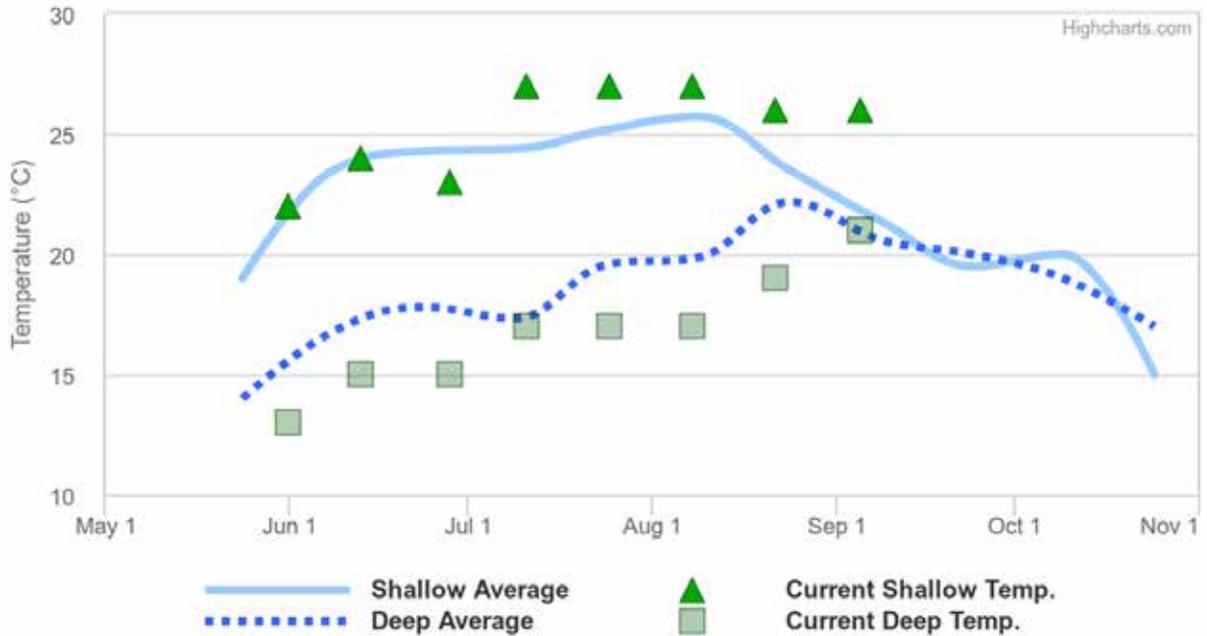
The table below shows the invasive aquatic plants and animals that have been documented in Cortland County, as cited in either the iMapInvasives database (<http://www.imapinvasives.org/>) or in the NYSDEC Division of Water database. These databases may include some, but not all, non-native plants or animals that have not been identified as “Prohibited and Regulated Invasive Species” in New York state regulations (6 NYCRR Part 575; http://www.dec.ny.gov/docs/lands_forests_pdf/islist.pdf).

This list is not complete, but instead represents only those species that have been reported and verified within the county. If any additional aquatic invasive species (AIS) are known or suspected in these or other waterbodies in the county, this information should be reported through iMap invasives or by contacting NYSDEC at dowinfo@dec.ny.gov.

Aquatic Invasive Species - Cortland County			
Waterbody	Kingdom	Common name	Scientific name
Cincinnatus Lake	Plant	Water chestnut	<i>Trapa natans</i>
Ellis Lake	Plant	Eurasian watermilfoil	<i>Myriophyllum spicatum</i>
Goodale Lake	Plant	Eurasian watermilfoil	<i>Myriophyllum spicatum</i>
Melody Lake	Plant	Eurasian watermilfoil	<i>Myriophyllum spicatum</i>
Melody Lake	Plant	Starry stonewort	<i>Nitellopsis obtusa</i>
Melody Lake	Animal	Chinese mystery snail	<i>Bellamyia chinensi</i>
Otselic River near Landers Corners	Animal	Asian clam	<i>Corbicula fluminea</i>
Skaneateles Lake	Plant	Eurasian watermilfoil	<i>Myriophyllum spicatum</i>
Skaneateles Lake	Plant	Curly leafed pondweed	<i>Potamogeton crispus</i>
Solon Pond	Plant	Eurasian watermilfoil	<i>Myriophyllum spicatum</i>
Tully Lake	Plant	Eurasian watermilfoil	<i>Myriophyllum spicatum</i>
Tully Lake	Plant	Starry stonewort	<i>Nitellopsis obtusa</i>
Tully Lake	Plant	Curly leafed pondweed	<i>Potamogeton crispus</i>
Upper Little York Lake	Animal	Zebra mussel	<i>Dreissena polymorpha</i>
Upper Little York Lake	Plant	Eurasian watermilfoil	<i>Myriophyllum spicatum</i>
Upper Little York Lake	Plant	Starry stonewort	<i>Nitellopsis obtusa</i>
Upper Little York Lake	Plant	Curly leafed pondweed	<i>Potamogeton crispus</i>
West Branch Tioughnioga River	Animal	Zebra mussel	<i>Dreissena polymorpha</i>

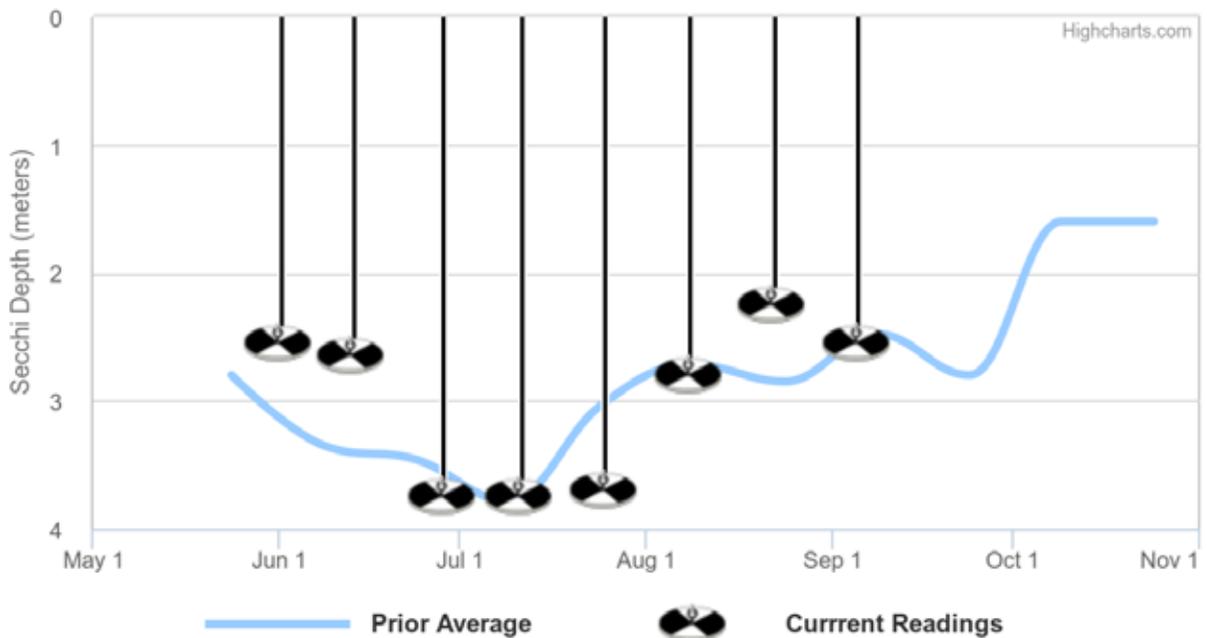
Appendix F: Current Year vs. Prior Averages for Song Lake

Current Year Water Temperatures vs. Prior Average



This year's shallow water sample temperatures are tending to be higher than normal when compared to the average of readings collected from 1988 to 2014. This year's deep water sample temperatures are tending to be lower than normal when compared to the average of readings collected from 2007 to 2014.

Current Year Secchi Readings vs. Prior Average



This year's session Secchi readings are tending to be lower than normal when compared to the average of readings collected from 1988 to 2014

Appendix G: Watershed and Land Use Map for Song Lake

This watershed and land use map was developed using USGS StreamStats and ESRI ArcGIS using the 2006 land use satellite imagery. The actual watershed map and present land uses within this watershed may be slightly different due to the age of the underlying data and some limits to the use of these tools in some geographic regions and under varying flow conditions. However, these maps are intended to show the approximate extent of the lake drainage basin and the major land uses found within the boundaries of the basin.

