Stissing Lake Questions and Answers, 2014 CSLAP

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

A1. Water clarity of Stissing Lake was slightly lower than normal, but recreational assessments were more favorable than normal in 204, consistent with less extensive coverage of aquatic plants.

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

A2. The HABs testing includes information about the types of algae found in the water samples. These results showed open water algae communities that at most times are comprised primarily of blue green algae levels. Shoreline blue green algae blooms have not been reported in recent years, although past blooms exhibited high toxins.

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

A3. Water clarity and nutrient levels in Stissing Lake were similar to those in other nearby lakes, although algae levels were much lower and no blooms were reported. Aquatic plant coverage was higher than in these other lakes.

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

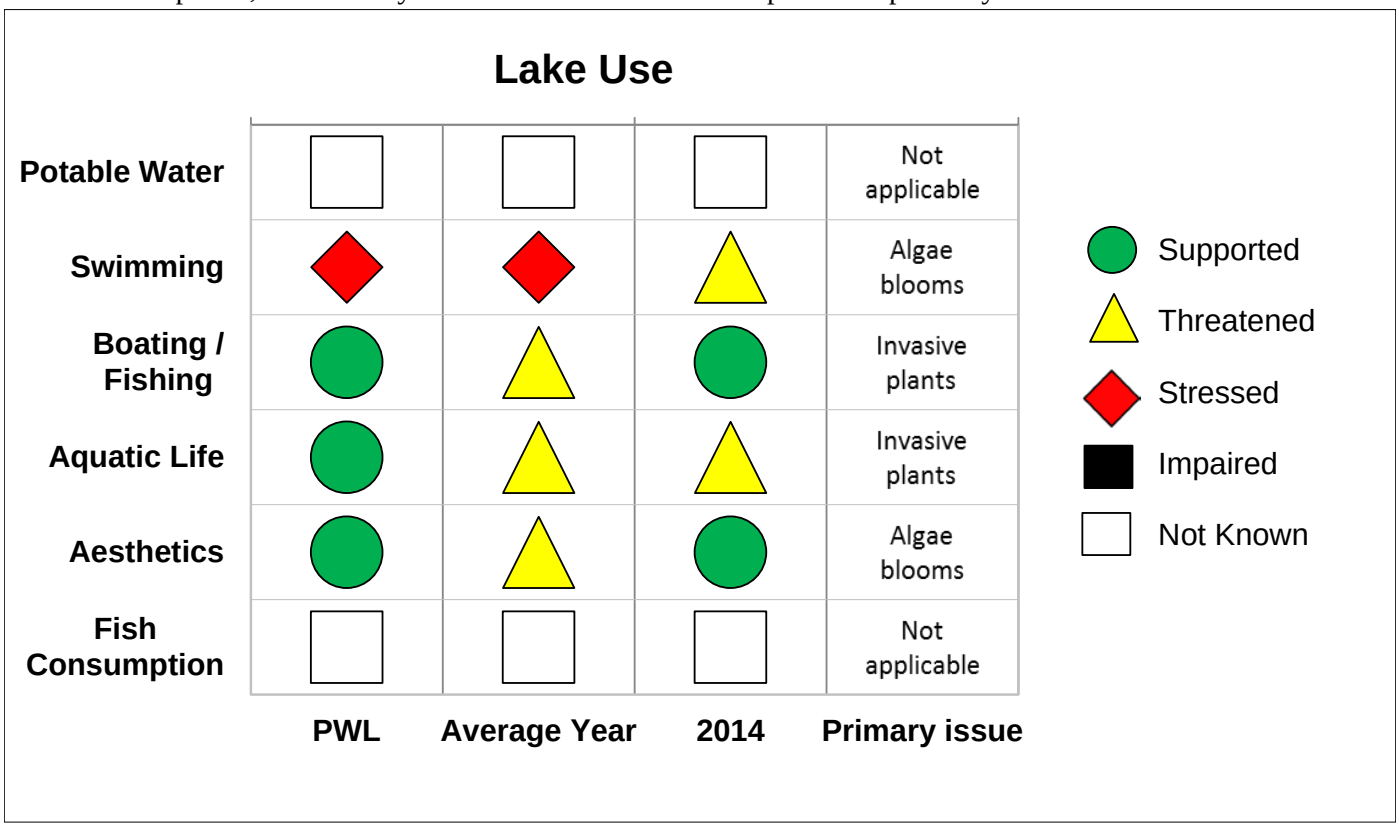
A4. Water clarity has steadily decreased in Stissing Lake, despite algae levels that have decreased over the same period. The drop in water transparency was consistent with a recent increase in phosphorus and nitrogen levels.

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

A5. Stissing Lake is probably susceptible to shoreline blue green algae blooms, although these have not been reported in recent years. Lake residents should evaluate any new sources of nutrients entering the lake, given the recent rise in phosphorus and nitrogen (that may have contributed to the lower water clarity).

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.

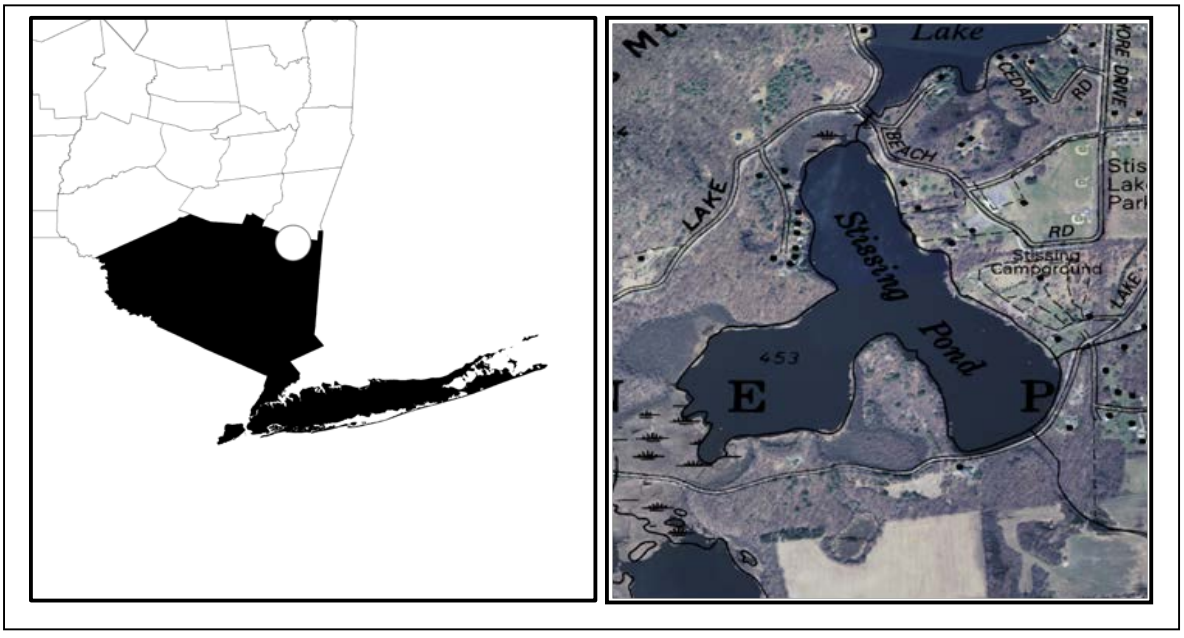


CSLAP 2014 Lake Water Quality Summary:
Stissing Lake

General Lake Information

Location	Town of Pine Plains
County	Dutchess
Basin	Lower Hudson River
Size	28.5 hectares (70.4 acres)
Lake Origins	Natural
Watershed Area	555 hectares (1,371 acres)
Retention Time	0.4 years
Mean Depth	3.5 meters
Sounding Depth	7.5 meters
Public Access?	boat ramp
Major Tributaries	Wappinger Creek
Lake Tributary To…	Wappinger Creek to Hudson River
WQ Classification	B (contact recreation = swimming)
Lake Outlet Latitude	41.968
Lake Outlet Longitude	-73.678
Sampling Years	2007-2012, 2014
2014 Samplers	Marilyn and Emily Henry
Main Contact	Marilyn Henry

Lake Map



Background

Stissing Lake is a 70 acre, class B lake found in the Town of Pine Plains in Dutchess County, in the lower Hudson River valley region of New York State. Stissing Lake was first sampled as part of CSLAP in 2007.

It is one of five CSLAP lakes among the more than 65 lakes found in Dutchess County, and one of 67 CSLAP lakes among the more than 360 lakes and ponds in the Lower Hudson River drainage basin.

Lake Uses

Stissing 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 lakefront residents and invited guests for swimming and other recreational uses, and by visitors through a public boat ramp.

Stissing Lake is not stocked by the state. It is not known by the report authors if private fish stocking occurs in Stissing Lake.

General statewide fishing regulations are applicable in Stissing Lake.

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

Historical Water Quality Data

CSLAP sampling was conducted on Stissing Lake from 2007 to 2012, and in 2014. 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 Stissing Lake can also be found on the NYSDEC web page at http://www.dec.ny.gov/lands/77874.html.

None of the unnamed ephemeral tributaries, nor the main inlet to the lake (Wappingers Creek) have been monitored through the NYSDEC Rotating Intensive Basins (RIBS) program or the state stream macroinvertebrate monitoring program, at least in the area near the lake. The fisheries populations (largemouth bass, smallmouth bass, and yellow perch) have been surveyed by the DEC Division of Fish and Wildlife. This survey showed that the relative weight of the surveyed fish was lower than expected.

Lake Association and Management History

Stissing Lake is served by the Stissing Lake Association, which is involved in a few lake management and social activities, including:

- Maintaining a town beach
- Maintaining the Lion's Club boat launch (with signage); an 8 HP limit has been imposed on boats using the lake
- Conducted aquatic plant survey (EWM); contracted with Allied Biological to conduct this work
- Lake cleanup day

Information about the Stissing Lake Association can be found at http://www.stissinglake.org.

Summary of 2014 CSLAP Sampling Results

Evaluation of 2014 Annual Results Relative to 2007-2013

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 – Stissing Lake" section in Appendix D.

Evaluation of Eutrophication Indicators

Secchi disk transparency readings were lower than normal in 2014, and these readings have steadily decreased since 2007. This was consistent with higher phosphorus (and nitrogen) readings over the last several years, but algae (chlorophyll *a*) readings have also decreased over the last several years.

Lake productivity is usually stable during most of the summer, but increases substantially in the fall, as manifested in lower water clarity and higher nutrient and algae levels. This may be consistent with migration of nutrients from bottom waters to the lake surface after the lake turns over, although limited deepwater nutrient readings do not show elevated phosphorus levels. No clear seasonal trends were apparent in 2014.

The lake can be characterized as *mesoeutrophic*, or moderately productive, based on chlorophyll *a*, water clarity (both typical of *mesotrophic* lakes), and total phosphorus readings (typical of *eutrophic* lakes). However, chlorophyll a readings were typical of *oligotrophic*, or highly unproductive lakes, in 2014. The trophic state indices (TSI) evaluation suggests that algae levels are much lower than expected given the phosphorus and water clarity readings. This indicates that non-algal particles may be affecting water clarity, or these algae results are not representative of normal conditions in the lake. Overall trophic conditions are summarized on the Lake Scorecard and Lake Condition Summary Table.

Evaluation of Potable Water Indicators

Algae levels, at least as measured through CSLAP, are not 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 the lake is not classified for use for drinking water. Deepwater phosphorus and ammonia readings are similar to those measured at the lake surface, suggesting that any deepwater intakes may support "unofficial" potable water use (or that thermal stratification is weak). Potable water conditions, at least as measurable through CSLAP, are summarized in the Lake Scorecard and Lake Condition Summary Table.

Evaluation of Limnological Indicators

pH, conductivity and total nitrogen readings were higher than usual in 2014, and both indicators have increased slightly over the last seven years. Calcium and NOx readings were lower than normal in 2014, and NOx readings have decreased over the same period. It is likely that the small changes in most of these indicators have been within the normal range of variability in the lake, at least in recent years. Overall limnological conditions are summarized in the Lake Scorecard and Lake Condition Summary Table.

Evaluation of Biological Condition

Macrophyte surveys were conducted by Allied Biological. This study found at least 26 aquatic plant species, including at least one protected plant species (*Ceratophyllum echinatum*, spined hornwort) and two exotic plant species (*Myriophyllum spicatum*, Eurasian watermilfoil, and *Potamogeton crispus*, curly-leafed pondweed). The modified floristic quality index (FQI) for the lake indicates that the quality of the aquatic plant community is probably "fair".

An incomplete inventory of fish species in the lake has found at least three warmwater fish species and one coolwater fish species. This inventory is not sufficient to characterize the fish community in the lake. However, the fish weight analysis indicated that the fish condition may be unfavorable.

Phytoplankton, zooplankton, and macroinvertebrate surveys have not been conducted through CSLAP in Stissing Pond. The fluoroprobe screening data analyzed by SUNY ESF indicates that the densest algae communities- the highest chlorophyll readings- are dominated by blue green algae, although "bloom" quantifies of algae were not apparent in 2014. Blue green algae blooms were found along the shoreline in the fall in 2009, but have not been detected in recent years.

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

Evaluation of Lake Perception

Recreational assessments were more favorable than usual in 2014, despite less favorable water quality assessments (which were consistent with lower water clarity). More favorable recreational assessments have been reported since the late 2000s. Aquatic plant coverage was lower in 2014; it is not known if this is due to a reduction in native or invasive plants. Recreational and water quality assessments improve slightly, and plant coverage decreases, during late summer in the typical summer. In 2014, these assessments are less favorable in mid-summer, but improve in late summer. Overall lake perception is summarized on the Lake Scorecard.

Evaluation of Local Climate Change

Air and water temperature readings in the summer index period were close to normal in 2014, and neither indicator has exhibited any long-term changes. It is not known if air and water temperature readings are a good indicator of local climate change.

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 at times exceed levels indicating susceptibility for harmful algal blooms (HABs), confirmed by fluoroprobe screening data showing elevated blue green algae levels in the open water and frequently in shoreline blooms. An analysis of algae samples indicated microcystin levels below the levels needed to support safe swimming in the open water. A 2009 shoreline bloom sample showed algal toxins well above safe levels within the sampled blooms, but no shoreline blooms have been reported since then.

Lake Condition Summary

Category	Indicator	Min	Overall Avg	Max	2014 Avg	Classification	2014 Change?	Long-term Change?
Eutrophication Indicators	Water Clarity	1.00	2.40	6.00	1.89	Mesotrophic	Lower Than Normal	Decreasing Significantly
	Chlorophyll *a*	0.05	2.99	48.72	0.27	Mesotrophic	Lower Than Normal	No Change
	Total Phosphorus	0.011	0.024	0.113	0.031	Eutrophic	Within Normal Range	No Change
Potable Water Indicators	Hypolimnetic Ammonia	0.01	0.02	0.04		Close to Surface NH4 Readings		
	Hypolimnetic Arsenic							
	Hypolimnetic Iron							
	Hypolimnetic Manganese							
Limnological Indicators	Hypolimnetic Phosphorus	0.013	0.018	0.027		Close to Surface TP Readings		
	Nitrate + Nitrite	0.00	0.02	0.17	0.01	Low NOx	Lower Than Normal	No Change
	Ammonia	0.01	0.04	0.46	0.14	Low Ammonia	Higher than Normal	No Change
	Total Nitrogen	0.21	0.56	1.29	0.69	Intermediate Total Nitrogen	Higher than Normal	No Change
	pH	6.83	7.50	8.02	7.70	Circumneutral	Higher than Normal	No Change
	Specific Conductance	126	315	419	354	Hardwater	Within Normal Range	No Change
	True Color	14	36	132	28	Intermediate Color	Within Normal Range	No Change
	Calcium	32.6	37.7	47.4	33.7	Highly Susceptible to Zebra Mussels	Lower Than Normal	No Change
Lake Perception	WQ Assessment	1	1.3	3	1.6	Crystal Clear	Within Normal Range	No Change
	Aquatic Plant Coverage	1	3.0	4	2.9	Surface Plant Growth	More Favorable Than Normal	No Change
	Recreational Assessment	1	1.4	4	1.1	Could Not Be Nicer	Within Normal Range	No Change
Biological Condition	Phytoplankton					Not measured through CSLAP	Not known	Not known
	Macrophytes					Fair quality of the aquatic plant community	Not known	Not known
	Zooplankton					Not measured through CSLAP	Not known	Not known
	Macroinvertebrates					Not measured through CSLAP	Not known	Not known
	Fish					Incomplete inventory	Not known	Not known
	Invasive Species					Eurasian watermilfoil, curly leafed pondweed	Not known	Not known
Local Climate Change	Air Temperature	14	24.3	35	23.7		Within Normal Range	No Change
	Water Temperature	17	23.9	31	24.5		Within Normal Range	No Change
Harmful Algal Blooms	Open Water Phycocyanin	4	54	216	33	Some readings indicate high risk of BGA	Not known	Not known
	Open Water FP Chl.a	2	6	19	8	Few readings indicate high algae levels	Not known	Not known
	Open Water FP BG Chl.a	1	4	14	4	Few readings indicate high BGA levels	Not known	Not known
	Open Water Microcystis	<DL	0.3	2.0	<DL	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	<DL	184.6	184.6		Very high shoreline bloom MC-LR	Not known	Not known
	Shoreline Anatoxin a	<DL	<DL	<DL		Shoreline bloom Anatoxin-a undetectable	Not known	Not known

Evaluation of Lake Condition Impacts to Lake Uses

Stissing Lake is presently among the lakes cited on the 2008 Lower Hudson River Basin Priority Waterbody List (PWL), with recreation listed as *stressed* due to excessive weeds, algae and nutrients. The PWL listing for the lake can be found in Appendix B.

Potable Water (Drinking Water)

The CSLAP dataset at Stissing 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. The algae levels in the lake suggest that the "unofficial" potable water use may be supported, at least during some of the summer, although some impacts may occur from any unofficial intakes near shoreline algal blooms.

Contact Recreation (Swimming)

The CSLAP dataset at Stissing Lake, including water chemistry data, physical measurements, and volunteer samplers' perception data, suggests that swimming and contact recreation may be *stressed* by poor water clarity and shoreline blooms, although lesser impacts were apparent in 2014 with the lack of shoreline blooms. 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 Stissing Lake, including water chemistry data, physical measurements, and volunteer samplers' perception data, suggest that non-contact recreation may be *threatened* by exotic plants, such as Eurasian watermilfoil and curly-leafed pondweed. These impacts were not apparent in 2014 with reduced coverage of aquatic plants.

Aquatic Life

The CSLAP dataset on Stissing Lake, including water chemistry data, physical measurements, and volunteer samplers' perception data, suggest that aquatic life may be *threatened* by 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 Stissing Lake, including water chemistry data, physical measurements, and volunteer samplers' perception data, suggest that aesthetics should be fully supported, although this use may be *threatened* at times by shoreline blooms.

Fish Consumption

There are no fish consumption advisories posted for Stissing Lake.

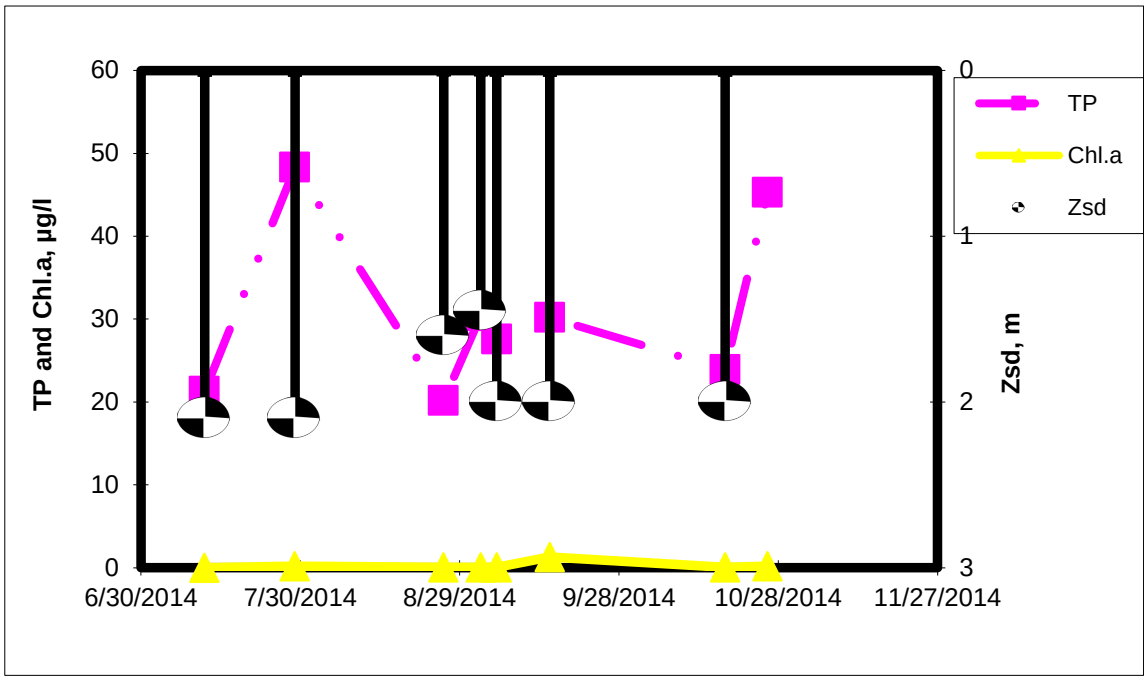
Additional Comments and Recommendations

Additional water quality and lake perception data will help to determine if the water quality conditions in the lake fully support most designated lake uses. Lake residents should report and avoid exposure to any surface scums or heavily discolored water usually associated with blue green algae blooms.

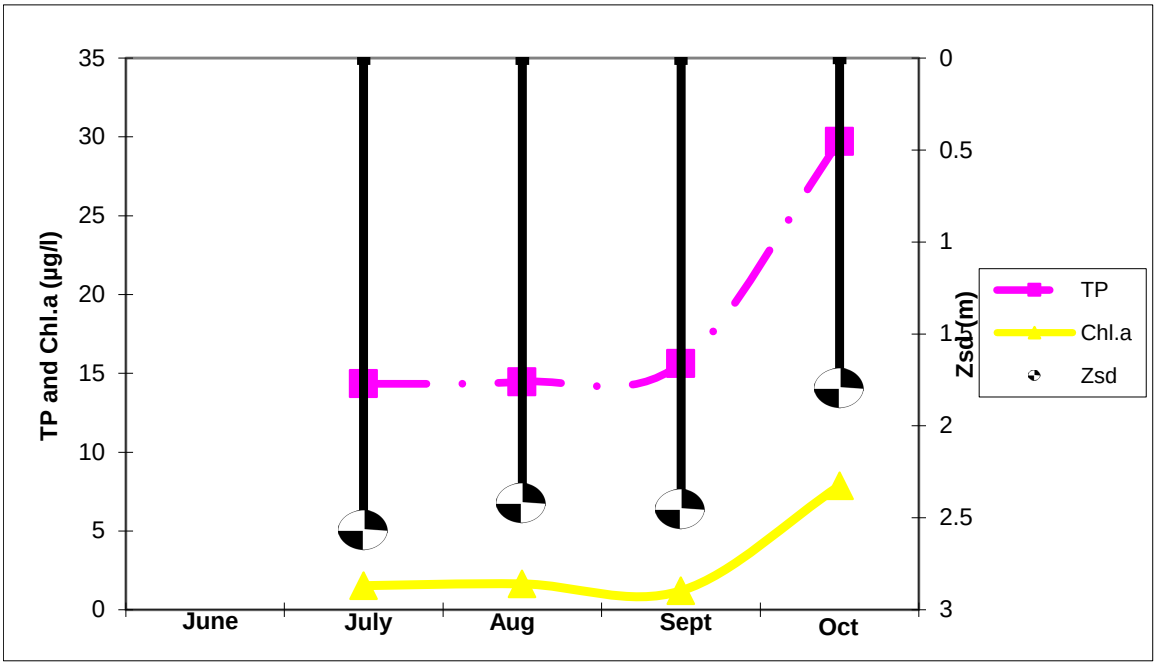
Aquatic Plant IDs-2014

None submitted for identification.

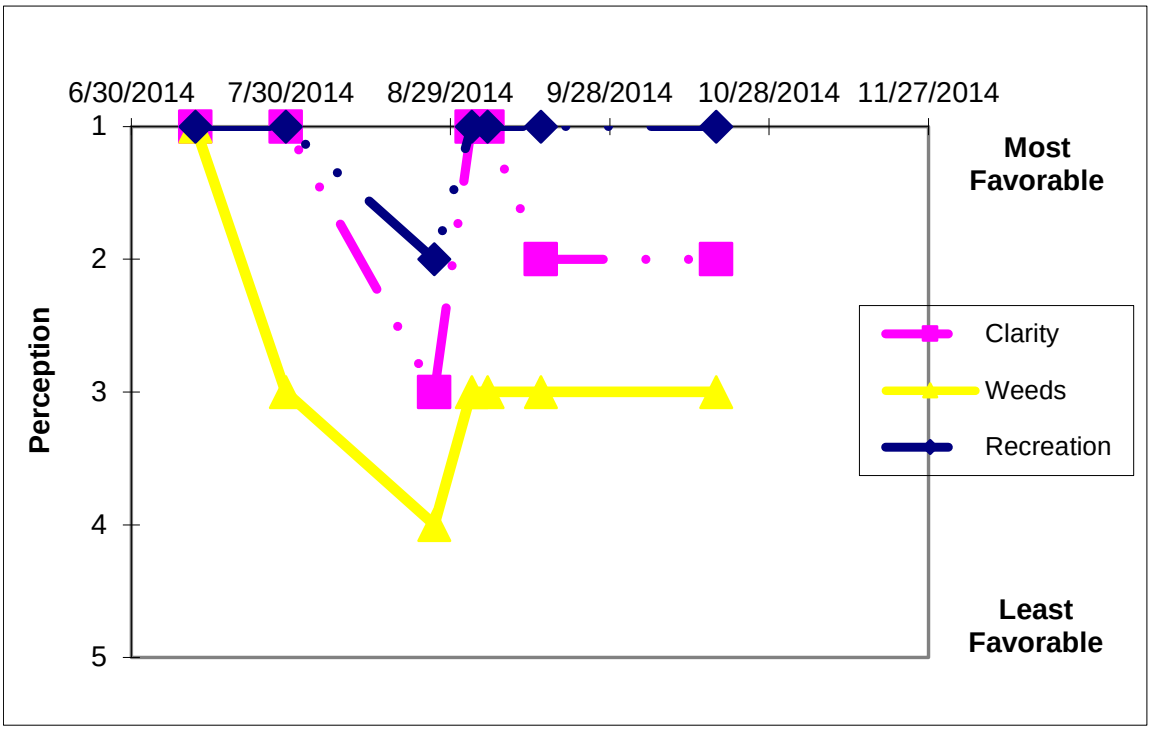
Time Series: Trophic Indicators, 2014



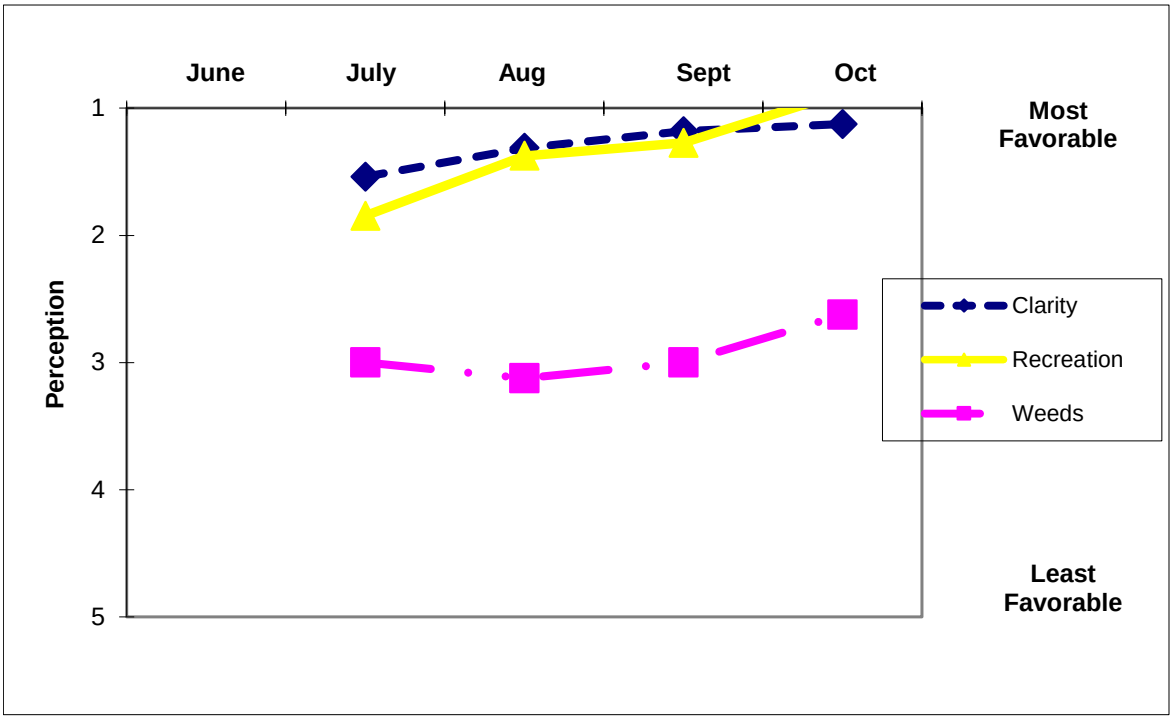
Time Series: Trophic Indicators, Typical Year (2007-2014)



Time Series: Lake Perception Indicators, 2014



Time Series: Lake Perception Indicators, Typical Year (2007-2014)



Appendix A- CSLAP Water Quality Sampling Results for Stissing Lake

LNum	PName	Date	Zbot	Zsd	Zsamp	Tot.P	NO3	NH4	TDN	TN/TP	TColor	pH	Cond25	Ca	Chl.a
213	Stissing L	7/7/2007	5.0	3.00	1.5	0.012	0.01	0.02	0.45	82.5	23	7.9	289	32.7	2.56
213	Stissing L	7/22/2007	8.0	2.50	1.5	0.015	0.01	0.01	0.57	85.8	21	7.7	295		3.22
213	Stissing L	8/5/2007	6.0	3.00	1.5	0.017	0.01	0.01	0.73	94.0	25	7.5	311		3.45
213	Stissing L	8/18/2007	7.0	3.00	1.5	0.016	0.01	0.02	0.53	74.2	27	7.3	246		5.34
213	Stissing L	9/1/2007	8.0	2.80	1.5	0.013	0.00	0.02	0.71	118.5	29	7.7	292	35.0	6.31
213	Stissing L	9/15/2007	7.5	2.75	1.5	0.017	0.00	0.11	0.72	91.3	25	7.2	282		6.83
213	Stissing L	9/29/2007	5.0	6.00	1.5	0.017	0.01	0.07	0.94	121.9	38	7.5	193		0.10
213	Stissing L	10/13/2007	7.0	5.00	1.5	0.019	0.01	0.04	0.52	59.6	44	7.0	202		0.91
213	Stissing L	7/5/2008	6.0	6.00	1.5	0.021	0.04	0.04	0.47	48.48	30	7.09	280	35.0	0.10
213	Stissing L	7/27/2008	7.5	1.00	1.5	0.065	0.01	0.01	0.33	11.01	29	7.54	223		0.10
213	Stissing L	8/12/2008	6.5	1.90	1.5	0.022	0.01	0.03	0.47	47.64	35	7.38	337		0.10
213	Stissing L	9/2/2008	6.5	2.00	1.5	0.012	0.02	0.03	0.36	68.89	31	7.52	301		0.10
213	Stissing L	9/14/2008				0.015	0.01	0.03	0.37	54.23	64	6.95	286	32.6	0.10
213	Stissing L	10/13/2008				0.027	0.07	0.05	0.54	44.00	20	7.26	247		48.72
213	Stissing L	10/20/2008				0.028	0.03	0.05	0.59	45.95	35	7.21	326		23.74
213	Stissing L	10/27/2008				0.035	0.02	0.09	0.65	41.44	31	6.83	265		15.94
213	Stissing L	07/06/2009	8.0	2.50	1.5	0.017			0.30	38.21	92	7.53	268	37.7	0.10
213	Stissing L	07/18/2009	8.4	2.40	1.5	0.015	0.03	0.02	0.38	56.55	20	7.22	242		8.35
213	Stissing L	08/02/2009	7.0	2.25	1.5		0.07	0.01	0.42		30		126		0.10
213	Stissing L	08/16/2009	7.7	3.20	1.5	0.025	0.01	0.03	0.45	40.15	51	7.59	241		1.10
213	Stissing L	08/30/2009		2.25	1.5	0.016	0.01	0.02	0.37	52.46	40	7.80	290	36.1	3.90
213	Stissing L	09/12/2009				0.021	0.01	0.01	0.43	45.27	100	7.13	239		0.70
213	Stissing L	09/18/2009	8.2	2.20	1.5	0.015	0.01	0.02	0.44	63.27	30	7.08	300		0.10
213	Stissing L	09/28/2009													
213	Stissing L	10/04/2009	7.2	1.93	1.5	0.018	0.01	0.02	0.49	58.71	38	7.10	295		0.10
213	Stissing L	10/04/2009													
213	Stissing L	8/3/2010	7.0	2.20	1.5	0.015	0.04	0.04	0.21	30.92	35	7.57	393	39.6	0.10
213	Stissing L	8/10/2010	7.3	3.10	1.5	0.015	0.01	0.02	0.41	60.57	22	7.68	382		0.10
213	Stissing L	8/15/2010	7.0	2.75	1.5	0.016	0.04	0.02	0.54	73.38	20	7.70	384		
213	Stissing L	8/24/2010	6.9	2.45	1.5	0.018	0.03	0.04	0.42	52.70	34	7.75	372		1.80
213	Stissing L	8/29/2010	6.9	2.63	1.5	0.017	0.09	0.02	0.45	59.06	21	7.48	383	39.0	0.20
213	Stissing L	9/7/2010	6.8	2.85	1.5	0.013	0.02	0.01	0.44	76.56	42	7.89	419		1.70
213	Stissing L	9/19/2010	7.3	1.60	1.5	0.018	0.17	0.02	0.46	55.85	19	7.58	406		0.10
213	Stissing L	10/3/2010	7.1	1.50	1.5	0.019	0.08	0.05	0.67	77.69	28	7.89	336		2.40
213	Stissing L	7/4/2011	6.8	2.70	1.5	0.016	0.01	0.01	0.53	75.23	24	7.42	360	36.4	0.70
213	Stissing L	7/17/2011	6.7	2.50	1.5	0.012	0.02	0.06	0.44	82.41	15	7.78	393		0.60
213	Stissing L	7/31/2011	6.4	2.20	1.5	0.011	0.01	0.02	0.49	97.12	31	7.67	206		1.20
213	Stissing L	8/21/2011	6.5	2.15	1.5	0.015	0.01	0.05	0.54	79.49	34	7.80	356		0.90
213	Stissing L	9/20/2011	7.0	1.25	1.5	0.021	0.01	0.03	0.56	59.59	41	7.50		37.7	0.60
213	Stissing L	10/10/2011	6.9	1.25	1.5	0.016	0.01	0.01	0.74	100.63	39	7.30	345		1.00
213	Stissing L	10/16/2011	7.0	1.25	1.5	0.065	0.01	0.01	0.74	24.94		7.26	350		1.00
213	Stissing L	10/24/2011	7.0	1.20	1.5	0.113	0.02	0.03	1.29	25.01	132	7.37	225		0.40
213	Stissing L	7/7/2012	7.1	2.60	1.5	0.023	0.01	0.02	0.39	37.63	44	7.25	357	47.4	0.05
213	Stissing L	7/29/2012	7.0	1.80	1.7	0.029	0.01	0.02	0.71	54.16	44	7.30	371		1.20
213	Stissing L	8/8/2012		1.70	1.5	0.026	0.01	0.02	0.62	53.65	43	7.75	342		0.90
213	Stissing L	8/11/2012	7.0	2.45	1.5	0.019	0.03	0.07	0.57	65.05	45	7.56	348		6.60
213	Stissing L	8/19/2012	7.0	2.10	1.5	0.017	0.01	0.01	0.49	61.93	36	7.84	322	46.7	0.05
213	Stissing L	9/2/2012	6.9	3.08	1.5	0.016	0.01	0.03	0.46	64.17	14	7.25	354		
213	Stissing L	9/24/2012	7.0	1.90	1.5	0.026	0.01	0.03	0.31	26.57	31	7.48	353		0.05
213	Stissing L	10/20/2012	7.0	2.05	1.5	0.055	0.02	0.15	1.00	40.08		7.54	360		
213	Stissing L	7/12/2014	7.5	2.10	1.5	0.021	0.01	0.06	0.66	67.86	22	7.68	377		
213	Stissing L	7/29/2014	7.8	2.10		0.048			0.71	32.48	38	7.80	311		0.20
213	Stissing L	8/26/2014	7.0	1.60	1.5	0.020	0.01	0.46	0.58	62.84	23	8.02	331		0.05
213	Stissing L	9/2/2014	7.2	1.45	1.5	0.030			0.67	48.27	27	7.80	345		0.05
213	Stissing L	9/5/2014	7.0	2.00	1.5	0.028	0.01	0.03	0.54	43.04	27	7.33	354	33.7	0.05
213	Stissing L	9/15/2014	7.3	2.00	1.5	0.030			0.98	71.32	32	7.59	363		1.30
213	Stissing L	10/18/2014	7.5	2.00	1.5	0.024	0.01	0.02	0.41	37.65	23	7.74	367		0.05
213	Stissing L	10/26/2014				0.045			0.99	48.18	28	7.61	384		0.20
213	Stissing L	9/29/2007	5.0			0.027									
213	Stissing L	10/13/2007	7.0			0.021									
213	Stissing L	07/06/2009				0.021		0.01							
213	Stissing L	08/30/2009				0.025		0.02							
213	Stissing L	09/12/2009				0.017									

LNum	PName	Date	Zbot	Zsd	Zsamp	Tot.P	NO3	NH4	TDN	TN/TP	TColor	pH	Cond25	Ca	Chl.a
213	Stissing L	09/18/2009				0.014		0.01							
213	Stissing L	10/04/2009				0.016									
213	Stissing L	8/3/2010	7.0			0.014		0.04							
213	Stissing L	8/15/2010	7.0			0.013		0.03							
213	Stissing L	8/29/2010	6.9			0.013		0.03							
213	Stissing L	9/19/2010	7.3			0.018		0.02							

LNum	PName	Date	Site	TAir	TH20	QA	QB	QC	QD	QF	QG	AQ-PC	AQ-Chla	MC-LR	Ana-a	Cylin	FP-Chl	FP-BG	HAB form	Shore HAB
213	Stissing L	7/7/2007	epi	28	26	2	3	2	2											
213	Stissing L	7/22/2007	epi	31	27	2	4	3	2											
213	Stissing L	8/5/2007	epi	24	27	2	4	4	2											
213	Stissing L	8/18/2007	epi	24	24	1	1	1	5											
213	Stissing L	9/1/2007	epi	22	24	1	3	2	5											
213	Stissing L	9/15/2007	epi	18	21	1	3	2	5											
213	Stissing L	9/29/2007	epi	25	27															
213	Stissing L	10/13/2007	epi	14	18	1	4	1	5											
213	Stissing L	7/5/2008	epi	25	26	2	3	3	2											
213	Stissing L	7/27/2008	epi	26	25	1	3	2	5											
213	Stissing L	8/12/2008	epi	22	23	1	3	1	8											
213	Stissing L	9/2/2008	epi	26	25	1	3	1	0											
213	Stissing L	9/14/2008	epi																	
213	Stissing L	10/13/2008	epi																	
213	Stissing L	10/20/2008	epi																	
213	Stissing L	10/27/2008	epi																	
213	Stissing L	07/06/2009	epi	31	27	1	3	1	0											
213	Stissing L	07/18/2009	epi	29	25	1	3	1	1											
213	Stissing L	08/02/2009	epi	24	25	1	3	2	5											
213	Stissing L	08/16/2009	epi	33	29	1	3	1	0											
213	Stissing L	08/30/2009	epi	25	25	1	3	1	0					0.05						
213	Stissing L	09/12/2009	epi									188.1								
213	Stissing L	09/18/2009	epi	20	19	1	3	1	0			216.1								
213	Stissing L	09/28/2009	epi											1.99						
213	Stissing L	10/04/2009	epi	17	18							117.5		1.03						
213	Stissing L	10/04/2009	epi											184.62						
213	Stissing L	8/3/2010	epi	24	24	1	4	1	0	0	0									
213	Stissing L	8/10/2010	epi	31	31	1	3	1	0	0	0									
213	Stissing L	8/15/2010	epi	25	25	1	3	2	25	0	0									
213	Stissing L	8/24/2010	epi	21	22	1	3	1	0	0	0									
213	Stissing L	8/29/2010	epi	34	26	1	3	1	0	0	0									
213	Stissing L	9/7/2010	epi	23	24															
213	Stissing L	9/19/2010	epi	26	22	1	3	1	0	0	0									
213	Stissing L	10/3/2010	epi	17	18	1	2	1	0	0	0									
213	Stissing L	7/4/2011	epi	28	26	2	4	3	23	0	0	3.80	1.60							
213	Stissing L	7/17/2011	epi	33	31	1	3	2	2	0	0	8.70	2.29							
213	Stissing L	7/31/2011	epi	30	31	3	3	3	0	0	0	25.10	2.90							
213	Stissing L	8/21/2011	epi	25	25	2	4	1	0	0	0	25.20	2.40							
213	Stissing L	9/20/2011	epi	17	18	2	3	2	0	0	0	35.70	4.10							
213	Stissing L	10/10/2011	epi	20	19	1	3	1	0	0	0	33.70	4.90							
213	Stissing L	10/16/2011	epi	16	18	1	3	1	0	0	0	27.70	5.40							
213	Stissing L	10/24/2011	epi	16	17	2	3	1	0	0	0	106.70	9.20							
213	Stissing L	7/7/2012	epi	27	28	1	3	1	0	0	0	15.00	0.80	<0.30	<0.392		2.43	1.33		
213	Stissing L	7/29/2012	epi	25	20	2	3	1	1	0	0								I	
213	Stissing L	8/8/2012	epi	26	26	1	3	1	0	0	0	22.40	0.60	0.39	<0.552		4.71	2.36	I	
213	Stissing L	8/11/2012	epi	31	29	2	3	1	0	0	0	14.20	0.90	0.40	<0.552		4.96	2.38	I	
213	Stissing L	8/19/2012	epi	25	22	1	3	1	0	0	0	14.70	0.90	<0.30	<0.552		3.79	2.07		
213	Stissing L	9/2/2012	epi	35	29	1	3	1	0	0	0	7.30	0.60	0.45	<0.725		3.53	2.00	I	
213	Stissing L	9/24/2012	epi	17	20	1	3	1	0	0	0	21.40	1.20	<0.30	<3.205		4.08	1.72	I	
213	Stissing L	10/20/2012	epi	17	18	1	3	1	0	0	0	181.80	1.10				16.28	13.81	I	
213	Stissing L	7/12/2014	epi	25	25	1	1	1	0	0	0								i	i
213	Stissing L	7/29/2014	epi	25	25	1	3	1	0	0	0								i	i
213	Stissing L	8/26/2014	epi	24	26	3	4	2	0	0	0	30.10	0.50				4.52	3.11	i	i

LNum	PName	Date	Site	TAir	TH20	QA	QB	QC	QD	QF	QG	AQ-PC	AQ-Chla	MC-LR	Ana-a	Cylin	FP-Chl	FP-BG	HAB form	Shore HAB
213	Stissing L	9/2/2014	epi	23	25	1	3	1	0	0	0	17.90	0.50	<0.29	<0.14	<0.002	4.95	1.68	i	i
213	Stissing L	9/5/2014	epi	30	29	1	3	1	0	0	0	9.20	0.40	<0.64	<0.03	<0.001	3.35	0.76	i	i
213	Stissing L	9/15/2014	epi	19	21	2	3	1	0	0	0	73.80	0.90	<0.70	<0.03	<0.001	18.62	11.63	i	i
213	Stissing L	10/18/2014	epi	21	22	2	3	1	0	0	0			<0.95	<0.09	<0.006			i	i
213	Stissing L	10/26/2014	epi																	
213	Stissing L	9/29/2007	epi																	
213	Stissing L	10/13/2007	epi																	
213	Stissing L	07/06/2009	epi																	
213	Stissing L	08/02/2009	epi																	
213	Stissing L	08/30/2009	epi																	
213	Stissing L	09/12/2009	epi																	
213	Stissing L	09/18/2009	epi																	
213	Stissing L	10/04/2009	epi																	
213	Stissing L	8/3/2010	epi																	
213	Stissing L	8/15/2010	epi																	
213	Stissing L	8/29/2010	epi																	
213	Stissing L	9/19/2010	epi																	

Legend Information

Indicator	*Description*	*Detection Limit*	*Standard (S) / Criteria (C)*
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/1	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 (aquaflor) (unitless)	1 unit	none
AQ-Chl	Chlorophyll *a* (aquaflor) (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	Cylindrospermposin (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 Stissing Lake

Thompson, Stissing, Mud/Twin Isl Ponds (1305-0010) Need Verific

Waterbody Location Information Revised: 07/11/2008

Water Index No:	H-101-P408,P409,P410			**Drain Basin:**	Lower Hudson River
Hydro Unit Code:	02020008/060	**Str Class:**	B		Low Hudson-Wappinger
Waterbody Type:	Lake			**Reg/County:**	3/Dutchess Co. (14)
Waterbody Size:	204.4 Acres			**Quad Map:**	PINE PLAINS (N-26-1)
Seg Description:	total area of all three lakes				

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

Use(s) Impacted	Severity	Problem Documentation
Recreation	Stressed	Possible
Recreation	Stressed	Possible

Type of Pollutant(s)

Known: - - -
Suspected: ALGAL/WEED GROWTH, Nutrients
Possible: Pathogens

Source(s) of Pollutant(s)

Known: - - -
Suspected: OTHER SOURCE (waterfowl)
Possible: Agriculture, Urban/Storm Runoff

Resolution/Management Information

Issue Resolvability: 1 (Needs Verification/Study (see STATUS))
Verification Status: 1 (Waterbody Nominated, Problem Not Verified)
Lead Agency/Office: DOW/BWAM **Resolution Potential:** Medium
TMDL/303d Status: n/a

Further Details

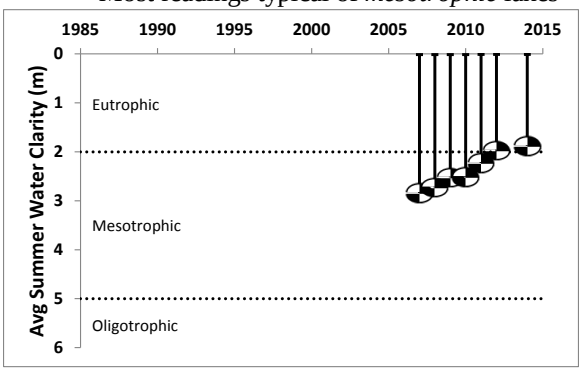
Overview
Recreational uses in Thompson, Stissing and Mud/Twin Island Ponds may experience minor impacts/threats due to excessive aquatic vegetation and/or algal growth. This assessment is based on previously reported concerns and conditions in the lake need to be verified.

Previous Assessment
Recreational uses (swimming, boating) and aesthetics in the lake were reported as being affected by excessive aquatic weed growth. Waterfowl (geese, ducks) are the suspected source of nutrient loads that promote the growth of aquatic vegetation. (Dutchess County WQCC, 1996)

Appendix C- Long Term Trends: Stissing Lake

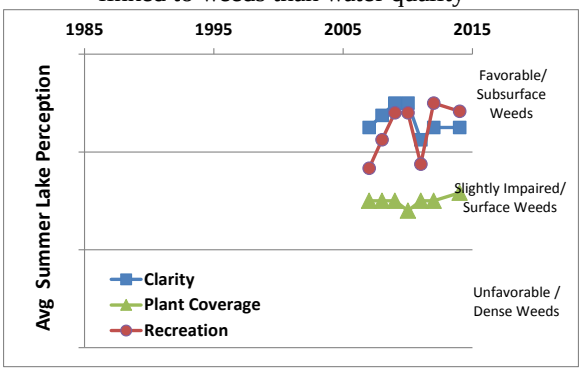
Long Term Trends: Water Clarity

- Water clarity decreasing in last seven years, consistent w/ ↓ algae and variable color
- Most readings typical of *mesotrophic* lakes



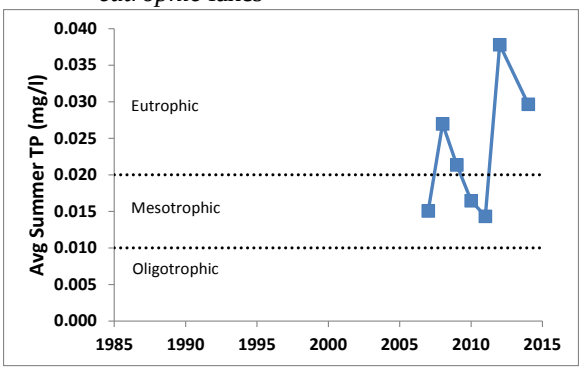
Long Term Trends: Lake Perception

- Slight improvement recreation 2007-14
- Recreational perception may be more closely linked to weeds than water quality



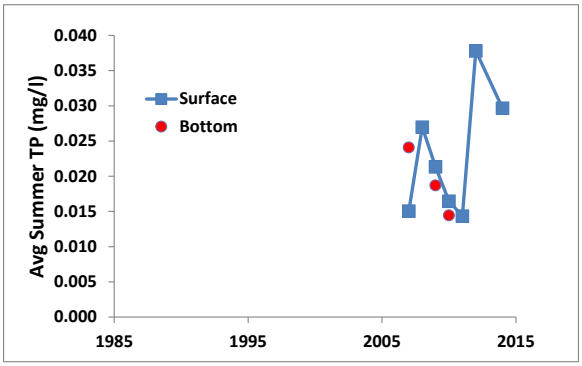
Long Term Trends: Phosphorus

- Increase in TP since 2011
- Most readings typical of *mesotrophic* to *eutrophic* lakes



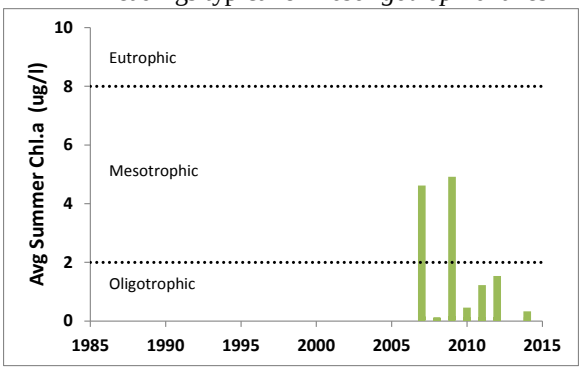
Long Term Trends: Bottom Phosphorus

- Deepwater and surface TP levels similar
- Deepwater TP data indicates weak thermal stratification



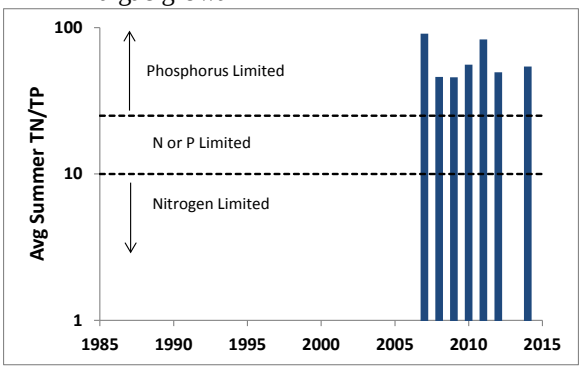
Long Term Trends: Chlorophyll a

- Decrease since 2009; may not be representative of lake conditions
- Readings typical of *mesoligotrophic* lakes



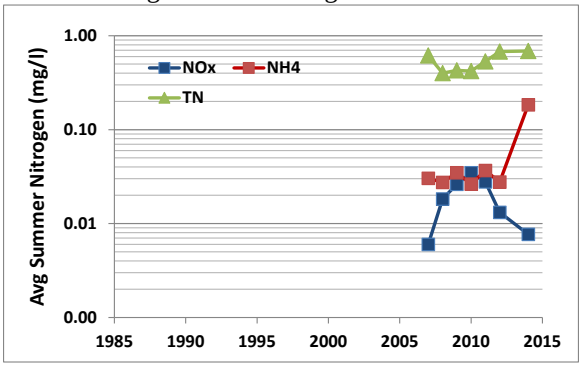
Long Term Trends: N:P Ratio

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



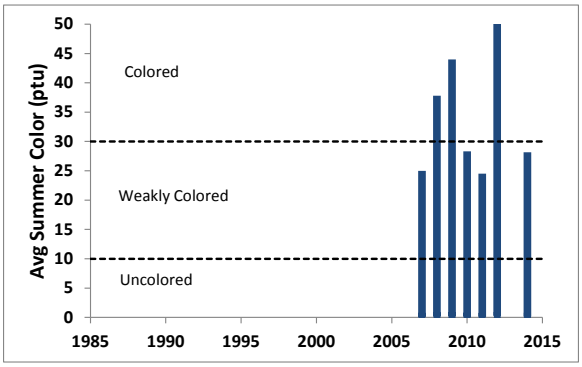
Long Term Trends: Nitrogen

- NOx ↓ and TN ↑ last few years
- Low NOx, ammonia and total nitrogen, though NH4 much higher in 2014



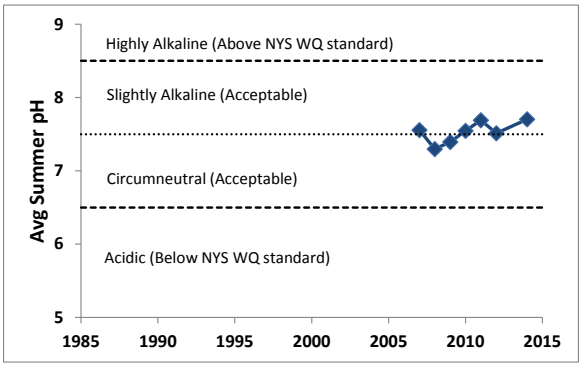
Long Term Trends: Color

- No long term trend; highly variable
- Most readings typical of *moderate colored* lakes



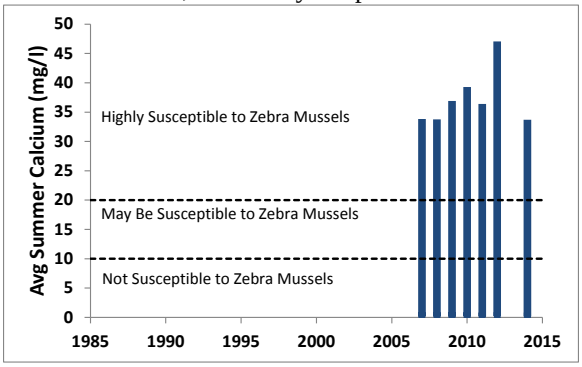
Long Term Trends: pH

- Increase since 2008, though small change
- Most readings typical of *slightly alkaline* to *circumneutral* lakes



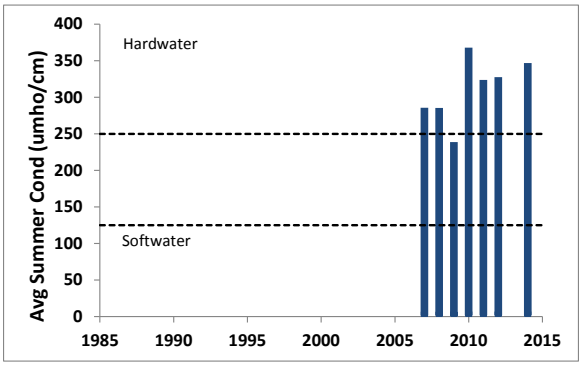
Long Term Trends: Calcium

- Calcium levels variable year to year
- Data indicates susceptibility to zebra mussels, but none yet reported at lake



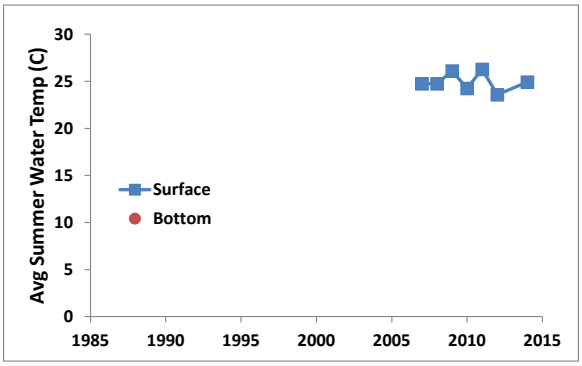
Long Term Trends: Conductivity

- ↑ conductivity since 2007
- Most readings typical of *hardwater* lakes



Long Term Trends: Water Temperature

- No long term trend
- Deepwater temperature data not available



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 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.

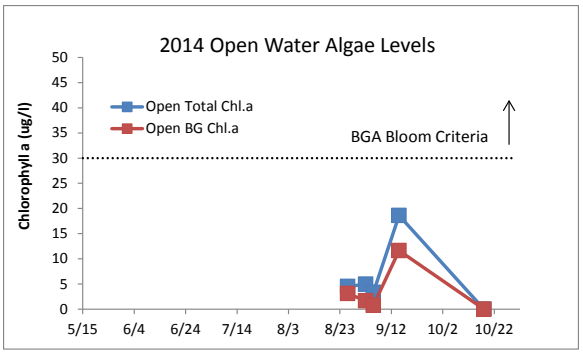


Figure D1:
2014 Open Water Total and BGA Chl.a

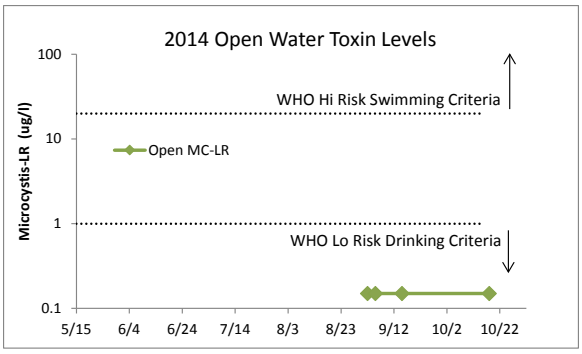


Figure D2:
2014 Open Water Microcystin-LR

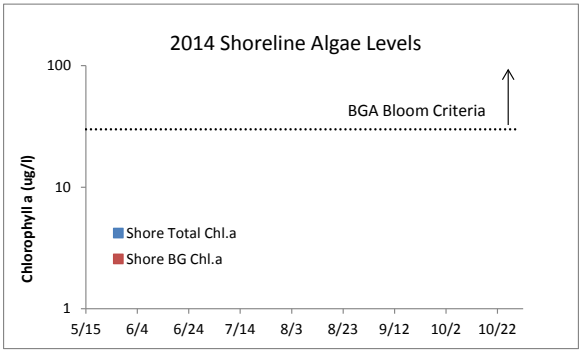


Figure D3:
2014 Shoreline Total and BGA Chl.a

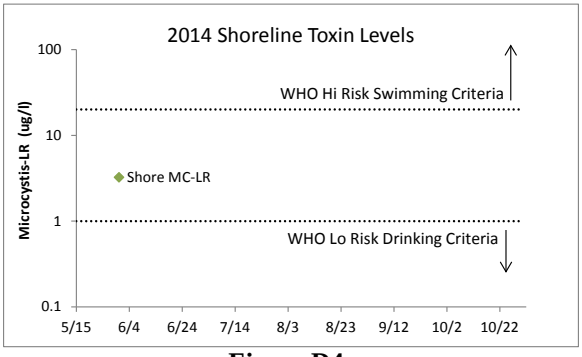


Figure D4:
2014 Shoreline Microcystin-LR

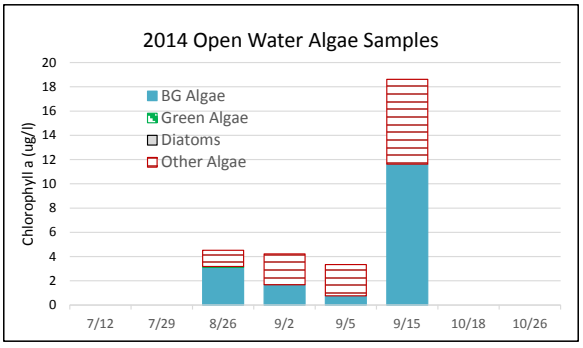


Figure D5:
2014 Open Water Algae Types

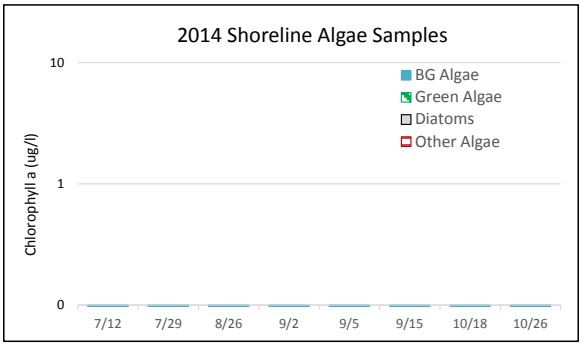


Figure D6:
2014 Shoreline Algae Types

Appendix E:
AIS Species in Dutchess County

The table below shows the invasive aquatic plants and animals that have been documented in Dutchess 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 - Dutchess County			
Waterbody	**Kingdom**	**Common name**	**Scientific name**
Devils Lake	Animal	Chinese mitten crab	*Eriocheir sinensis*
Devils Lake	Plant	Water chestnut	*Trapa natans*
Fishkill Creek	Plant	Water chestnut	*Trapa natans*
Gossamans Pond	Plant	Eurasian watermilfoil	*Myriophyllum spicatum*
Green Mountain Lake	Plant	Eurasian watermilfoil	*Myriophyllum spicatum*
Green Mountain Lake	Plant	Curly leafed pondweed	*Potamogeton crispus*
Hudson River	Animal	Zebra mussel	*Dreissena polymorpha*
Hudson River	Plant	Water chestnut	*Trapa natans*
Hunns Lake	Plant	Eurasian watermilfoil	*Myriophyllum spicatum*
Lake Dutchess	Plant	Eurasian watermilfoil	*Myriophyllum spicatum*
Lake Dutchess	Plant	Curly leafed pondweed	*Potamogeton crispus*
Lake Dutchess	Plant	Water chestnut	*Trapa natans*
Long Pond	Plant	Fanwort	*Cabomba caroliniana*
Rudd Pond	Plant	Eurasian watermilfoil	*Myriophyllum spicatum*
Rudd Pond	Plant	Curly leafed pondweed	*Potamogeton crispus*
Sepasco Lake	Plant	Eurasian watermilfoil	*Myriophyllum spicatum*
Sepasco Lake	Plant	Brittle naiad	*Najas minor*
Silver Lake	Plant	Fanwort	*Cabomba caroliniana*
Stissing Pond	Plant	Eurasian watermilfoil	*Myriophyllum spicatum*
Stissing Pond	Plant	Curly leafed pondweed	*Potamogeton crispus*
Sylvan Lake	Plant	Eurasian watermilfoil	*Myriophyllum spicatum*
Twin Island Lake	Plant	Eurasian watermilfoil	*Myriophyllum spicatum*
Upton Lake	Plant	Eurasian watermilfoil	*Myriophyllum spicatum*
Wappinger Lake	Animal	Common carp	*Cyprinus carpio*

Waterbody	Kingdom	Common name	Scientific name
Wappinger Lake	Plant	Eurasian watermilfoil	*Myriophyllum spicatum*
Wappinger Lake	Plant	Curly leafed pondweed	*Potamogeton crispus*
Wappinger Lake	Plant	Water chestnut	*Trapa natans*

Appendix F: Watershed and Land Use Map for Stissing 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.