Sixberry Lake Questions and Answers, 2015 CSLAP

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

A1. Water quality conditions in Sixberry Lake continue to be highly favorable. Water clarity is very high, due to low nutrient and algae levels. However, phosphorus readings were slightly higher than usual in 2015, and this may have contributed to slightly lower (than normal) water clarity and a small shoreline blue green algae bloom along the southern shoreline in mid-August.

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

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

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

A3. Sixberry Lake had much higher water clarity, and lower nutrient and algae levels, than other nearby lakes. Shoreline blooms have been reported in some of these lakes, including Lake of the Woods and Boyd Pond. Aquatic plant coverage was probably similar to the coverage in these other lakes in 2015.

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

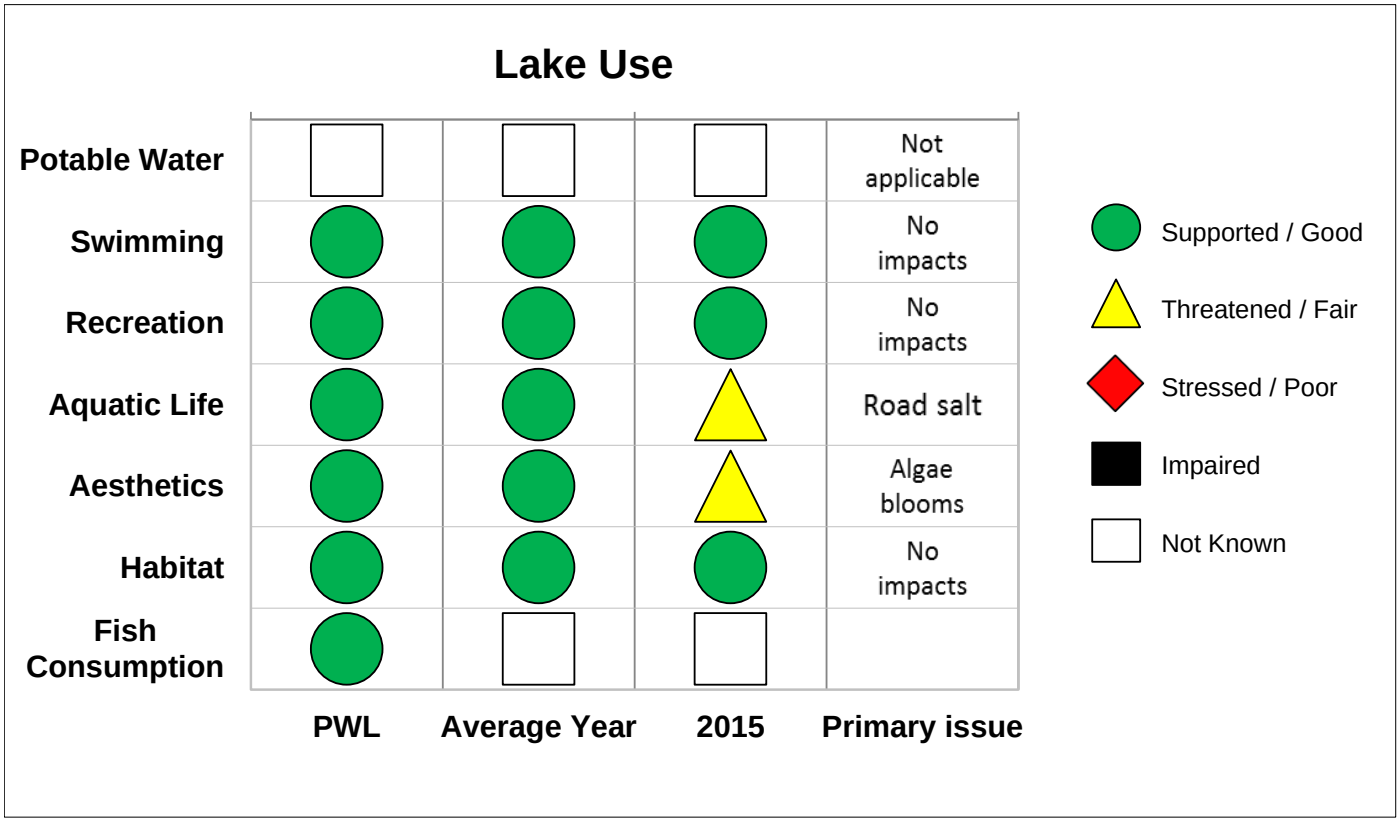
A4. Phosphorus readings were slightly higher than usual in 2015, and plant coverage was higher, although it is not yet known if there any long-term trends.

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

A5. Water quality conditions are still very highly favorable, but any new or seasonal sources of nutrients should be evaluated as a potential trigger for the small blooms reported in 2015.

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 maintain 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.

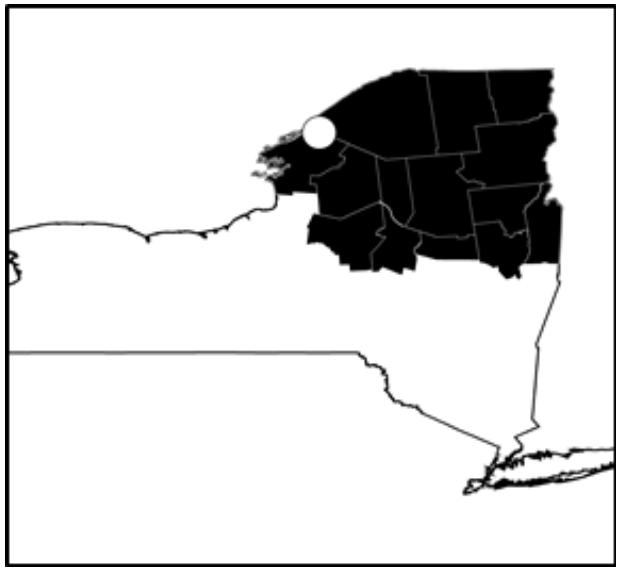


CSLAP 2015 Lake Water Quality Summary:
Sixberry Lake

General Lake Information

Location	Town of Theresa
County	Jefferson
Basin	St. Lawrence River
Size	51.8 hectares (128 acres)
Lake Origins	Natural
Watershed Area	350 hectares (865 acres)
Retention Time	4.5 years
Mean Depth	14 meters
Sounding Depth	29 meters
Public Access?	DEC cartop launch on southeast shoreline
Major Tributaries	Unnamed inlet on south end
Lake Tributary To…	unnamed outlet to groundwater feed to Butterfield Lake to Black Creek to Black Lake to Oswegatchie River to St. Lawrence River
WQ Classification	B (contact recreation = swimming, bathing)
Lake Outlet Latitude	44.2793
Lake Outlet Longitude	-75.77448
Sampling Years	2001-2004, 2015
2015 Samplers	Francis Wood
Main Contact	Francis Wood

Lake Map



Background

Sixberry Lake is a 128 acre, class B lake found in the Town of Theresa in Jefferson County, in the Indian River Lakes region of northwestern New York State. It was first sampled as part of CSLAP in 2001.

It is one of eight CSLAP lakes among the more than 140 lakes found in Jefferson County and one of 26 CSLAP lakes among the more than 1650 lakes and ponds in the St. Lawrence River drainage basin.

Lake Uses

Sixberry Lake is a Class B lake; this means that the best intended use for the lake is for contact recreation- swimming and bathing, although it should support non-contact recreation—boating, aquatic life, and aesthetics. The lake is used by lake residents and invited guests for swimming and boating. There is a public cartop launch on the lake along the southeast shoreline.

About 300 lake trout and 500 Atlantic salmon are stocked each year in Sixberry Lake by the state of New York. It is not known by the report authors if private stocking occurs. Fish species in the lake include lake trout, walleye, smallmouth bass, largemouth bass, northern pike, Atlantic salmon, yellow perch, and bluegill.

General statewide fishing regulations are applicable in Sixberry Lake. In addition, the open season on lake trout lasts all year, with a daily take limit of 3 and a size limit of 21”. The open season on landlocked salmon also lasts all year, with a daily take limit of 3 and a size limit of 19”. Ice fishing is allowed for both fish species. The open season for yellow perch and sunfish lasts all year, with no take or size limits. There is a 10hp motor limit at the DEC hard surface ramp launch.

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

Historical Water Quality Data

CSLAP sampling was conducted on Sixberry Lake from 2001-2004, and in 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 for Sixberry Lake can also be found on the NYSDEC web page at http://www.dec.ny.gov/lands/77835.html.

Sixberry Lake was not sampled by the NYSDEC as part of any of the major regional or statewide monitoring programs, although it is suspected that the lake may have been sampled as part of fisheries management efforts at the lake.

There are no RIBS monitoring sites on or near Sixberry Lake, and none of the tributaries to the lake are named nor have they been sampled through any statewide monitoring programs.

Lake Association and Management History

Sixberry Lake is served by the Sixberry Lake Association. It is not known if the lake association is actively involved in lake management or maintains a website, but they work closely with the Indian River Lakes Conservancy to address lake issues in the Indian River Lakes region.

Summary of 2015 CSLAP Sampling Results

Evaluation of 2015 Annual Results Relative to 2001-2004

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 – Sixberry Lake" section in Appendix C.

Evaluation of Eutrophication Indicators

Phosphorus readings were slightly higher than usual in surface samples in 2015, but water clarity was also slightly higher, and there were some small shoreline blue green algae blooms in mid-August. Although it is likely that this bloom was not representative as normal conditions in the lake, the (only) minor changes in these other indicators suggest 2015 represented a typical year in the lake. None of these indicators has exhibited any long-term changes, although additional data may be needed to verify this water quality stability.

Lake productivity typically increases slightly during the summer, but except for a small increase in phosphorus, water clarity and algae levels did not change during the summer of 2015.

The lake can be characterized as *oligotrophic,* or highly unproductive, based on water clarity, chlorophyll *a*, and total phosphorus readings (all typical of *oligotrophic* 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 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 used for drinking water. 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 readings were slightly higher than usual in 2015, while total nitrogen and calcium levels were lower than usual. However, it is not known if any of these indicators has shown any long-term trends.

Chloride levels in the 2015 samples, conducted for the first time through CSLAP and cited in Appendix A, ranged from 5 to 12 mg/l. These values are within the lower end of 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 range of values found in a number of NYS lakes

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

Evaluation of Biological Condition

The 2015 fluoroprobe data indicates very low total algae and low blue green algae levels in open water samples, although the small mid-August shoreline bloom from the south shoreline at the inlet was dominated by a mix of blue green algae species (*Anabaena* and *Microcystis*) and diatoms, and had blue green algae levels above the criteria indicating a bloom.

Macrophytes, zooplankton and macroinvertebrates have not been evaluated through CSLAP in Sixberry Lake. Fisheries surveys conducted by DEC have found a mix of warmwater, coolwater, and coldwater fish species. Smallmouth bass is the most common shallow water gamefish; lake trout are the most common coldwater gamefish. Smallmouth up to 17" and lake trout up to 26" are reasonably common; however, previous fisheries surveys found smallmouth bass typically below expected weight.

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 usual in 2015, consistent with slightly higher water clarity and despite the small shoreline blue green algae bloom in mid-August. Plant coverage has generally increased in the lake, but is not known if this was due to native or exotic plants. It is not known if any long-term trends in lake perception have occurred.

These assessments are fairly stable during the typical summer, despite a slight seasonal drop in water clarity. Plant coverage does increase during the typical summer. Each of these seasonal changes (or lack of changes) were generally apparent in 2015. Overall lake perception is summarized on the Lake Scorecard and Lake Condition Summary Table.

Evaluation of Local Climate Change

Air and water temperature readings in the summer index period were close to normal in 2015, and surface and water temperature readings have not changed (or this change is not yet apparent) since the early 2000s.

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 algae levels were well below the thresholds for harmful algal blooms (HABs) in open water samples, and open water algal toxin levels were not detectable. Algal toxins were also not detected in the mid-August shoreline bloom sample with elevated blue green algae levels.

Lake Condition Summary

Category	Indicator	Min	CSLAP Avg	Max	2015 Avg	Classification	2015 Change?	Long-term Change?
Eutrophication Indicators	Water Clarity	3.75	6.17	8.30	6.81	Oligotrophic	Within Normal Range	No Change
	Chlorophyll *a*	0.23	1.16	2.92	1.13	Oligotrophic	Within Normal Range	No Change
	Total Phosphorus	0.001	0.005	0.010	0.006	Oligotrophic	Higher than Normal	Increasing Slightly
Potable Water Indicators	Hypolimnetic Ammonia	0.00	0.02	0.07	0.03	Close to Surface NH4 Readings	Higher than Normal	Not known
	Hypolimnetic Arsenic							Not known
	Hypolimnetic Iron							Not known
	Hypolimnetic Manganese							Not known
Limnological Indicators	Hypolimnetic Phosphorus	0.004	0.010	0.023	0.011	Close to Surface TP Readings	Within Normal Range	Not known
	Nitrate + Nitrite	0.00	0.01	0.04	0.01	Low NOx	Within Normal Range	No Change
	Ammonia	0.00	0.02	0.07	0.02	Low Ammonia	Within Normal Range	No Change
	Total Nitrogen	0.11	0.32	0.74	0.23	Low Total Nitrogen	Lower Than Normal	No Change
	pH	5.27	7.79	8.98	7.95	Alkaline	Within Normal Range	No Change
	Specific Conductance	48	75	87	76	Softwater	Within Normal Range	No Change
	True Color	0	5	19	4	Uncolored	Within Normal Range	No Change
	Calcium	8.3	10.6	16.4	8.6	May be Susceptible to Zebra Mussels	Lower Than Normal	No Change
Lake Perception	WQ Assessment	1	1.8	3	1.6	Not Quite Crystal Clear	More Favorable Than Normal	No Change
	Aquatic Plant Coverage	1	2.1	3	2.5	Subsurface Plant Growth	Less Favorable than Normal	Slightly Improving
	Recreational Assessment	1	1.3	2	1.5	Could Not Be Nicer	Within Normal Range	No Change
Biological Condition	Phytoplankton					Open water-low blue green algae biomass	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					Coldwater fishery; smallmouth bass below expected size	Not known	Not known
	Invasive Species					Eurasian watermilfoil	Not known	Not known
Local Climate Change	Air Temperature	15	26.1	33	24.0		Lower Than Normal	No Change
	Water Temperature	16	23.0	26	23.0		Within Normal Range	No Change

Category	Indicator	Min	CSLAP Avg	Max	2015 Avg	Classification	2015 Change?	Long-term Change?
Harmful Algal Blooms	Open Water Phycocyanin	-1	2	5	2	No readings indicate high risk of BGA	Not known	Not known
	Open Water FP Chl.a	0	0	1	0	No readings indicate high algae levels	Not known	Not known
	Open Water FP BG Chl.a	0	0	0	0	No readings indicate high BGA levels	Not known	Not known
	Open Water Microcystis	<DL	<DL	<DL	<DL	Open water MC-LR consistently not detectable	Not known	Not known
	Open Water Anatoxin a	<DL	<DL	<DL	<DL	Open water Anatoxin-a consistently not detectable	Not known	Not known
	Shoreline Phycocyanin					No shoreline blooms sampled for PC	Not known	Not known
	Shoreline FP Chl.a	2.5	115	172	115	Most readings indicate high algae levels	Not known	Not known
	Shoreline FP BG Chl.a	2.5	19	51	19	Some readings indicate high BGA levels	Not known	Not known
	Shoreline Microcystis	<DL	<DL	<DL	<0.60	Shoreline bloom MC-LR consistently not detectable	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

Sixberry Lake is among the lakes on the 2008 St. Lawrence River drainage basin Priority Waterbody List (PWL), with no (known) use impairments. The PWL listing for Sixberry Lake is listed in Appendix B.

Potable Water (Drinking Water)

The CSLAP dataset at Sixberry 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 low algae levels indicate excessive algae would impact any "unofficial" potable water use.

Public Bathing

The CSLAP dataset at Sixberry Lake, including water chemistry data, physical measurements, and volunteer samplers' perception data, suggests that public bathing, if conducted at a public swimming beach, should be supported. 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 Sixberry Lake, including water chemistry data, physical measurements, and volunteer samplers' perception data, suggest that recreation should be supported.

Aquatic Life

The CSLAP dataset on Sixberry Lake, including water chemistry data, physical measurements, and volunteer samplers' perception data, suggest that aquatic life should be supported, although this use may be *threatened* by road salt runoff. Additional data are needed to evaluate the food and habitat conditions for aquatic organisms in the lake.

Aesthetics and Habitat

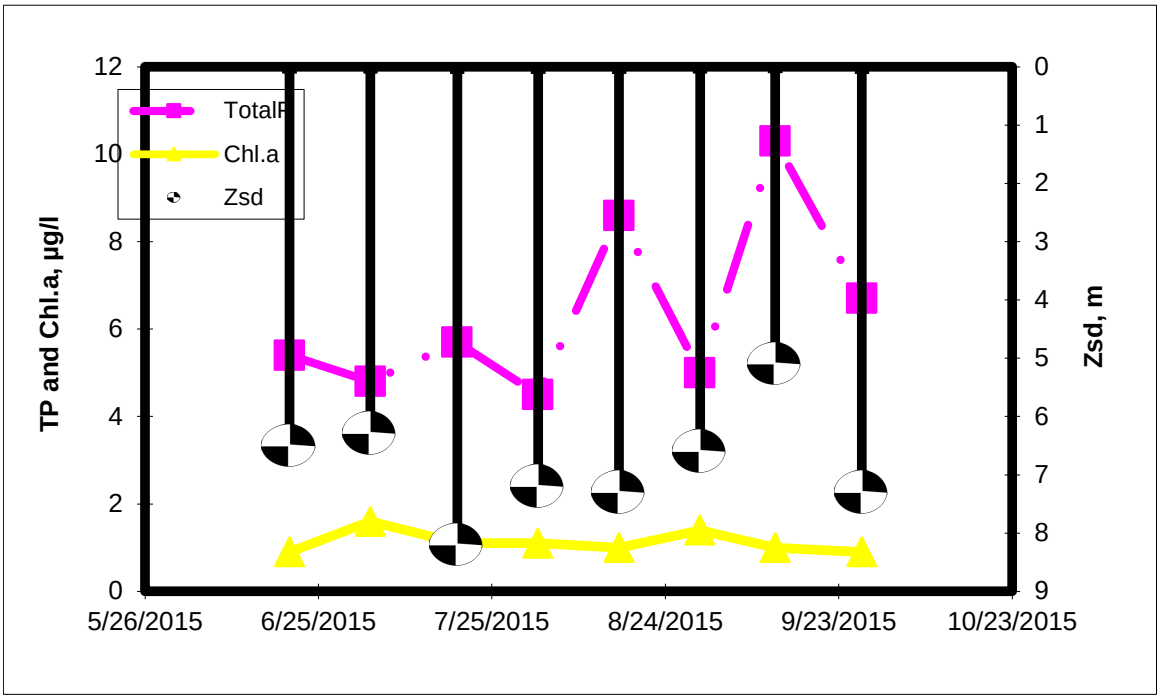
The CSLAP dataset on Sixberry Lake, including water chemistry data, physical measurements, and volunteer samplers' perception data, suggest that aesthetics and habitat should be *good*, although aesthetics may be only *fair* due to shoreline algae blooms.

Fish Consumption
There are no fish consumption advisories posted for Sixberry Lake.

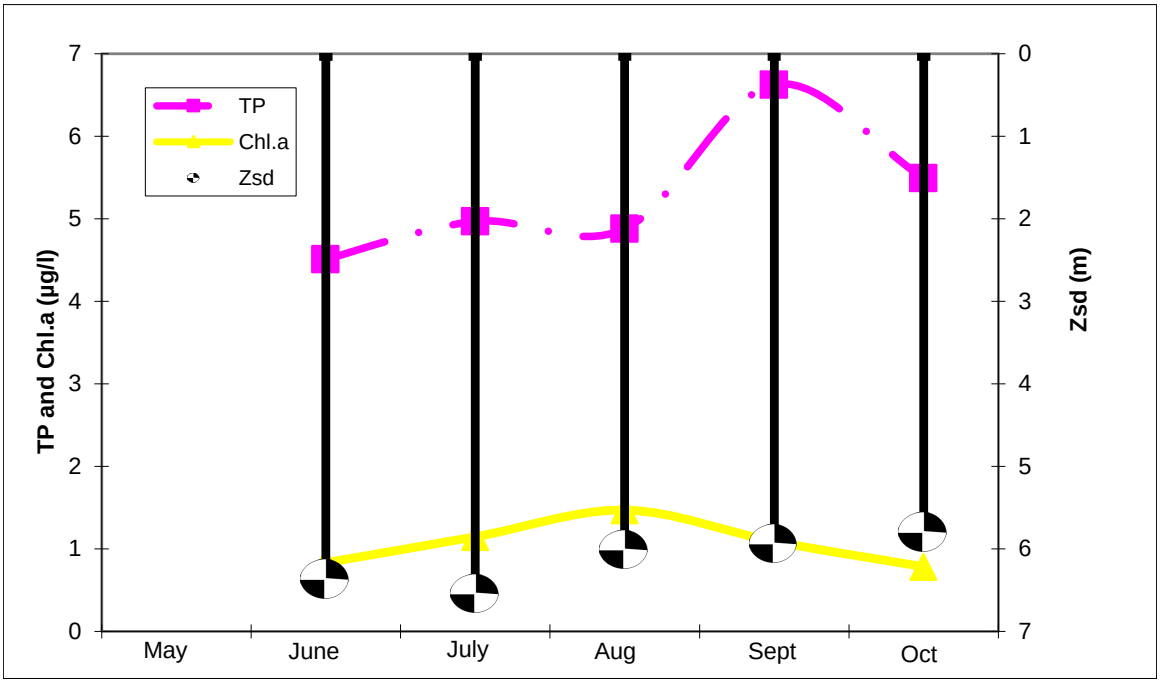
Additional Comments and Recommendations
An aquatic plant survey may help to determine where there is a high diversity of aquatic plants, as common found in lakes with good water quality, and if any invasive plants are present. Lake residents should also continue to report and avoid exposure to surface scums or heavily discolored water associated with harmful algae blooms. This might help to determine if these blooms are rare or increasing in frequency.

Aquatic Plant IDs-2015
None submitted for identification in 2015.

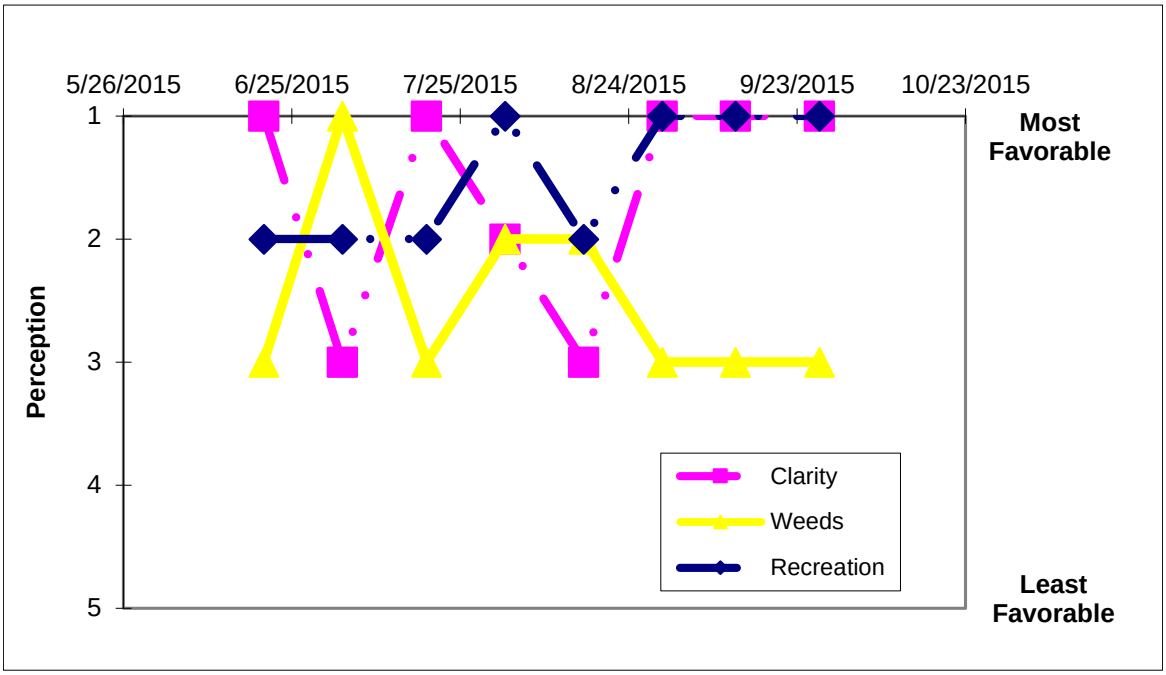
Time Series: Trophic Indicators, 2015



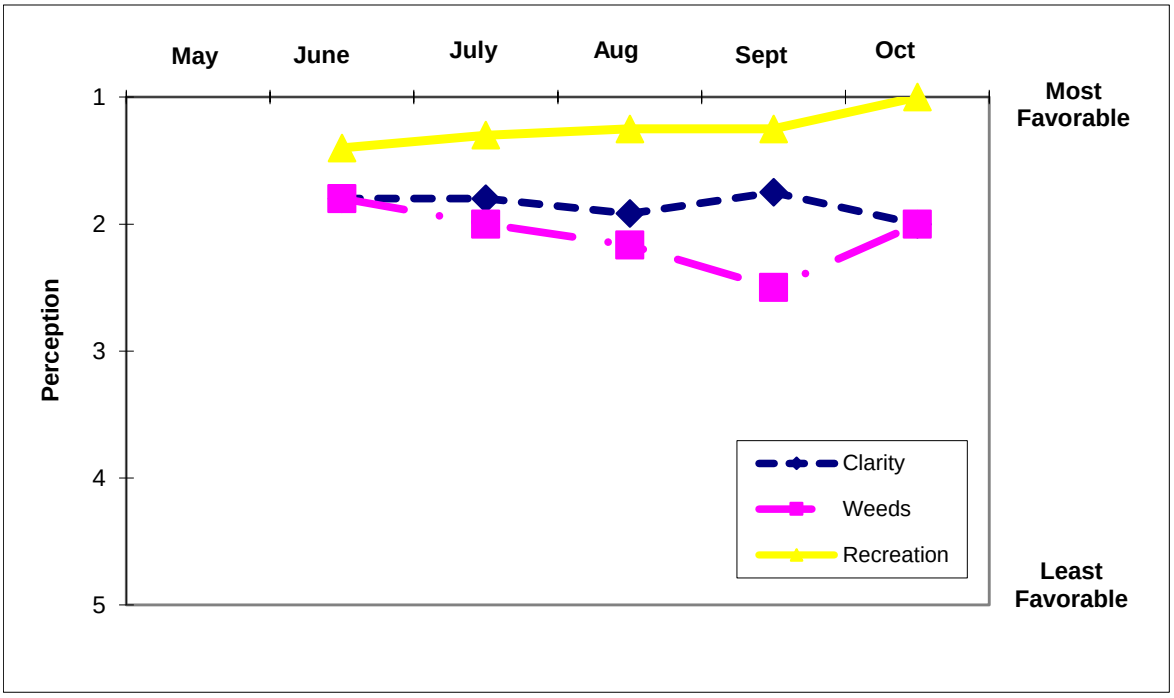
Time Series: Trophic Indicators, Typical Year (2001-2015)



Time Series: Lake Perception Indicators, 2015



Time Series: Lake Perception Indicators, Typical Year (2001-2015)



Appendix A- CSLAP Water Quality Sampling Results for Sixberry Lake

LNum	PName	Date	Zbot	Zsd	Zsamp	Tot.P	NO3	NH4	TDN	TN/TP	TColor	pH	Cond25	Ca	Chl.a	Cl
178	Sixberry L	6/10/2001	26.5	7.50	1.5	0.002	0.01				6	7.96	78		0.23	
178	Sixberry L	6/24/2001	26.7	7.45	1.5	0.004	0.01				3	7.97	77		0.61	
178	Sixberry L	7/8/2001	26.6	7.60	1.5	0.003	0.01				1	7.31	76		1.68	
178	Sixberry L	7/22/2001	27.0	8.30	1.5	0.004	0.01				3	7.37	77			
178	Sixberry L	8/5/2001	27.4	8.20	1.5	0.006	0.01				2	8.17	80		2.92	
178	Sixberry L	8/19/2001	27.3	7.30	1.5	0.004	0.01				2	7.88	79			
178	Sixberry L	9/3/2001	27.8	7.40	1.5	0.007	0.01				1	7.35	79		0.90	
178	Sixberry L	9/23/2001	27.8	7.70	1.5	0.007	0.01				3	7.40	78		1.19	
178	Sixberry L	06/30/02	27.0	4.90	1.5	0.006	0.00	0.02	0.42	67.77		7.81	76		1.59	
178	Sixberry L	07/13/02	27.2	5.90	1.5	0.007	0.00	0.07	0.64	89.05	6	7.93	77		1.09	
178	Sixberry L	07/29/02	28.5	5.95	1.5	0.005	0.00	0.07	0.45	91.37	12	8.02	76		1.27	
178	Sixberry L	08/11/02	29.4	6.50	1.5	0.004	0.01	0.03	0.35	82.89	19		78			
178	Sixberry L	08/25/02	29.1	5.85	1.5	0.001	0.01	0.05	0.31	307.01	6	8.02	77			
178	Sixberry L	09/08/02	29.4	6.10	1.5	0.005	0.00	0.01	0.28	54.37	8	8.05	75		0.92	
178	Sixberry L	09/22/02	29.4	6.05	1.5	0.002	0.00	0.01	0.28	124.69	8	8.16	78		1.23	
178	Sixberry L	10/06/02	29.4	5.95	1.5	0.005	0.01	0.04	0.39	74.44	11	7.89	79		0.45	
178	Sixberry L	6/22/2003	27.5	5.50	1.5	0.005	0.00	0.00	0.21	39.70	5	7.73	72	9.0		
178	Sixberry L	7/6/2003	27.4	6.50	1.5	0.005	0.00	0.03	0.42	82.88	4	7.75	78		1.0	
178	Sixberry L	7/28/2003	28.2	6.05	1.5	0.006	0.00	0.00	0.11	19.67	9	7.71	77		1.5	
178	Sixberry L	8/3/2003	26.8	5.70	1.5	0.005	0.00	0.00	0.27	58.06	10	7.73	77		1.1	
178	Sixberry L	8/25/2003	29.5	5.70	1.5	0.002	0.00	0.00	0.24	124.43	2	7.59	78	8.8	1.2	
178	Sixberry L	9/14/2003		5.70	1.5	0.006	0.00	0.01	0.28	48.11	7	7.70	78		1.0	
178	Sixberry L	10/13/2003	29.0	5.65		0.006	0.00	0.00	0.23	40.75	5	7.58	77		1.1	
178	Sixberry L	7/3/2004	32.0	5.35	1.5	0.003	0.03	0.02	0.17	49.71	5	5.27	70	16.4	0.6	
178	Sixberry L	7/20/2004	28.0	5.35	1.5	0.006	0.02	0.02	0.28	46.41	6	6.77	79		0.5	
178	Sixberry L	8/3/2004	26.0	4.15	1.5	0.006	0.01	0.01	0.36	63.90	0	8.40	83		1.6	
178	Sixberry L	8/12/2004	27.0	3.75	1.5	0.007	0.01	0.01	0.34	50.55	3	8.98	72		1.4	
178	Sixberry L	8/28/2004	28.0	3.90	1.5	0.006	0.01	0.01	0.74	125.68	3	8.26	61	12.4	1.5	
178	Sixberry L	9/11/2004	27.0	3.80	1.5	0.009	0.01	0.02	0.34	40.03	8	8.45	70		1.8	
178	Sixberry L	9/26/2004	28.0	4.30	0.5	0.006	0.04	0.03	0.58	93.17	8	7.54	48		0.9	
178	Sixberry L	6/20/2015	26.1	6.50	1.5	0.005	0.00	0.02	0.20	37.78	6	7.16	85	8.9	0.9	
178	Sixberry L	7/4/2015	26.4	6.30	1.5	0.005			0.24	49.58	7	8.00	85		1.6	
178	Sixberry L	7/19/2015	26.8	8.20	1.5	0.006	0.00	0.01	0.23	39.65	3	8.14	76		1.1	24.3
178	Sixberry L	8/2/2015	26.5	7.20	1.5	0.005			0.19	42.00	6	7.66	73		1.1	
178	Sixberry L	8/16/2015	26.2	7.30	1.5	0.009	0.02	0.03	0.32	36.98	5	8.08	70	8.3	1.0	
178	Sixberry L	8/30/2015	26.8	6.60	1.5	0.005			0.26	52.80	3	8.48	70		1.4	
178	Sixberry L	9/12/2015	26.7	5.10	1.5	0.010	0.01	0.04	0.17	16.02	1	8.09	65		1.0	5.0
178	Sixberry L	8/2/2015			bloom											
178	Sixberry L	8/9/2015			bloom											
178	Sixberry L	8/15/2015			bloom											
178	Sixberry L	9/27/2015	28.7	7.30	1.5	0.007			0.26	38.81	3	8.01	87		0.9	
178	Sixberry L	06/30/02	27.0			0.012	0.00	0.03	0.34	27.44						
178	Sixberry L	07/13/02	27.2			0.008	0.00	0.06	0.35	42.04						
178	Sixberry L	07/29/02	28.5			0.012	0.00	0.07	0.55	45.05						
178	Sixberry L	08/11/02	29.4			0.011	0.01	0.03	0.27	24.72						
178	Sixberry L	08/25/02	29.1			0.009	0.00	0.04	0.28	31.16						
178	Sixberry L	09/08/02	29.4			0.006	0.00	0.03	0.35	54.31						
178	Sixberry L	09/22/02	29.4			0.005	0.00	0.01	0.27	57.60						
178	Sixberry L	10/06/02	29.4			0.008	0.00	0.05	0.39	50.20						
178	Sixberry L	6/22/2003				0.008	0.00	0.00	0.13	15.84						
178	Sixberry L	7/6/2003				0.006	0.01	0.03	0.37	57.23						
178	Sixberry L	7/28/2003				0.005	0.00	0.00	0.15	32.07						
178	Sixberry L	8/3/2003				0.016	0.01	0.03	0.27	17.20						
178	Sixberry L	8/25/2003				0.011	0.00	0.01	0.24	21.57						
178	Sixberry L	9/14/2003				0.007	0.00	0.01	0.26	36.47						
178	Sixberry L	10/13/2003				0.006	0.00	0.01	0.26	43.05						
178	Sixberry L	7/3/2004				0.004	0.02	0.01	0.52	119.3						
178	Sixberry L	8/3/2004				0.015	0.02	0.01	0.22	14.6						
178	Sixberry L	8/12/2004				0.023	0.02	0.02	0.29	12.8						
178	Sixberry L	8/28/2004				0.009	0.01	0.01	0.31	34.2						
178	Sixberry L	9/11/2004				0.009	0.01	0.04	0.29	32.1						
178	Sixberry L	6/20/2015			24.5	0.007		0.02								
178	Sixberry L	7/4/2015			24.5	0.011										

LNum	PName	Date	Zbot	Zsd	Zsamp	Tot.P	NO3	NH4	TDN	TN/TP	TColor	pH	Cond25	Ca	Chl.a	Cl
178	Sixberry L	7/19/2015			25.3	0.013		0.03								
178	Sixberry L	8/2/2015			25.0	0.008										
178	Sixberry L	8/16/2015			24.7	0.016										
178	Sixberry L	8/30/2015			26.0	0.013		0.04								
178	Sixberry L	9/12/2015			25.0	0.012										
178	Sixberry L	9/27/2015			27.0	0.005		0.03								

LNum	PName	Date	Site	TAir	TH20	QA	QB	QC	QD	QF	QG	AQ-PC	AQ-Chla	MC-LR	Ana-a	Cyl	FP-Chl	FP-BG	HAB form	Shore HAB
178	Sixberry L	6/10/2001	epi	24	19	2	1	1												
178	Sixberry L	6/24/2001	epi	22	22	2	2	2	6											
178	Sixberry L	7/8/2001	epi	24	22	2	2	2	6											
178	Sixberry L	7/22/2001	epi	31	24	2	2	1	0											
178	Sixberry L	8/5/2001	epi	29	26	2	2	2	0											
178	Sixberry L	8/19/2001	epi	23	24	2	2	2	5											
178	Sixberry L	9/3/2001	epi	27	23	2	2	2												
178	Sixberry L	9/23/2001	epi	24	21	2	2	1	0											
178	Sixberry L	06/30/02	epi	29	26	2	2	1												
178	Sixberry L	07/13/02	epi	27	24	2	2	1												
178	Sixberry L	07/29/02	epi	31	25	2	2	1												
178	Sixberry L	08/11/02	epi	31	25	2	2	1												
178	Sixberry L	08/25/02	epi	30	24	1	2	1												
178	Sixberry L	09/08/02	epi	30	23	2	3	1												
178	Sixberry L	09/22/02	epi	26	23	2	3	1												
178	Sixberry L	10/06/02	epi	23	19	2	2	1												
178	Sixberry L	6/22/2003	epi	28	22	2	1	1	0											
178	Sixberry L	7/6/2003	epi	30	26	1	2	1	0											
178	Sixberry L	7/28/2003	epi	22	23	1	2	1	0											
178	Sixberry L	8/3/2003	epi	31	26	2	2	1	0											
178	Sixberry L	8/25/2003	epi	24	24	2	3	1	0											
178	Sixberry L	9/14/2003	epi	28	24															
178	Sixberry L	10/13/2003	epi	19	16	2	2	1	0											
178	Sixberry L	7/3/2004	epi	25	22	2	2	1	0											
178	Sixberry L	7/20/2004	epi	33	24	2	2	1	0											
178	Sixberry L	8/3/2004	epi	29	24	2	2	1	0											
178	Sixberry L	8/12/2004	epi	22	22	2	2	1	0											
178	Sixberry L	8/28/2004	epi	26	23	2	2	1	0											
178	Sixberry L	9/11/2004	epi	29	22	2	2	2	0											
178	Sixberry L	9/26/2004	epi	23	21	2	2	1	0											
178	Sixberry L	6/20/2015	epi	21	22	1	3	2	8	0	0	1.4	0.1	<0.65	<0.007	<0.000	0.2	0.0	F	I
178	Sixberry L	7/4/2015	epi	25	22	3	1	2	68	0	0	0.1	0.2	<0.88	<0.010	<0.000	0.4	0.0	F	I
178	Sixberry L	7/19/2015	epi	28	25	1	3	2	0	0	0	2.5	0.2	<0.30	<0.009	<0.049	0.3	0.0	I	I
178	Sixberry L	8/2/2015	epi	25	25	2	2	1	0	4	0	-0.8	0.1	<0.19	<0.004	<0.015	0.7	0.1	FH	E
178	Sixberry L	8/16/2015	epi	32	25	3	2	2	0	23457	2345	5.4	0.2	<0.44	<0.002	<0.014	0.2	0.0	D	D
178	Sixberry L	8/30/2015	epi	26	23	1	3	1	0	0	245			<0.39	<0.012	<0.031	0.7	0.3	I	I
178	Sixberry L	9/12/2015	epi	15	21	1	3	1	5	0	0	3.2	0.1	<0.27	<0.009	<0.022	0.5	0.3	I	I
178	Sixberry L	8/2/2015	bloom											<0.47	<0.004	<0.028	171.0	50.8		d
178	Sixberry L	8/9/2015	bloom											<2.54	<0.008	<0.028	171.8	4.3		
178	Sixberry L	8/15/2015	bloom											<0.88	<0.017	<0.042	2.5	2.5		
178	Sixberry L	9/27/2015	epi	20	21	1	3	1	0		0	1.5	0.3	<0.30	<0.007	<0.035	0.1	0.0	I	I
178	Sixberry L	8/3/2004	hypo		14															
178	Sixberry L	8/12/2004	hypo		12															
178	Sixberry L	8/28/2004	hypo		12															
178	Sixberry L	9/11/2004	hypo		11															
178	Sixberry L	6/20/2015	hypo		7															
178	Sixberry L	7/4/2015	hypo		5															
178	Sixberry L	7/19/2015	hypo		8															
178	Sixberry L	8/2/2015	hypo		7															
178	Sixberry L	8/16/2015	hypo		24															
178	Sixberry L	8/30/2015	hypo		7															
178	Sixberry L	9/12/2015	hypo		7															
178	Sixberry L	9/27/2015	hypo		10															

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, 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/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 Sixberry Lake

Sixberry Lake (0906-0065) NoKnownImpct

Waterbody Location Information Revised: 11/13/2008

Water Index No:	SL-25- 7/P1- 8- P54..P56			**Drain Basin:**	Saint Lawrence River
Hydro Unit Code:	04150303/080	**Str Class:**	B		Indian River
Waterbody Type:	Lake			**Reg/County:**	6/Jefferson Co. (23)
Waterbody Size:	123.8 Acres			**Quad Map:**	REDWOOD (D-17-3)
Seg Description:	entire lake				

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

Use(s) Impacted	Severity	Problem Documentation
NO USE IMPAIRMNT		

Type of Pollutant(s)
Known: - - -
Suspected: - - -
Possible: - - -

Source(s) of Pollutant(s)
Known: - - -
Suspected: - - -
Possible: - - -

Resolution/Management Information

Issue Resolvability: 8 (No Known Use Impairment)
Verification Status: (Not Applicable for Selected RESOLVABILITY)
Lead Agency/Office: n/a **Resolution Potential:** n/a
TMDL/303d Status: n/a

Further Details

Water Quality Sampling
Sixberry Lake has been sampled as part of the NYSDEC Citizen Statewide Lake Assessment Program (CSLAP) beginning in 2001 and continuing through 2004. An Interpretive Summary report of the findings of this sampling was published in 2005. These data indicate that the lake continues to be best characterized as oligotrophic, or highly unproductive. Phosphorus levels in the lake fall well below the state guidance value indicating impacted/stressed recreational uses. Corresponding transparency measurements significantly exceed what is the recommended minimum for swimming beaches. Measurements of pH typically fall within the state water quality range of 6.5 to 8.5. The lake water is weakly colored, but color does not limit water transparency. (DEC/DOW, BWAM/CSLAP, September 2005)

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 very favorable since the lake was first evaluated and continuing through the most recent assessment. The recreational suitability of the lake is described most frequently as "could not be nicer" and "excellent." The lake itself is most often described as "not quite crystal clear," an assessment that is slightly less favorable that expected given measured water quality characteristics. Assessments have noted that aquatic plants rarely grow to the lake surface and are not cited as having an impact on uses. Aquatic plants are assumed to be dominated by native species however a plant survey has not been conducted on the lake. (DEC/DOW, BWAM/CSLAP, September 2005)

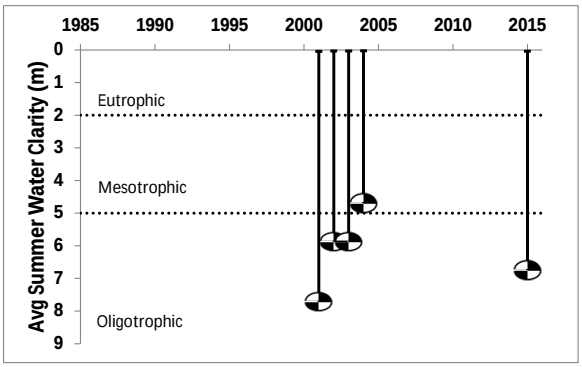
Lake Uses

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 drinking 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.

Appendix C- Long Term Trends: Sixberry Lake

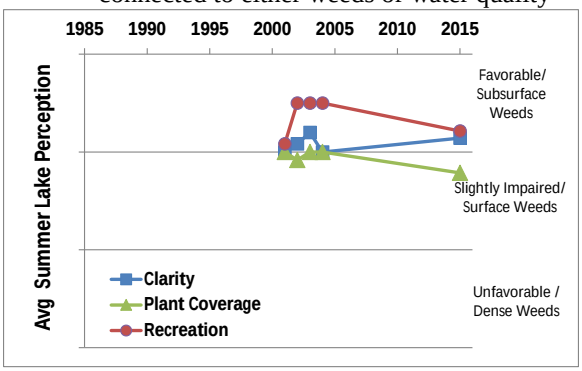
Long Term Trends: Water Clarity

- No long term trend; nearly all readings high
- Most readings typical of *oligotrophic* lakes



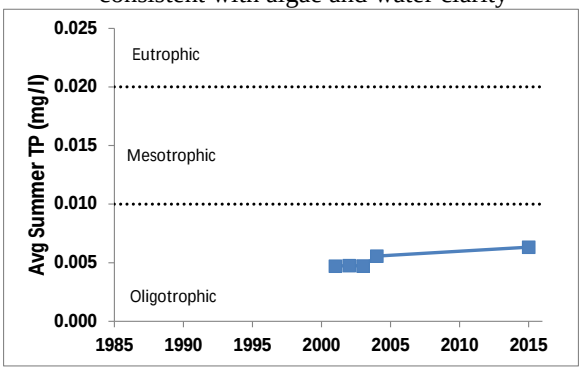
Long Term Trends: Lake Perception

- Mostly favorable; ↑ plant coverage 2015
- Recreational perception not strongly connected to either weeds or water quality



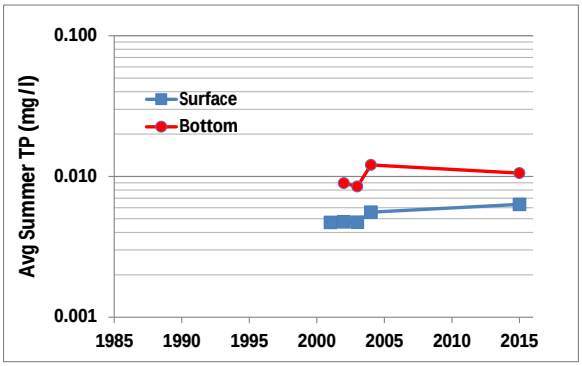
Long Term Trends: Phosphorus

- No long term trend; slight higher in 2015
- Most readings typical of *oligotrophic* lakes, consistent with algae and water clarity



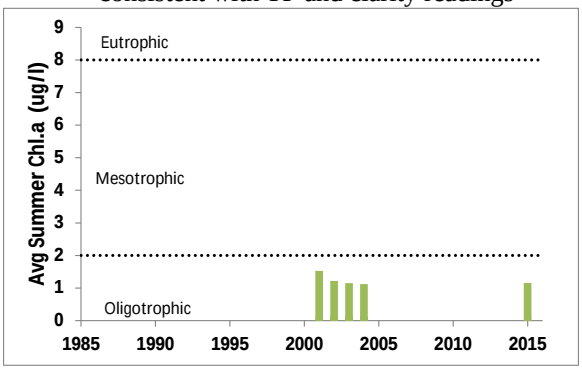
Long Term Trends: Bottom Phosphorus

- Deep and surface TP similar
- Similar readings likely indicate little internal nutrient release



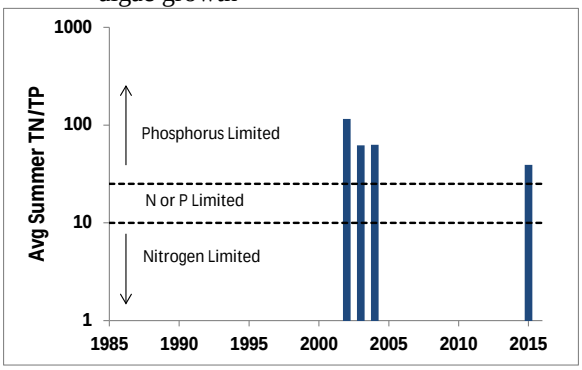
Long Term Trends: Chlorophyll a

- Fairly stable (and low) algae levels
- Most readings typical of *oligotrophic* lakes, consistent with TP and clarity readings



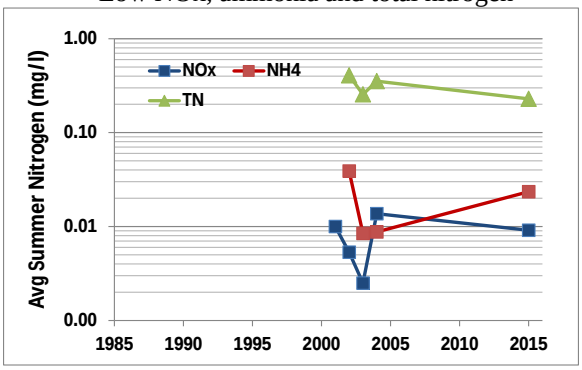
Long Term Trends: N:P Ratio

- May be decreasing
- Most readings indicate phosphorus limits algae growth



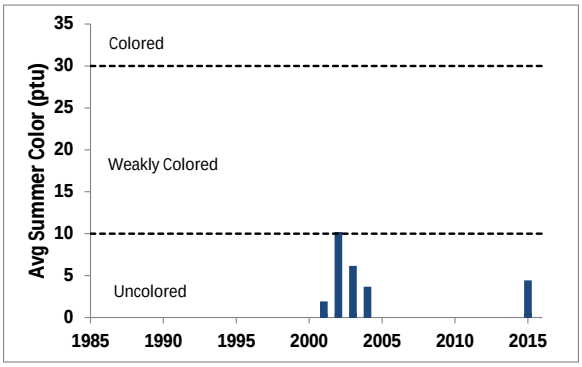
Long Term Trends: Nitrogen

- No long term trend in any of the nitrogen indicators, although TN lower in 2015
- Low NOx, ammonia and total nitrogen



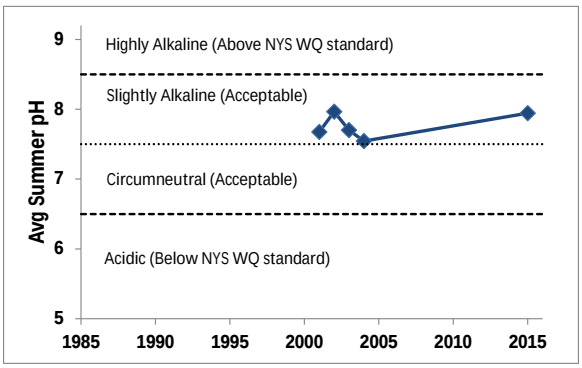
Long Term Trends: Color

- No long term trend; fairly stable and low
- Most readings typical of *uncolored* lakes



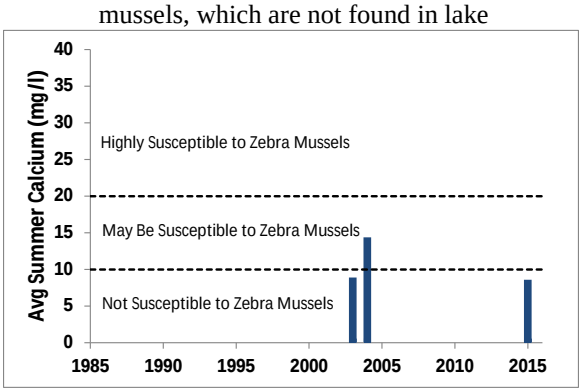
Long Term Trends: pH

- Mostly stable pH, but slightly higher in '15
- Most readings typical of *slightly alkaline* lakes



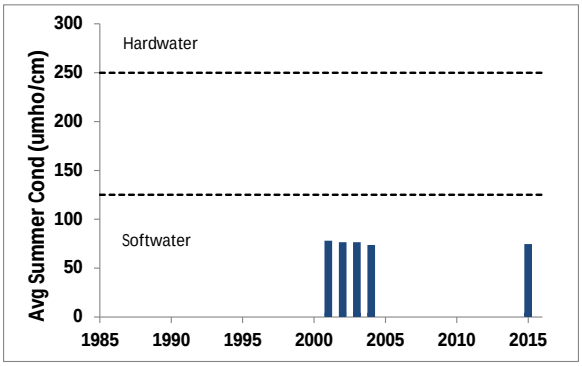
Long Term Trends: Calcium

- No long-term changes; fairly stable
- Low calcium and low susceptibility to zebra mussels, which are not found in lake



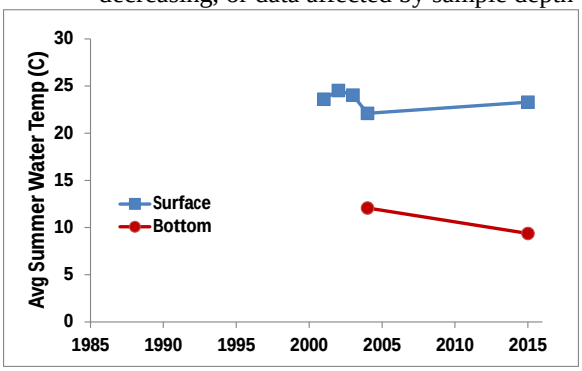
Long Term Trends: Conductivity

- Very stable readings with low conductivity
- Most readings typical of *softwater* lakes



Long Term Trends: Water Temperature

- No long term trend
- Not yet clear if deepwater temperatures are decreasing, or data affected by sample depth



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.

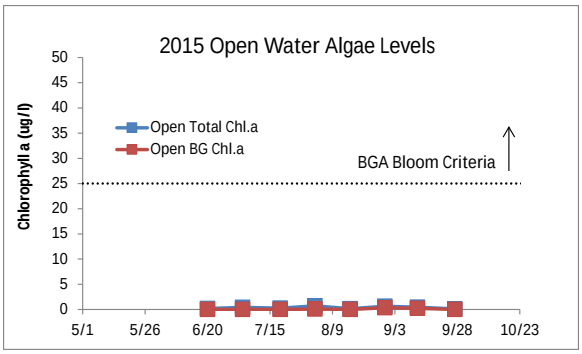


Figure D1:
2015 Open Water Total and BGA Chl.a

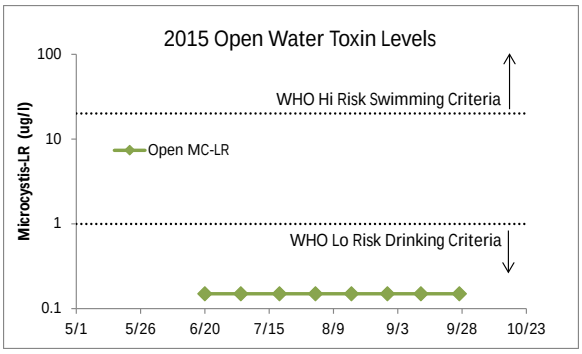


Figure D2:
2015 Open Water Microcystin-LR

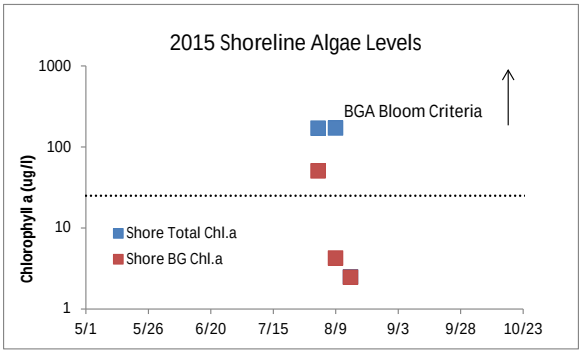


Figure D3:
2015 Shoreline Total and BGA Chl.a

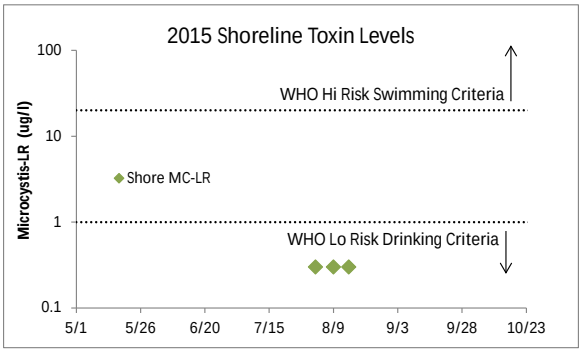


Figure D4:
2015 Shoreline Microcystin-LR

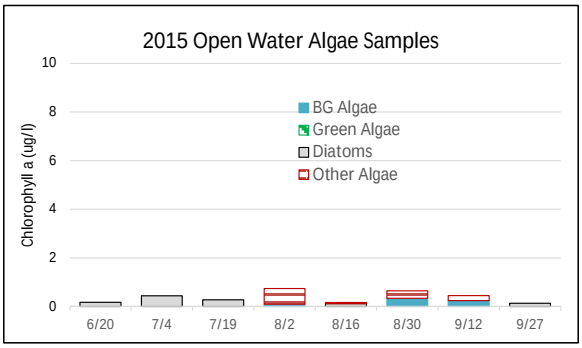


Figure D5:
2015 Open Water Algae Types

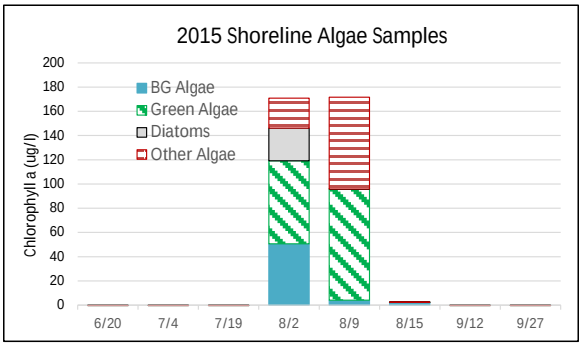


Figure D6:
2015 Shoreline Algae Types

Appendix E:
AIS Species in Jefferson County

The table below shows the invasive aquatic plants and animals that have been documented in Jefferson 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).

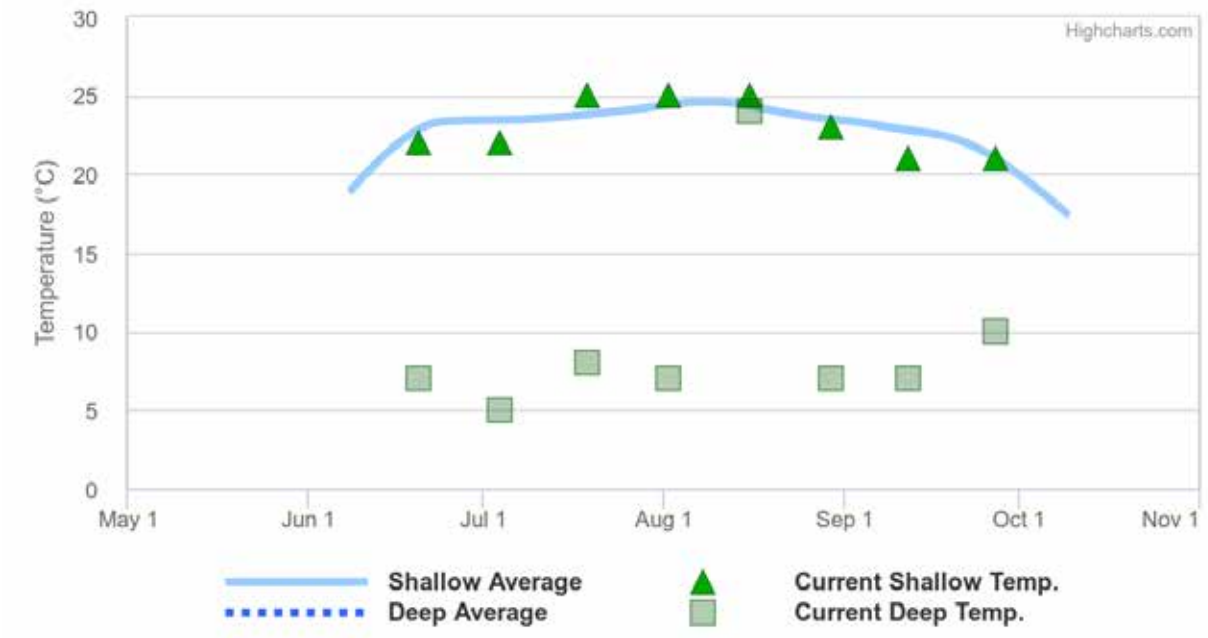
This list is not complete, but instead represents only those species that have been reported and verified within the county. If any additional aquatic invasive species (AIS) are known or suspected in these or other waterbodies in the county, this information should be reported through iMap invasives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

Aquatic Invasive Species - Jefferson County			
Waterbody	**Kingdom**	**Common name**	**Scientific name**
Black Pond	Animal	Common carp	*Cyprinus carpio*
Black Pond	Plant	European frogbit	*Hydrocharis morsus-ranae*
Black Pond	Plant	Curly leafed pondweed	*Potamogeton crispus*
Butterfield Lake	Plant	Eurasian watermilfoil	*Myriophyllum spicatum*
Cranberry Pond	Plant	European frogbit	*Hydrocharis morsus-ranae*
Crooked Creek	Plant	European frogbit	*Hydrocharis morsus-ranae*
Floodwood Pond	Plant	Common carp	*Cyprinus carpio*
Floodwood Pond	Plant	European frogbit	*Hydrocharis morsus-ranae*
Floodwood Pond	Plant	Eurasian watermilfoil	*Myriophyllum spicatum*
Floodwood Pond	Plant	Brittle naiad	*Najas minor*
Floodwood Pond	Plant	Curly leafed pondweed	*Potamogeton crispus*
Floodwood Pond	Plant	Water chestnut	*Trapa natans*
Goose Pond	Plant	Eurasian watermilfoil	*Myriophyllum spicatum*
Hyde Lake	Plant	Eurasian watermilfoil	*Myriophyllum spicatum*
Lake of the Isles	Plant	Eurasian watermilfoil	*Myriophyllum spicatum*
Sixberry Lake	Plant	Eurasian watermilfoil	*Myriophyllum spicatum*
Lake Ontario	Plant	Flowering-rush, Flowering rush	*Butomus umbellatus*
Lake Ontario	Animal	Common carp	*Cyprinus carpio*
Lake Ontario	Animal	Quagga mussel	*Dreissena bugensis*
Lake Ontario	Animal	Zebra mussel	*Dreissena polymorpha*
Lake Ontario	Plant	European frogbit	*Hydrocharis morsus-ranae*
Lake Ontario	Plant	Eurasian watermilfoil	*Myriophyllum spicatum*
Lake Ontario	Plant	Brittle naiad	*Najas minor*
Lake Ontario	Animal	Round goby	*Neogobius melanostomus*

Waterbody	Kingdom	Common name	Scientific name
Lake Ontario	Plant	Starry stonewort	*Nitellopsis obtusa*
Lake Ontario	Animal	Allegheny crayfish	*Orconectes obscurus*
Lake Ontario	Plant	Curly leafed pondweed	*Potamogeton crispus*
Lake Ontario	Plant	Water chestnut	*Trapa natans*
Lakeview Pond	Animal	Common carp	*Cyprinus carpio*
Lakeview Pond	Plant	Eurasian watermilfoil	*Myriophyllum spicatum*
Lakeview Pond	Plant	Curly leafed pondweed	*Potamogeton crispus*
Millsite Lake	Plant	Eurasian watermilfoil	*Myriophyllum spicatum*
Millsite Lake	Plant	Banded mystery snail	*Viviparus georgianus*
Moon Lake	Plant	Eurasian watermilfoil	*Myriophyllum spicatum*
Moon Lake	Plant	Curly leafed pondweed	*Potamogeton crispus*
Mud Lake	Plant	Eurasian watermilfoil	*Myriophyllum spicatum*
Muskellunge Lake	Animal	Rudd	*Scardinius erythrophthalmus*
North Colwell Pond	Plant	Brittle naiad	*Najas minor*
North Colwell Pond	Plant	Water chestnut	*Trapa natans*
Payne Lake	Plant	Eurasian watermilfoil	*Myriophyllum spicatum*
Payne Lake	Plant	Curly leafed pondweed	*Potamogeton crispus*
Pleasant Lake	Plant	European frogbit	*Hydrocharis morsus-ranae*
Pleasant Lake	Plant	Eurasian watermilfoil	*Myriophyllum spicatum*
Red Lake	Plant	Eurasian watermilfoil	*Myriophyllum spicatum*
Saint James Lake	Animal	Common carp	*Cyprinus carpio*
Saint James Lake	Plant	European frogbit	*Hydrocharis morsus-ranae*
Saint James Lake	Animal	Round goby	*Neogobius melanostomus*
Saint James Lake	Plant	Water chestnut	*Trapa natans*
South Colwell Pond	Plant	European frogbit	*Hydrocharis morsus-ranae*
South Colwell Pond	Plant	Eurasian watermilfoil	*Myriophyllum spicatum*
South Colwell Pond	Plant	Curly leafed pondweed	*Potamogeton crispus*
South Colwell Pond	Plant	Water chestnut	*Trapa natans*
St. Lawrence River	Animal	Zebra mussel	*Dreissena polymorpha*
St. Lawrence River	Plant	European frogbit	*Hydrocharis morsus-ranae*
St. Lawrence River	Plant	Eurasian watermilfoil	*Myriophyllum spicatum*
St. Lawrence River	Plant	Starry stonewort	*Nitellopsis obtusa*
St. Lawrence River	Plant	Curly leafed pondweed	*Potamogeton crispus*

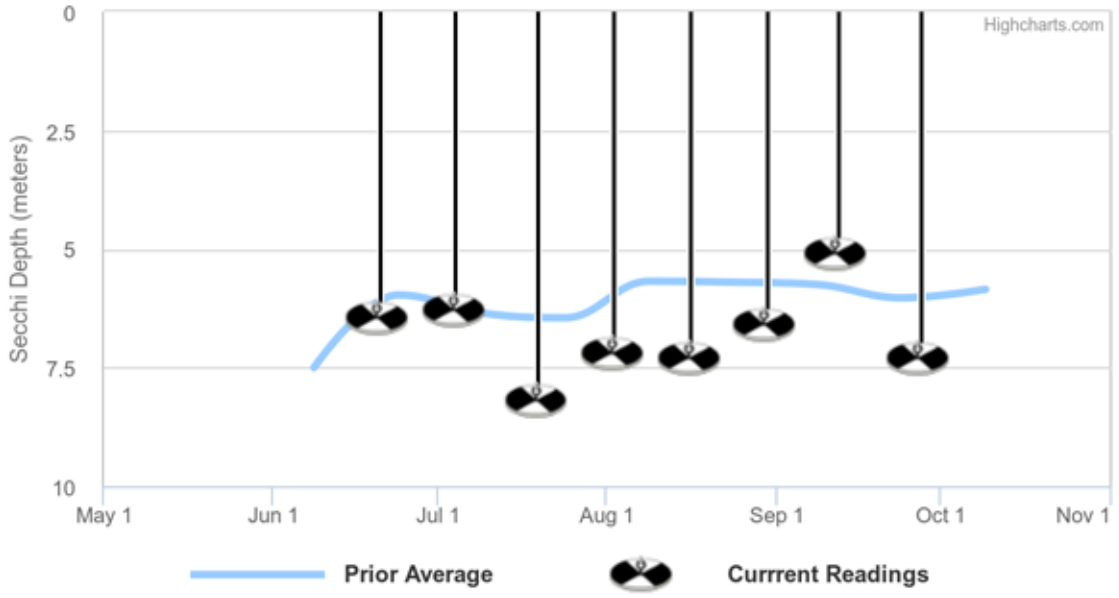
Appendix F: Current Year vs. Prior Averages for Sixberry Lake

Current Year Water Temperatures vs. Prior Average



There are not enough shallow water sample temperatures to determine a trend for the current year when compared to the average of readings collected from 2001 to 2004. No prior year deep water temperature readings exist ito compare with the current year readings.

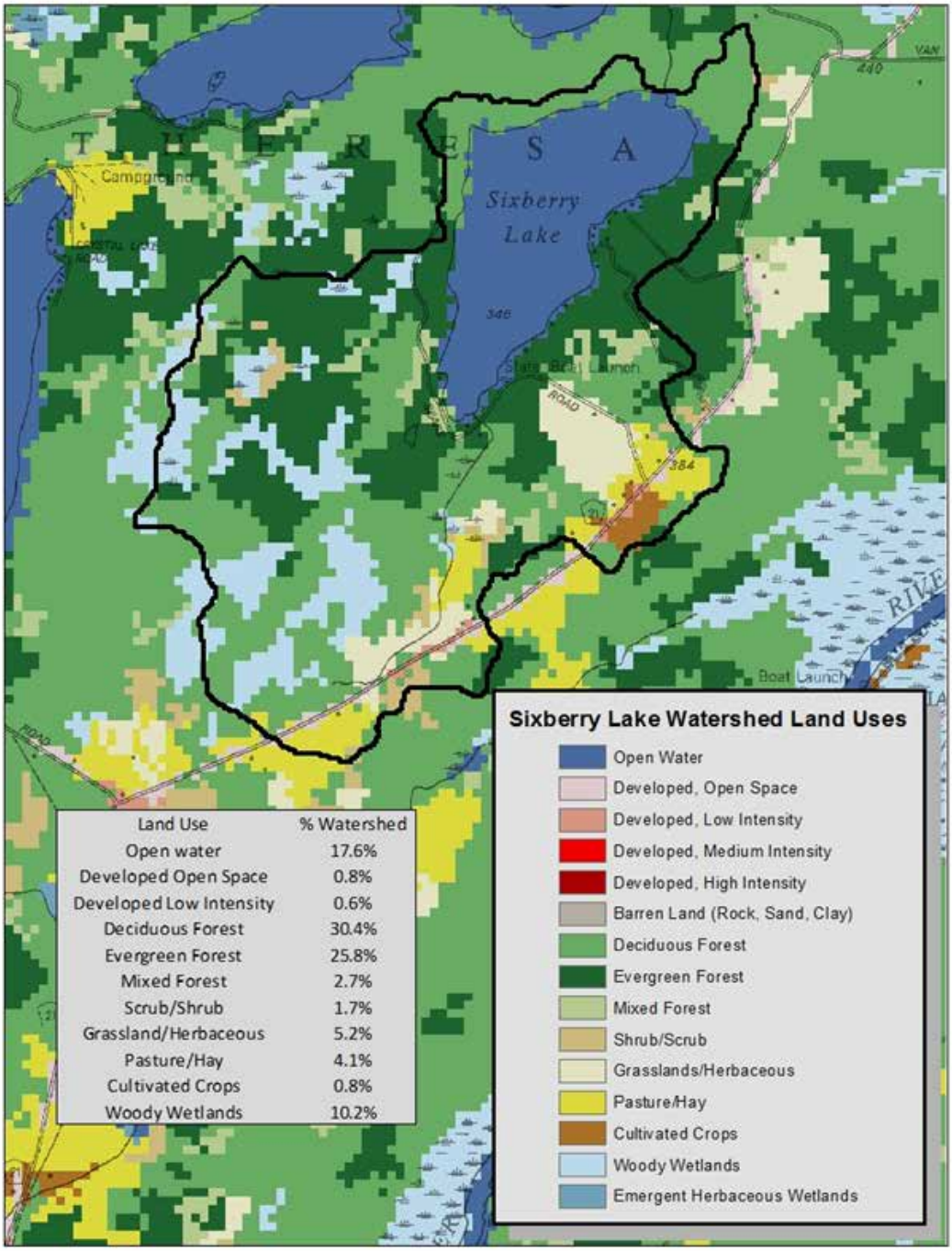
Current Year Secchi Readings vs. Prior Average



There are not enough session Secchi readings to determine a trend for the current year when compared to the average of readings collected from 2001 to 2004

Appendix G: Watershed and Land Use Map for Sixberry 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.



Land Use	% Watershed
Open water	17.6%
Developed Open Space	0.8%
Developed Low Intensity	0.6%
Deciduous Forest	30.4%
Evergreen Forest	25.8%
Mixed Forest	2.7%
Scrub/Shrub	1.7%
Grassland/Herbaceous	5.2%
Pasture/Hay	4.1%
Cultivated Crops	0.8%
Woody Wetlands	10.2%