Panther Lake Questions and Answers, 2015 CSLAP

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

A1. Water quality conditions appear to have changed since the early 2000s. Water clarity was slightly lower in 2014 and 2015, despite lower algae levels. Aquatic plant coverage has been lower in the last two years.

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

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

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

A3. Panther Lake had slightly lower water clarity, but lower nutrient and algae levels, than the typical lake in the area. Aquatic plant coverage was lower than in these other lakes, despite the presence of Eurasian watermilfoil.

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

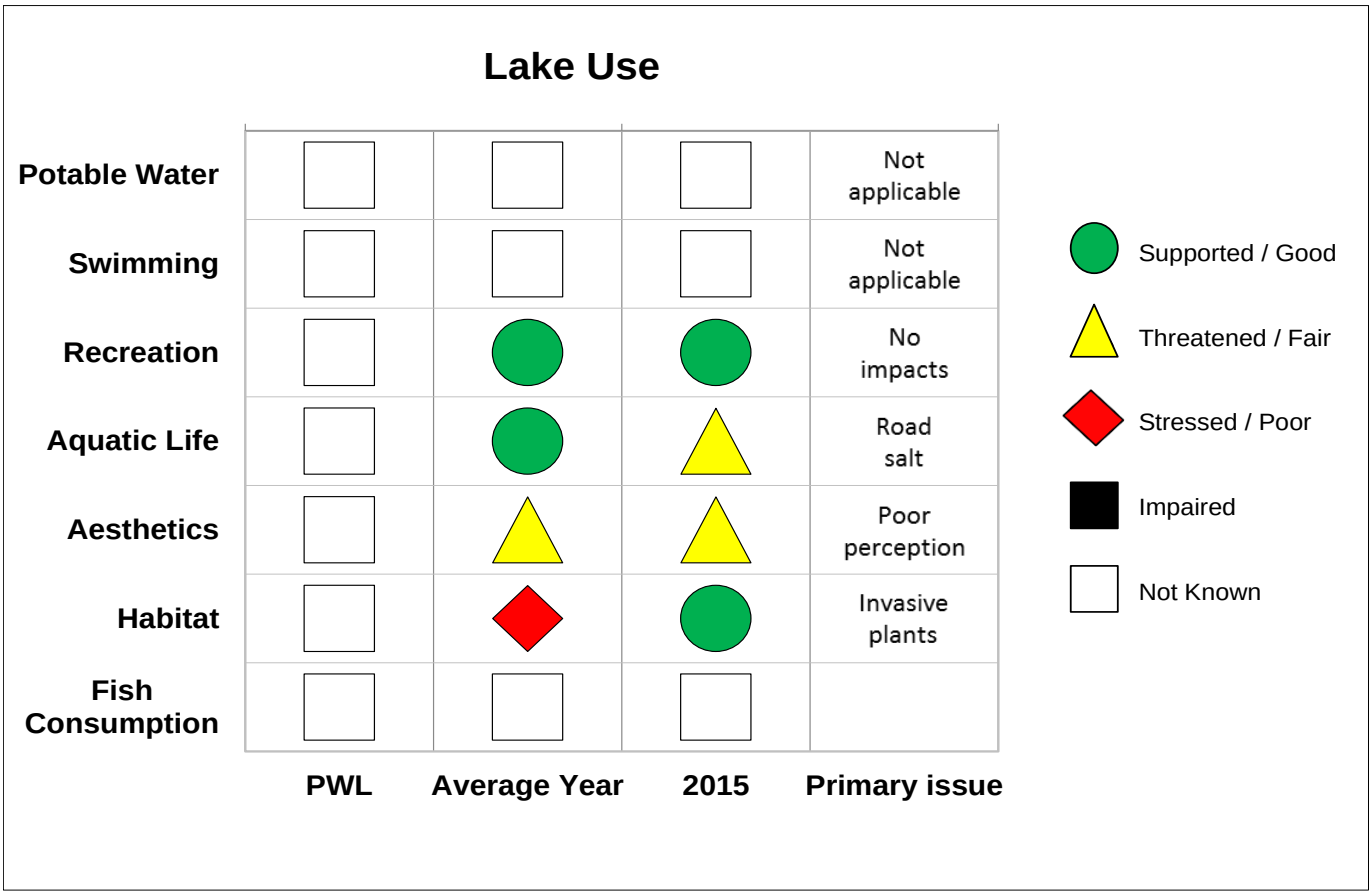
A4. The CSLAP indicators showed higher pH and conductivity levels, and lower water clarity, algae levels and aquatic plant coverage readings in 2014 and 2015 compared to the 1993-1997 period. However, any trends will likely become apparent with additional present-day data.

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

A5. Panther Lake does not appear to be susceptible to shoreline blue green algae blooms, consistent with relatively low nutrient and open water algae levels. It is not known to what extent relatively low water clarity affects lake use, but lake residents should look for any sources of turbidity or eroding materials contributing to the drop in 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 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:
Panther Lake

General Lake Information

Location	Town of Constantia
County	Oswego
Basin	Seneca/Oneida/Oswego Rivers
Size	49.2 hectares (121.5 acres)
Lake Origins	Augmented by 10ft by 180ft earthen dam (1820)
Watershed Area	398 hectares (983 acres)
Retention Time	0.4 years
Mean Depth	2.6 meters
Sounding Depth	7.0 meters
Public Access?	Private ramp (fee launch)
Major Tributaries	West Branch Little River
Lake Tributary To…	West Branch Little River to Little River to Fish Creek to Oneida Lake to…..to Lake Ontario
WQ Classification	B (contact recreation = swimming)
Lake Outlet Latitude	43.329299
Lake Outlet Longitude	-75.909913
Sampling Years	1993-1997, 2014-2015
2015 Samplers	Bruce and Deb Walters, Barry McClean, Hawley Goodell, Jim Lemm, and Lynn and Arthur Montani
Main Contact	Bruce Walters

Lake Map

Background

Panther Lake is a 122 acre, class B lake found in the Town of Constantia in Oswego County, in the Tug Hill region of New York State. It was first sampled as part of CSLAP in 1993.

It is one of five CSLAP lakes among the more than 270 lakes and ponds found in Oswego County, and one of 13 CSLAP lakes among the nearly 1000 lakes and ponds in the Oswego River drainage basin.

Lake Uses

Panther 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, aquatic life and aesthetics. However, the lake is used by lake residents and invited guests for swimming and non-power boating. There is only limited public access to the lake through the use of a private fee launch.

Panther Lake has been stocked with tiger muskies, but it is not known what other private stocking may occur.

General statewide fishing regulations are applicable in Panther Lake. In addition, open season for trout lasts from April 1st through October 15th, with no size limit, but a daily take limit of five fish. Ice fishing is permitted. Fish species in the lake include largemouth bass, tiger muskellunge, brown bullhead, bluegill, black crappie, chain pickerel, smallmouth bass, and pumpkinseed.

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

Historical Water Quality Data

CSLAP sampling was conducted on Panther Lake from 1993 to 1997, and in 2014 to 2015. The CSLAP reports for each of the past several years can be found on the NYSFOLA website at http://nysfola.mylaketown.com. The most recent CSLAP report and scorecard for Panther Lake can also be found on the NYSDEC web page at http://www.dec.ny.gov/lands/77850.html.

Panther Lake was not sampled as part of any of the major New York State monitoring programs prior to CSLAP. DEC Fisheries monitoring in the mid-1990s found water clarity, pH and conductivity readings nearly identical to those measured through CSLAP, and dissolved oxygen levels that are high to the bottom of the lake. Zooplankton samples were also collected, but those results are not available.

Neither the inlet to nor the outlet (West Branch Little River) of the lake has been monitored through the NYSDEC Rotating Intensive Basins (RIBS) or stream biomonitoring programs.

Lake Association and Management History

Panther Lake is served by the Panther Lake Association. It is not known what activities are conducted by the lake association or whether they maintain a website.

Summary of 2015 CSLAP Sampling Results

Evaluation of 2015 Annual Results Relative to 1993-2014

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

Evaluation of Eutrophication Indicators

Water clarity readings in the last two years were much lower than in the period from 1997 to 2001, despite lower phosphorus and algae levels in the last two years. This suggests that lower clarity may be due to non-algal matter (creating turbidity). It is not yet known if these differences are part of a longer-term trend.

Lake productivity increases slightly in late summer in many years, as indicated by increasing algae and nutrient levels. This seasonal increase in lake productivity was very apparent in 2015- algae levels increased significantly, although water clarity decreased only slightly and nutrient levels varied over the summer.

The lake can be characterized as *mesotrophic,* or moderately productive, based on water clarity, chlorophyll *a*, and total phosphorus readings (all typical of *mesotrophic* lakes). However, water clarity readings in 2015 were more typical of *eutrophic* (or highly productive) lakes. The trophic state indices (TSI) evaluation suggests that phosphorus levels are lower than expected given the algae (chlorophyll *a*) and water clarity readings in the lake. Overall trophic conditions are summarized on the Lake Scorecard and Lake Condition Summary Table.

Evaluation of Potable Water Indicators

Algae levels are usually 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, and the lake is not classified for use 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

Water color readings were slightly higher in 2014 and 2015 than in the period from 1993 to 1997, but measured water color has been slightly higher in most CSLAP lakes after the change in labs in 2002 (so the change in color might not be "real"). Conductivity and pH readings were higher in 2014 and 2015, and the nitrogen indicators (NOx, ammonia, and total nitrogen) were slightly higher in 2015 than in 2014. It is likely that the small changes in most of these limnological indicators have been within the normal range of variability in the lake.

Chloride levels in the 2015 samples, collected for the first time through CSLAP and cited in Appendix A, ranged from 5 to 15 mg/l. These values fall within the range for "low" to "moderate" road salt runoff levels cited by the New Hampshire DES. These readings are well below the state potable water quality standard of 250 mg/l, and below the typical range of values found in most NYS lakes. These readings suggest a low to moderate likelihood of biological impacts from road salt. Additional data will help to determine if these represent normal readings for the lake.

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

Evaluation of Biological Condition

The fluoroprobe screening samples analyzed by SUNY ESF in 2014 and 2015 indicated increasing levels of algae and an increasing percentage of blue green algae during the summer, although all readings were well below bloom criteria. The shoreline bloom sample collected in the early summer of 2014 had relatively low total algae levels and was dominated by green algae; no shoreline blue green blooms were reported in 2014 or 2015.

The composition of the fish community includes a mix of warmwater and coolwater fish species, but the lake is probably typical of a warmwater fishery. An assessment of the fish community was completed in late spring of 2010 by DEC to determine the existing predatory fish population. Local anglers expressed a desire for the DEC to stock walleyes in the lake, which had been done periodically in the past. It was determined that the black bass and pickerel population were fairly high, and therefore the probability of a successful walleye stocking program was low. It was decided that the existing tiger muskellunge stocking program should continue since it is a small but popular fishery.

Aquatic plant surveys were conducted by SUNY Oneonta found at least 18 different aquatic plant species, including one invasive aquatic plant (Eurasian watermilfoil, or *Myriophyllum spicatum*). A modified floristic quality index (mFQI) evaluation of the lake would identify the quality of the aquatic plant community as “good”.

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

Evaluation of Lake Perception

“Excessive weed growth” is usually cited as the primary influence on recreational assessments, but recreational assessments have been mostly favorable and were more favorable than usual in 2014 and 2015. Water quality assessments were similar in the last two years to those reported in 1993-1997, despite slightly lower water clarity. Aquatic plant coverage was reduced in the last two years (compared to 1993-1997), but it is not known if this is due to a reduction in invasive or native plants, or if it reflects recent management. Recreational assessments degrade into the fall in the typical year, consistent with a seasonal increase in plant coverage, but these seasonal changes were not apparent in 2015. Overall lake perception is summarized on the Lake Scorecard and Lake Condition Summary Table.

Evaluation of Local Climate Change

Water temperatures in the summer index period (June through September) were higher in 2014 and 2015 than in the period from 1993 to 1997, but it is not known if these (2014) readings represent present conditions. It is also not known if this is an indication of local climate change or if water temperatures can accurately assess these changes.

Evaluation of Algal Toxins

Algal toxin levels can vary significantly within blooms and from shoreline to lake, and the absence of toxins in a sample does not indicate safe swimming conditions. Fluoroprobe readings

have been below the thresholds associated with harmful algal blooms (HABs). Algal toxin levels were undetectable in all open water samples and the single sampled shoreline bloom in 2014. However, lake residents and pets should avoid exposure to any surface scums or heavily discolored water that resembles a blue green algae bloom.

Lake Condition Summary

Category	Indicator	Min	Annual Avg	Max	2015 Avg	Classification	2015 Change?	Long-term Change?
Eutrophication Indicators	Water Clarity	1.80	2.98	4.00	1.86	Mesotrophic	Lower Than Normal	Decreasing Significantly
	Chlorophyll *a*	1.40	6.40	14.80	6.88	Mesotrophic	Within Normal Range	No Change
	Total Phosphorus	0.007	0.012	0.058	0.013	Mesotrophic	Within Normal Range	Increasing Slightly
Potable Water Indicators	Hypolimnetic Ammonia							Not known
	Hypolimnetic Arsenic							Not known
	Hypolimnetic Iron							Not known
	Hypolimnetic Manganese							Not known
Limnological Indicators	Hypolimnetic Phosphorus							Not known
	Nitrate + Nitrite	0.01	0.01	0.02	0.01	Low NOx	Higher than Normal	No Change
	Ammonia	0.01	0.04	0.05	0.04	Low Ammonia	Higher than Normal	No Change
	Total Nitrogen	0.33	0.45	0.63	0.50	Low Total Nitrogen	Higher than Normal	No Change
	pH	6.86	7.58	8.32	7.66	Alkaline	Within Normal Range	No Change
	Specific Conductance	36	78	99	93	Softwater	Higher than Normal	Increasing Slightly
	True Color	5	14	26	16	Intermediate Color	Within Normal Range	No Change
	Calcium	9.4	9.6	9.7	9.1	Not Susceptible to Zebra Mussels	Within Normal Range	No Change
Lake Perception	WQ Assessment	1	2.0	3	2.0	Not Quite Crystal Clear	Within Normal Range	No Change
	Aquatic Plant Coverage	1	3.1	4	1.7	Surface Plant Growth	More Favorable Than Normal	Slightly Improving
	Recreational Assessment	1	2.4	4	1.3	Excellent	More Favorable Than Normal	Slightly Improving
Biological Condition	Phytoplankton					Open water-low blue green algae biomass	Not known	Not known
	Macrophytes					Good 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					Warmwater fishery	Not known	Not known
	Invasive Species					Eurasian watermilfoil	Not known	Not known
Local Climate Change	Air Temperature	9	22.3	35	24.3		Within Normal Range	No Change
	Water Temperature	13	21.4	27	25.1		Higher Than Normal	No Change

Category	Indicator	Min	Annual Avg	Max	2015 Avg	Classification	2015 Change?	Long-term Change?
Harmful Algal Blooms	Open Water Phycocyanin	4	10	21	18	No readings indicate high risk of BGA	Not known	Not known
	Open Water FP Chl.a	2	4	6	5	No readings indicate high algae levels	Not known	Not known
	Open Water FP BG Chl.a	0	1	2	3	No readings indicate high BGA levels	Not known	Not known
	Open Water Microcystis	<DL	<DL	0.5	<DL	Low to undetectable open water microcystins	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	176.9	176.9	176.9		All readings indicate very high algae levels	Not known	Not known
	Shoreline FP BG Chl.a	0.0	0.0	0.0		No readings indicate high BGA levels	Not known	Not known
	Shoreline Microcystis	<DL	<DL	<DL		Shoreline bloom MC-LR consistently not detectable	Not known	Not known
	Shoreline Anatoxin a	<DL	<DL	<DL		Shoreline bloom Anatoxin-a consistently not detectable	Not known	Not known

Evaluation of Lake Condition Impacts to Lake Uses

Panther Lake is not among the lakes on the 2008 Oswego (Oneida) River drainage basin Priority Waterbody List (PWL); it is listed as *unassessed*.

Potable Water (Drinking Water)

The CSLAP dataset at Panther 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. There is no evidence that any potable water impacts occur for any "unofficial" use of the lake for drinking.

Public Bathing

The CSLAP dataset at Panther Lake, including water chemistry data, physical measurements, and volunteer samplers' perception data, suggests that public bathing, if conducted at a public swimming beach, would be supported, although this use may be *threatened* by invasive plants (Eurasian watermilfoil). 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 Panther Lake, including water chemistry data, physical measurements, and volunteer samplers' perception data, suggest that recreation is fully supported, although this use may be *threatened* by periodic low water clarity and excessive growth of Eurasian watermilfoil.

Aquatic Life

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

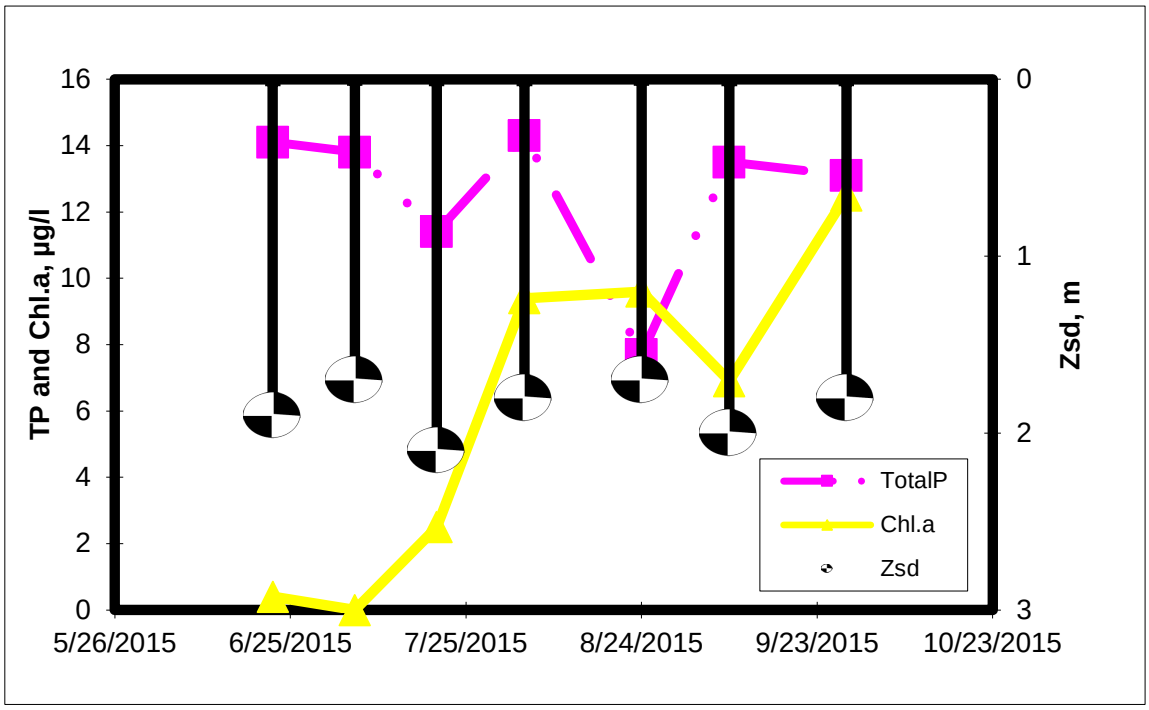
Aesthetics and Habitat
The CSLAP dataset on Panther Lake, including water chemistry data, physical measurements, and volunteer samplers' perception data, suggest that aesthetics may at times be *fair* due to poor perception associated with "excessive weeds". Habitat may at times be *poor* due to invasive weeds, although this has not been an issue in the last few years.

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

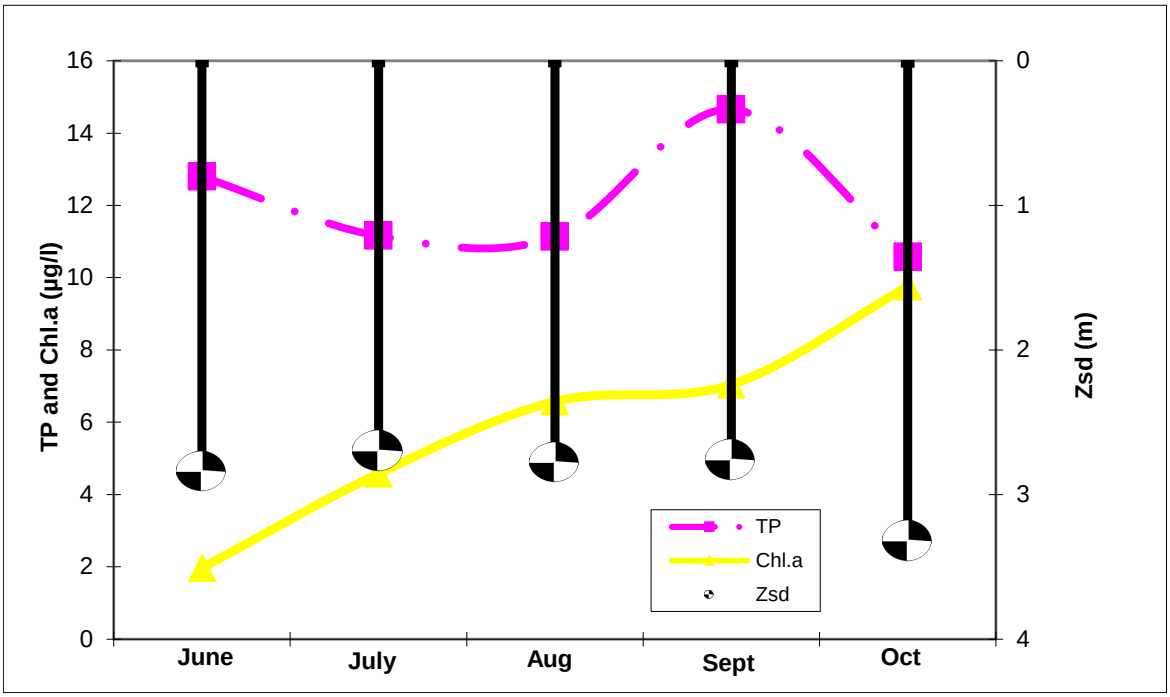
Additional Comments and Recommendations
Lake residents are encouraged to report and avoid exposure to any shoreline blue green algae blooms, and to follow the spread of Eurasian watermilfoil in the lake. Lake residents should also be on the lookout for fanwort (*Cabomba caroliniana*), recently found at Kasoag Lake.

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

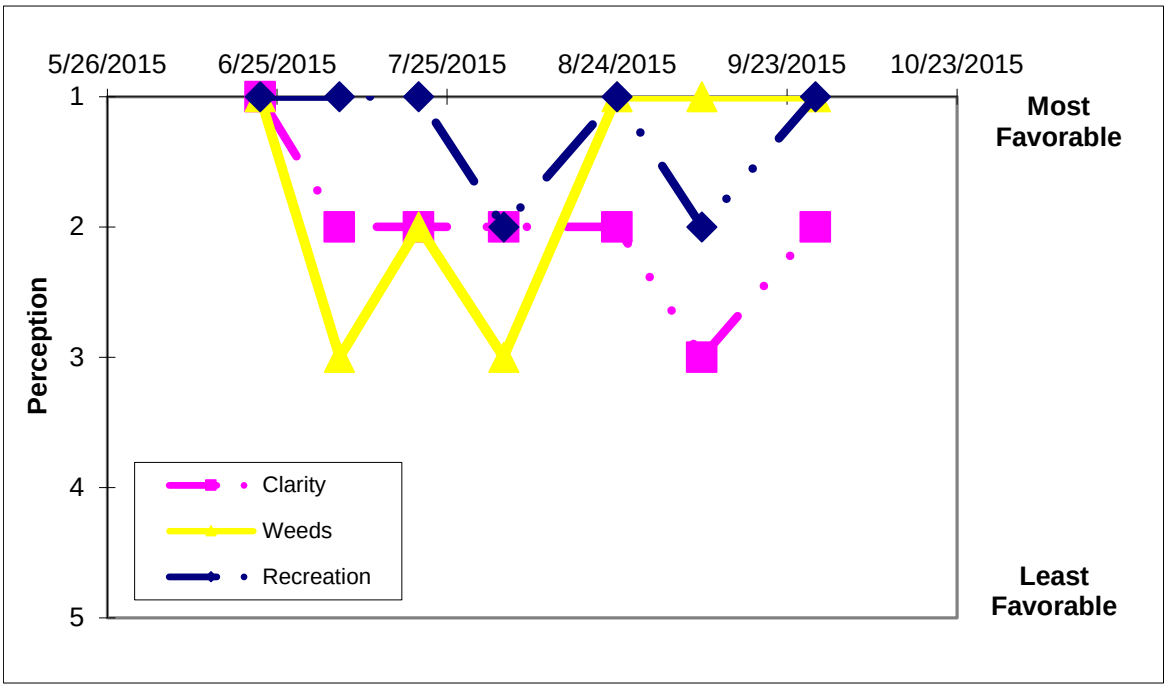
Time Series: Trophic Indicators, 2015



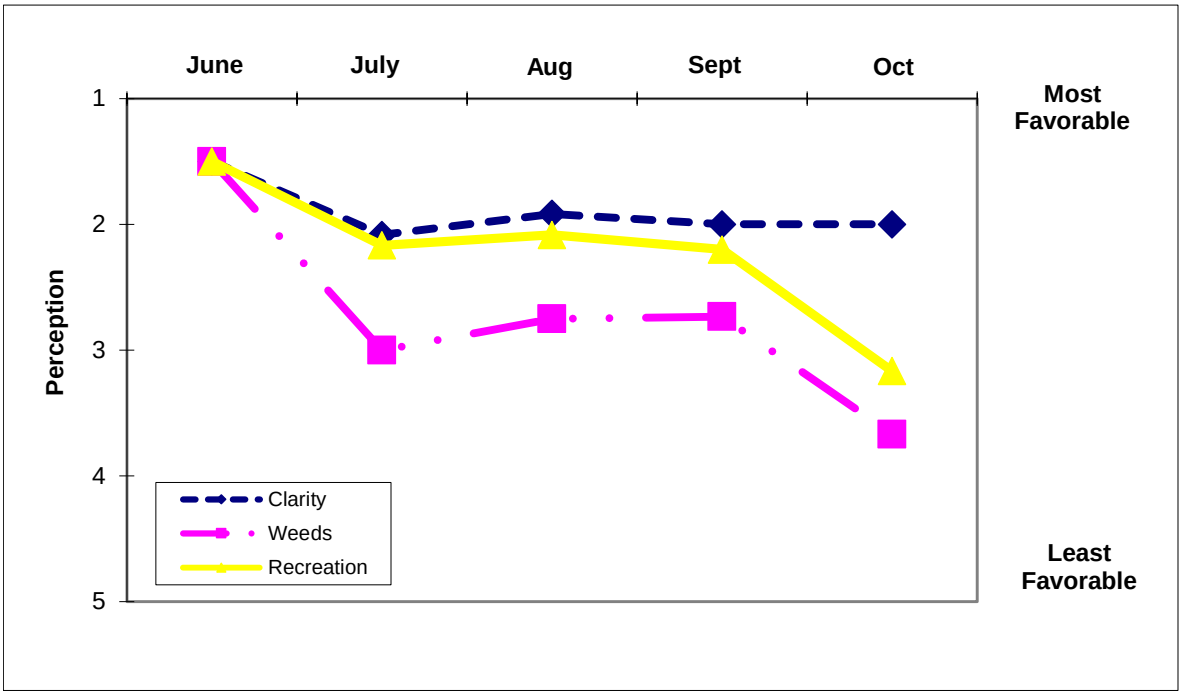
Time Series: Trophic Indicators, Typical Year (1993-2015)



Time Series: Lake Perception Indicators, 2015



Time Series: Lake Perception Indicators, Typical Year (1993-2015)



Appendix A- CSLAP Water Quality Sampling Results for Panther Lake

LNum	PName	Date	Zbot	Zsd	Zsamp	Tot.P	NO3	NH4	TDN	TN/TP	TColor	pH	Cond25	Ca	Chl.a	Cl
103	Panther L	7/10/1993	5.6	2.80	1.5	0.009	0.01				17	7.71	68		3.48	
103	Panther L	7/25/1993	5.3	2.55	1.5	0.012	0.01				16	7.38	71		3.70	
103	Panther L	8/8/1993	5.5	2.38	1.5	0.013	0.01				14	7.09	71		12.20	
103	Panther L	8/15/1993	5.4	3.50	1.5	0.010	0.01				14	7.76	71		5.85	
103	Panther L	8/22/1993	5.6	3.00	1.5	0.010	0.01				20	7.63	71		8.26	
103	Panther L	9/6/1993	5.5	3.10	1.5	0.011	0.01				16	7.78	72		7.58	
103	Panther L	9/18/1993	5.5	3.00	1.5	0.011	0.02				16	7.89	73		11.80	
103	Panther L	9/26/1993	5.3	3.10	1.5	0.011	0.01				17	7.88	73		13.30	
103	Panther L	6/28/1994	5.3	3.88	1.5	0.010	0.01				16	7.57	71		1.70	
103	Panther L	7/11/1994	5.2	3.35	1.5	0.007	0.01				12	7.29	69		7.29	
103	Panther L	7/23/1994	5.3	3.50	1.5	0.009	0.01				8	7.53	71		3.11	
103	Panther L	9/6/1994	5.5	2.75	1.5	0.012	0.01				15	7.45	74			
103	Panther L	9/26/1994	5.0	2.50	1.5	0.012	0.01				11	7.65	74		7.92	
103	Panther L	10/10/1994	5.0	2.50	1.5	0.017	0.01				15	7.57	74		10.70	
103	Panther L	7/11/1995	4.8	2.63	1.5	0.012	0.01				10	7.69	80		6.64	
103	Panther L	7/16/1995	5.3	2.50	1.5	0.010	0.01					7.65	80		3.67	
103	Panther L	7/31/1995	5.0	3.38	1.5	0.009	0.01					7.29	82		6.42	
103	Panther L	8/14/1995	5.0	3.50	1.5	0.009	0.01				10	7.89	82		3.82	
103	Panther L	8/27/1995	4.8	3.50	1.5	0.009	0.01				10	7.93	83		6.95	
103	Panther L	9/11/1995	4.8	3.50	1.5	0.010	0.01				10	7.88	83		3.65	
103	Panther L	9/25/1995	4.8	3.38	1.5	0.010	0.01					7.84	85		9.42	
103	Panther L	10/1/1995	4.8	3.25	1.5	0.009	0.01				25	7.43	83		7.43	
103	Panther L	10/9/1995	5.0	3.75	1.5	0.010	0.01				5	7.68	84		14.80	
103	Panther L	7/7/1996	4.8	2.90	1.5	0.009	0.01				15	7.49	78		5.10	
103	Panther L	8/4/1996	4.8	2.88	1.5	0.010	0.01				15	7.66	78		5.40	
103	Panther L	8/11/1996	4.8	2.93	1.5	0.010	0.01				15	7.71	79		5.10	
103	Panther L	8/25/1996	5.5	3.13	1.5	0.014	0.01				15	7.64	79		5.00	
103	Panther L	9/1/1996	5.0	2.75	1.5	0.010	0.01				10	7.65	79		4.80	
103	Panther L	9/23/1996	4.5	3.75	1.5	0.013	0.01				15	7.6	79		5.27	
103	Panther L	10/6/1996	4.5	3.75	1.5	0.009	0.01				10	7.59	75		7.30	
103	Panther L	10/13/1996	4.5	4.00	1.5	0.010	0.01				10	7.78	80		11.70	
103	Panther L	7/14/1997	4.3	3.25	1.5	0.012	0.01				15	6.91	77		4.06	
103	Panther L	7/27/1997	4.5	2.88	1.5	0.010	0.01				15	7.55	78		5.90	
103	Panther L	8/17/1997	4.5	2.88	1.5	0.011	0.01				10	6.86	79		7.05	
103	Panther L	9/1/1997	4.5	2.63	1.5	0.014	0.01				12	7.9	80		2.39	
103	Panther L	9/7/1997				0.010					10	7.32	80		3.68	
103	Panther L	9/29/1997	4.5	2.88	1.5	0.012					7	7.75	79		9.31	
103	Panther L	10/5/1997	4.5	2.88	1.5	0.010					9	8.06	80		9.31	
103	Panther L	10/19/1997	4.5	3.13	1.5	0.009					12	7.65	82		7.05	
103	Panther L	6/22/2014	7.0	2.75	1.5	0.014	0.01	0.04	0.48	73.54	14	7.13	94	9.4	3.80	
103	Panther L	7/6/2014	7.0	2.00	1.5	0.015			0.53	79.77	20	7.12	99		4.70	
103	Panther L	7/6/2014			bloom											
103	Panther L	7/20/2014	7.0	2.30	1.5	0.017	0.01	0.05	0.41	52.52	17	7.47	98		7.50	
103	Panther L	8/10/2014	7.0	2.55	1.5	0.011			0.40	77.96	18	7.79	92		2.60	
103	Panther L	8/24/2014	7.0	2.40	1.5	0.015	0.01	0.01	0.35	50.33	22	7.41	36	9.7	4.20	
103	Panther L	9/7/2014	7.0	2.50	1.5	0.014			0.63	100.35	22	6.88	80		1.40	
103	Panther L	9/21/2014		1.80	1.5	0.058	0.01	0.05	0.33	12.48	26	8.32	97		5.70	
103	Panther L	6/22/2015		1.90	1.5	0.014	0.02	0.03	0.43	30.71	16	7.71	95	8.9	0.40	
103	Panther L	7/6/2015	7.0	1.70	1.5	0.014			0.54	39.28	19	7.28	88			
103	Panther L	7/20/2015		2.10	1.5	0.011	0.02	0.03	0.51	44.65	28	7.41	100		2.50	14.7
103	Panther L	8/4/2015	6.1	1.80	1.5	0.014			0.54	37.48	15	8.00	105		9.40	
103	Panther L	8/24/2015	6.5	1.70	1.5	0.008	0.00	0.05	0.53	68.18	10	7.83	101	9.2	9.60	
103	Panther L	9/8/2015	6.0	2.00	1.5	0.014			0.41	30.30	10	7.83	96		6.90	
103	Panther L	9/28/2015		1.80	1.5	0.013	0.01	0.06	0.57	43.44		7.55	68		12.50	5.0

LNum	PName	Date	Type	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
103	Panther L	7/10/1993	Epi	29	27	2	3	3	2											
103	Panther L	7/25/1993	Epi	25	24	2	3	3	23											
103	Panther L	8/8/1993	Epi	22	23															
103	Panther L	8/15/1993	Epi	30	26	2	3	3	2											
103	Panther L	8/22/1993	Epi	12	23	2	4	3	2											
103	Panther L	9/6/1993	Epi	24	22	2	3	2	12											
103	Panther L	9/18/1993	Epi	15	19	2	3	2	2											
103	Panther L	9/26/1993	Epi	19	17	2	3	2	2											
103	Panther L	6/28/1994	Epi	20	22	2	2	2	2											
103	Panther L	7/11/1994	Epi			2	2	2	2											
103	Panther L	7/23/1994	Epi	25	26	2	3	2	5											
103	Panther L	9/6/1994	Epi	16	19	1	3	2	5											
103	Panther L	9/26/1994	Epi	20	19	2	2	2	2											
103	Panther L	10/10/1994	Epi	9	13	2	3	2												
103	Panther L	7/11/1995	Epi	25	24	2	3	2	2											
103	Panther L	7/16/1995	Epi	26	26															
103	Panther L	7/31/1995	Epi	35	27	2	3	2	2											
103	Panther L	8/14/1995	Epi	25	26	2	3	2												
103	Panther L	8/27/1995	Epi	21	23	2	3	2	2											
103	Panther L	9/11/1995	Epi	17	20	2	3	2	2											
103	Panther L	9/25/1995	Epi	14	16	2	3	2	2											
103	Panther L	10/1/1995	Epi	19	16	2	3	2	2											
103	Panther L	10/9/1995	Epi	12	15															
103	Panther L	7/7/1996	Epi	35	24	2	4	3	2											
103	Panther L	8/4/1996	Epi	22	25	2	3	3	2											
103	Panther L	8/11/1996	Epi	30	25	2	3	3	2											
103	Panther L	8/25/1996	Epi	28	25	2	3	1												
103	Panther L	9/1/1996	Epi	23	23	2	3	2												
103	Panther L	9/23/1996	Epi	10	18	2	4	4	2											
103	Panther L	10/6/1996	Epi	17	14	2	4	4	2											
103	Panther L	10/13/1996	Epi	20	14	2	4	3	2											
103	Panther L	7/14/1997	Epi	34	26	2	4	3	2											
103	Panther L	7/27/1997	Epi	26	25	2	4	3	2											
103	Panther L	8/17/1997	Epi	22	24	2	3	3	2											
103	Panther L	9/1/1997	Epi	23	23	2	4	4	2											
103	Panther L	9/7/1997	Epi																	
103	Panther L	9/29/1997	Epi	16	16	2	4	4	2											
103	Panther L	10/5/1997	Epi	23	16	2	4	4	2											
103	Panther L	10/19/1997	Epi	16	15	2	4	4	2											
103	Panther L	6/22/2014	Epi	24	22					0	0	3.80	0.70	<0.58	<0.44	<0.002	2.60	0.00	i	i
103	Panther L	7/6/2014	Epi	27	24					0	0	21.00	0.90	<0.62	<0.03	<0.002	6.11	0.68	e	e
103	Panther L	7/6/2014	bloom											<1.25	<0.06	<0.003	176.86	0.00		e
103	Panther L	7/20/2014	Epi	29	24	3	2	1	0	0	0	8.90	0.80	<0.39	<0.21	<0.003	4.29	0.02		i
103	Panther L	8/10/2014	Epi	29	25	1	2	1	0	0	0	5.30	0.50	<0.28	<0.05	<0.001	1.67	0.42		i
103	Panther L	8/24/2014	Epi	25	22	2	2	1	0	0	0	6.30	0.60	<1.06	<0.16	<0.002	3.22	0.65		i
103	Panther L	9/7/2014	Epi	20	24	2	3	1	0	0	0	9.60	0.50	<0.64	<0.03	<0.001	3.58	0.81		i
103	Panther L	9/21/2014	Epi	22	18	2	1	1	0	0	0	14.50	0.70	<0.49	<0.12	<0.001	6.31	2.20		i
103	Panther L	6/22/2015	Epi	27	24	1	1	1	0	0	0	14.80	0.70	<0.59	<0.004	<0.001	3.29	1.22		
103	Panther L	7/6/2015	Epi	27	27	2	3	1	0	0	0	26.10	0.80	<0.86	<0.008	<0.046	6.66	3.87	I	
103	Panther L	7/20/2015	Epi	26	27	2	2	1	0	0	0	16.50	0.30	<0.30	<0.002	<0.014	3.24	2.22		
103	Panther L	8/4/2015	Epi	21	26	2	3	2	0	0	4	21.00	0.60	<0.18	<0.002	<0.009	5.03	2.89	F	
103	Panther L	8/24/2015	Epi	20	23	2	1	1	0	0	0	17.50	0.70	<0.21	<0.003	<0.010	7.54	4.51	I	I
103	Panther L	9/8/2015	Epi	28	27	3	1	2	0	0	0			<0.39	<0.004	<0.012	4.89	2.45	B	
103	Panther L	9/28/2015	Epi	21	22	2	1	1	0	0	0	11.50	0.60	<0.30	0.01	<0.035	4.01	1.86	I	I

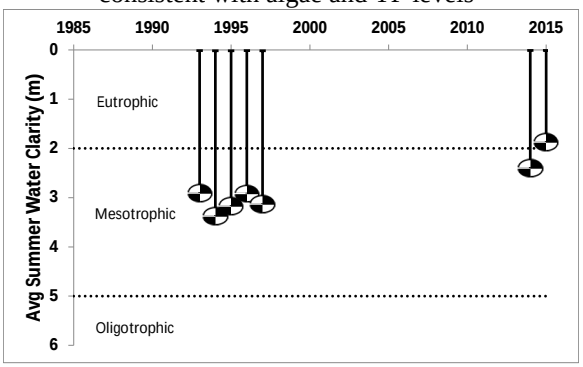
Legend Information

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 C- Long Term Trends: Panther Lake

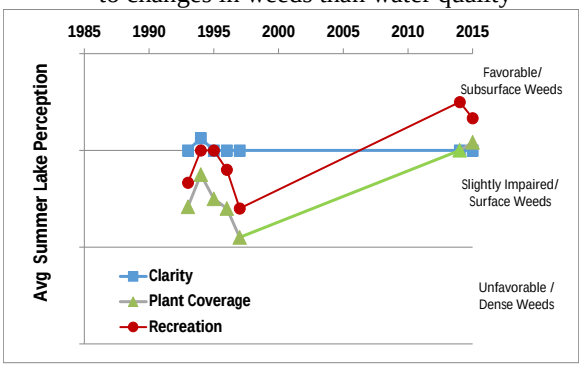
Long Term Trends: Water Clarity

- Clarity ↓ last two yrs; not yet known if trend
- Most readings typical of *mesotrophic* lakes, consistent with algae and TP levels



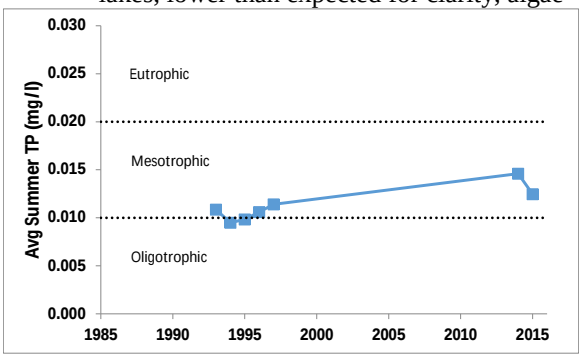
Long Term Trends: Lake Perception

- Improved rec; fewer weeds 1997-15
- Recreational perception more closely linked to changes in weeds than water quality



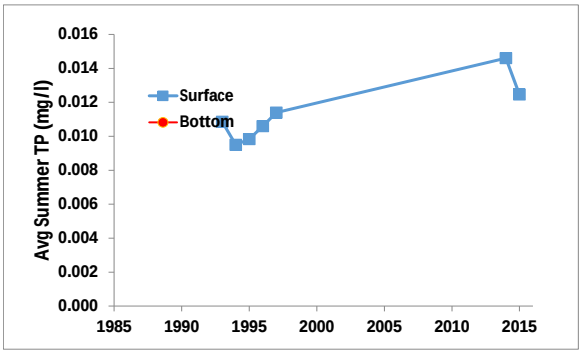
Long Term Trends: Phosphorus

- TP ↑1994-15; not yet known if trend
- Most readings typical of *mesoligotrophic* lakes, lower than expected for clarity, algae



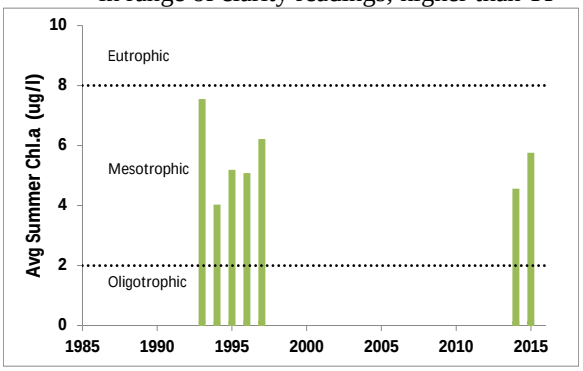
Long Term Trends: Bottom Phosphorus

- No bottom TP readings
- Likely that surface and bottom TP readings are similar in shallow unstratified lakes



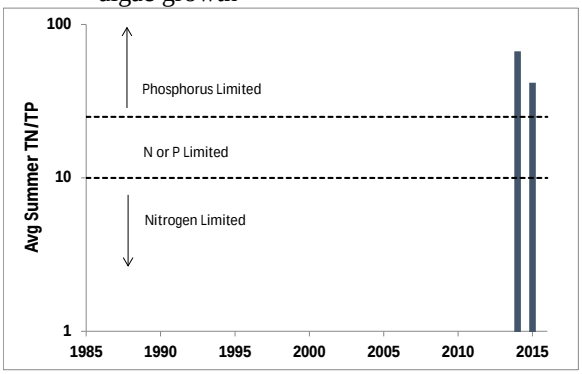
Long Term Trends: Chlorophyll a

- ↓ 1997-15; not clear if trend
- Most readings typical of *mesotrophic* lakes, in range of clarity readings; higher than TP



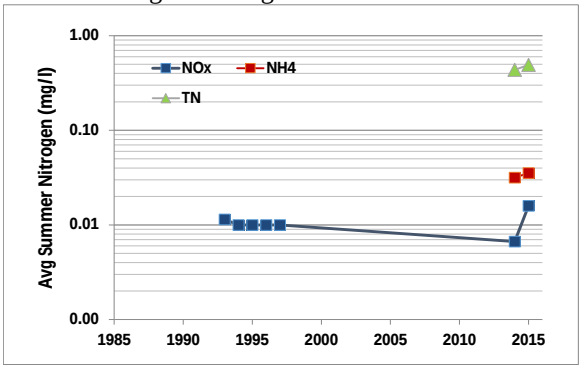
Long Term Trends: N:P Ratio

- Lower readings in 2015
- These readings indicate phosphorus limits algae growth



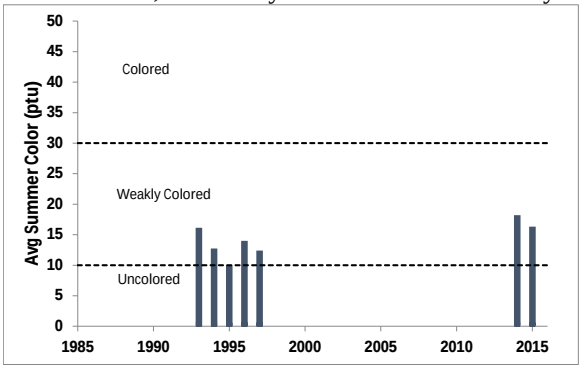
Long Term Trends: Nitrogen

- No clear trends for any N indicators
- Generally low NOx, ammonia, and total nitrogen readings



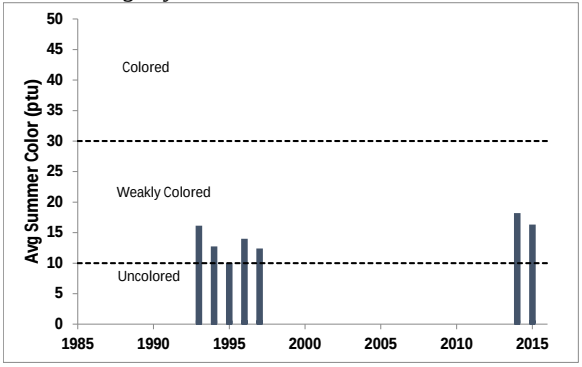
Long Term Trends: Color

- Most lakes w/ ↑color since '02 lab change
- Most readings typical of *weakly colored* lakes, with likely no effect on water clarity



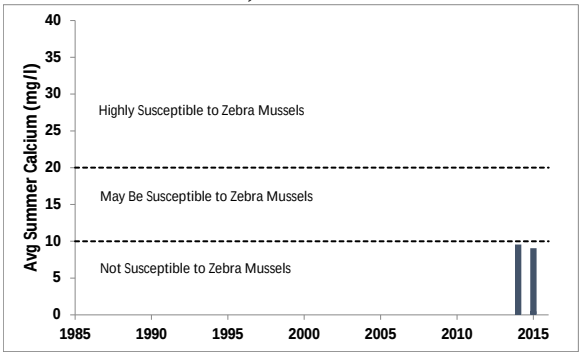
Long Term Trends: pH

- 2014-15 slightly higher than 1997-01 data
- Most readings typical of *circumneutral* to *slightly alkaline* lakes



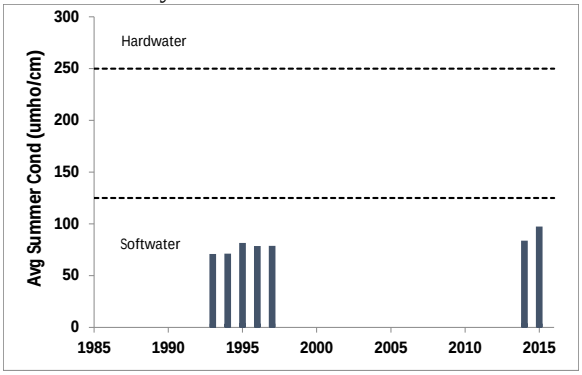
Long Term Trends: Calcium

- 2014 and 2015 data similar
- Most readings indicate low susceptibility to zebra mussels, which aren't found in lake



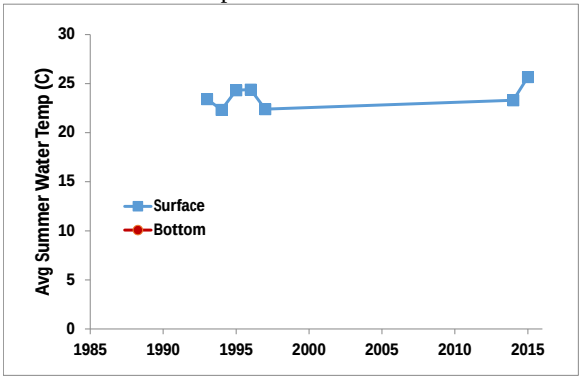
Long Term Trends: Conductivity

- 2014 data slightly higher than 1997-01 data
- Most readings typical of lakes with *soft water* in all years



Long Term Trends: Water Temperature

- 2014-15 data similar to 1997-01 data
- No deepwater data, but likely that surface and bottom temperatures are similar



Appendix D:
Algae Testing Results from SUNY ESF Study

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

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

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

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

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

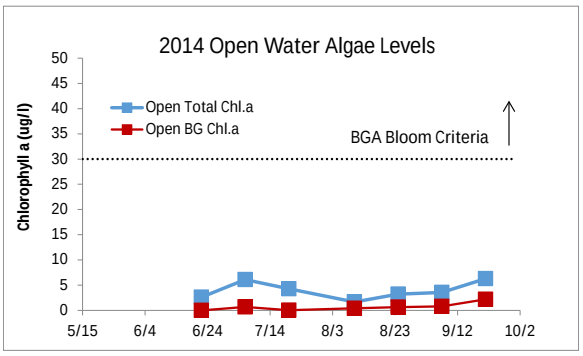


Figure D1:
2014 Open Water Total and BGA Chl.a

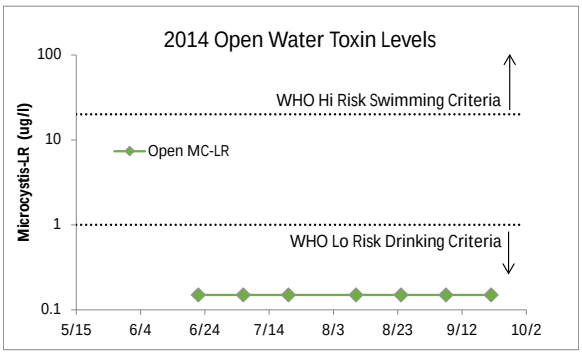


Figure D2:
2014 Open Water Microcystin-LR

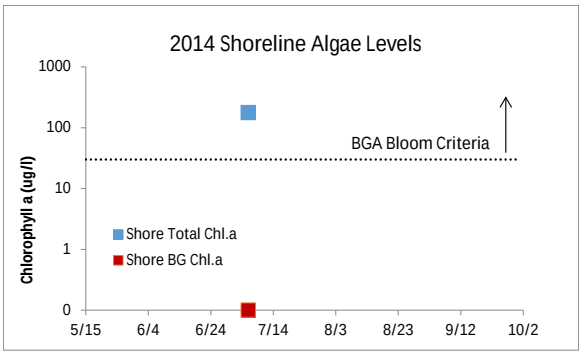


Figure D3:
2014 Shoreline Total and BGA Chl.a

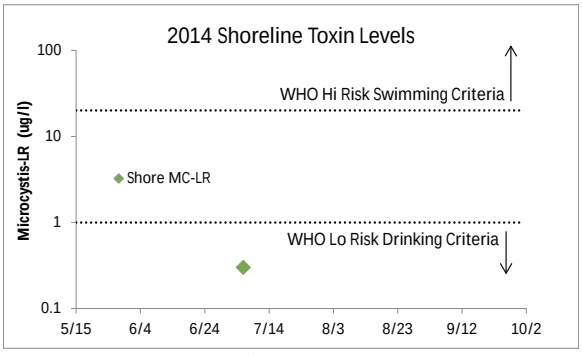


Figure D4:
2014 Shoreline Microcystin-LR

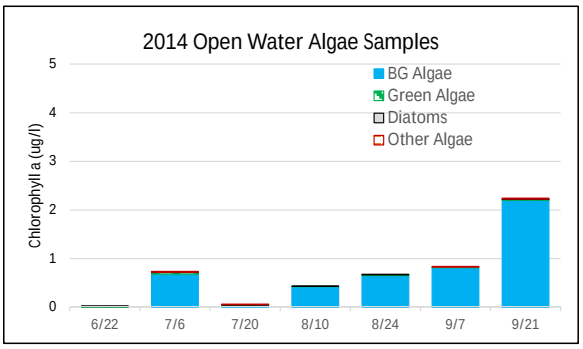


Figure D5:
2014 Open Water Algae Types

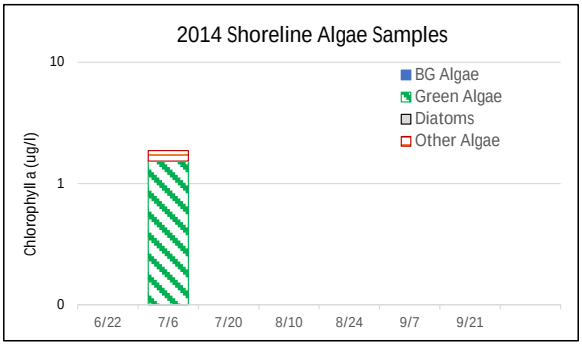


Figure D6:
2014 Shoreline Algae Types

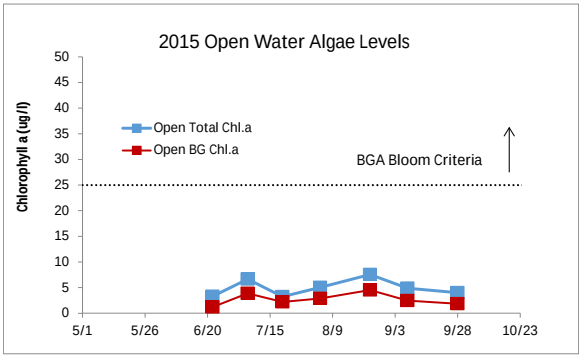


Figure D7:
2015 Open Water Total and BGA Chl.a

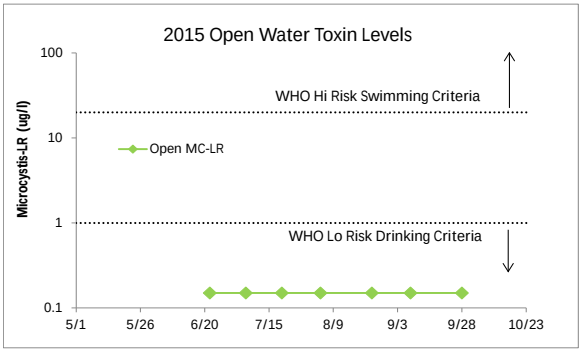


Figure D8:
2015 Open Water Microcystin-LR

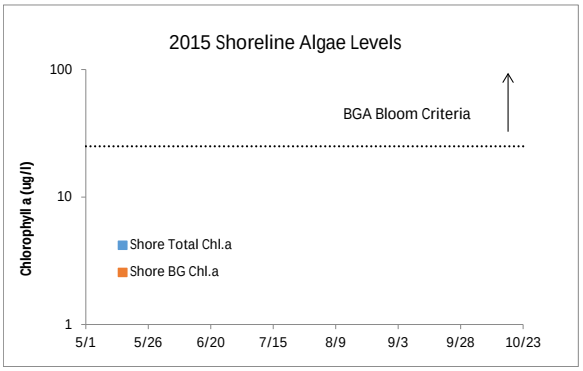


Figure D9:
2015 Shoreline Total and BGA Chl.a

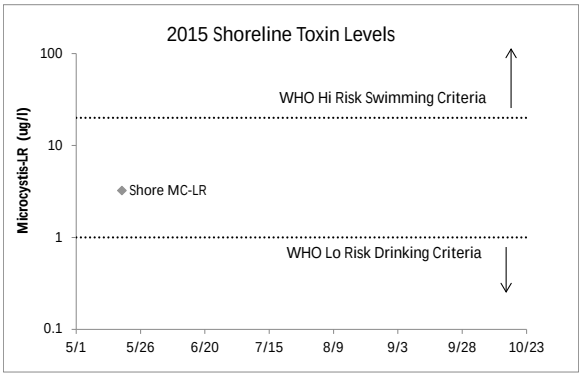


Figure D10:
2015 Shoreline Microcystin-LR

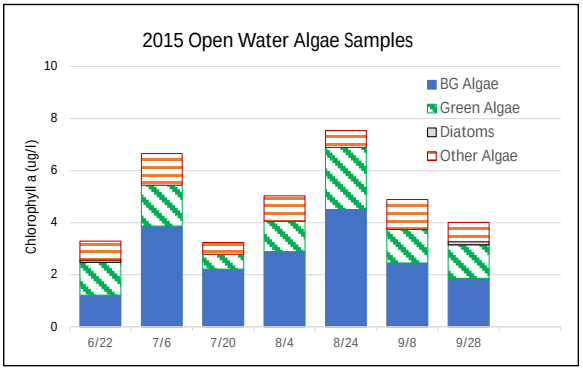


Figure D11:
2015 Open Water Algae Types

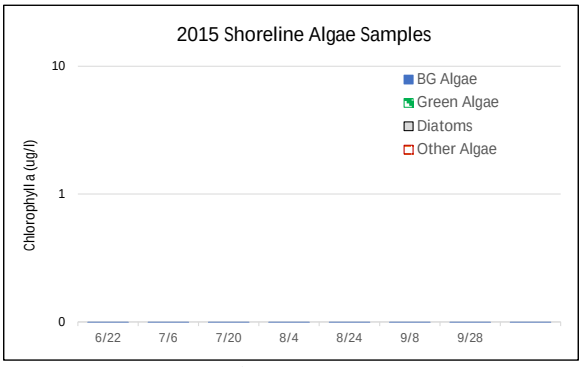


Figure D12:
2015 Shoreline Algae Types

Appendix E:
AIS Species in Oswego County

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

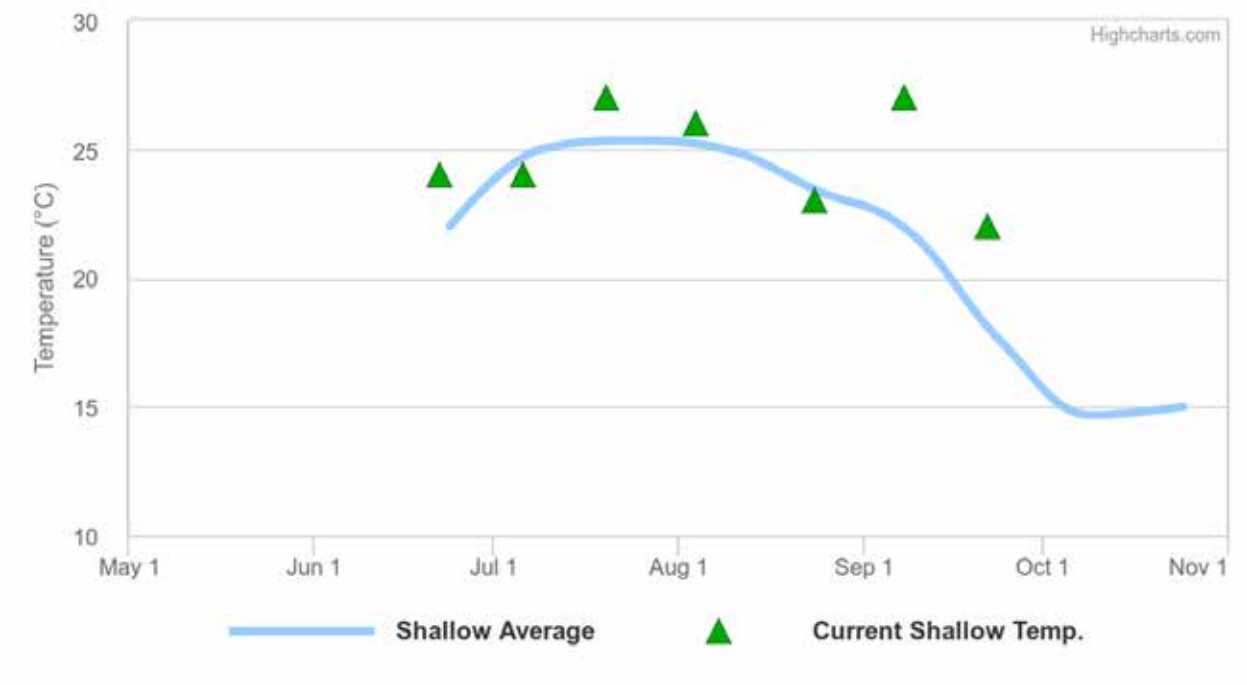
This list is not complete, but instead represents only those species that have been reported and verified within the county. If any additional aquatic invasive species (AIS) are known or suspected in these or other waterbodies in the county, this information should be reported through iMap invasives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

Aquatic Invasive Species – Oswego County			
Waterbody	**Kingdom**	**Common name**	**Scientific name**
Castor Pond	Plant	Eurasian watermilfoil	*Myriophyllum spicatum*
Castor Pond	**Plant**	**Brittle naiad**	***Najas minor***
Kasoag Lake	Plant	Eurasian watermilfoil	*Myriophyllum spicatum*
Kasoag Lake	Plant	Fanwort	*Cabomba caroliniana*
Lake Neatahwanta	Plant	Eurasian watermilfoil	*Myriophyllum spicatum*
Lake Neatahwanta	Plant	Water chestnut	*Trapa natans*
Lake Ontario	Animal	Common carp	*Cyprinus carpio*
Lake Ontario	Animal	Quagga mussel	*Dreissena bugensis*
Lake Ontario	Animal	Zebra mussel	*Dreissena polymorpha*
Lake Ontario	Animal	Round goby	*Neogobius melanostomus*
Lake Ontario	**Animal**	**Mud bithynia snail**	***Bithynia tentaculata***
Lake Ontario	**Animal**	**Bloody-red shrimp**	***Hemimysis anomala***
Lorton Lake	Plant	Variable watermilfoil	*Myriophyllum heterophyllum*
Lorton Lake	Plant	Brittle naiad	*Najas minor*
Mexico Pond	Plant	Fanwort	*Cabomba caroliniana*
North Sandy Pond	Plant	European frogbit	*Hydrocharis morsus-ranae*
North Sandy Pond	Plant	Variable watermilfoil	*Myriophyllum heterophyllum*
North Sandy Pond	Plant	Eurasian watermilfoil	*Myriophyllum spicatum*
North Sandy Pond	Animal	Round goby	*Neogobius melanostomus*
North Sandy Pond	Animal	Zebra mussel	*Dreissena polymorpha*
North Sandy Pond	**Plant**	**European frogbit**	***Hydrocharis morsus-ranae***
Oneida Lake	Animal	Mud bithynia	*Bithynia tentaculata*
Oneida Lake	Animal	Chinese mystery snail	*Cipangopaludina chinensis*
Oneida Lake	Animal	Common carp	*Cyprinus carpio*
Oneida Lake	Animal	Quagga mussel	*Dreissena bugensis*
Oneida Lake	Animal	Zebra mussel	*Dreissena polymorpha*
Oneida Lake	Plant	European frogbit	*Hydrocharis morsus-ranae*

Waterbody	Kingdom	Common name	Scientific name
Oneida Lake	Plant	Eurasian watermilfoil	*Myriophyllum spicatum*
Oneida Lake	Plant	Starry stonewort	*Nitellopsis obtusa*
Oneida Lake	Plant	Curly leafed pondweed	*Potamogeton crispus*
Oneida Lake	Plant	Water chestnut	*Trapa natans*
Oneida Lake	Animal	European stream valvata	*Valvata piscinalis*
Oneida River	Plant	Water chestnut	*Trapa natans*
Oswego River	Animal	Zebra mussel	*Dreissena polymorpha*
Oswego River	Plant	Water chestnut	*Trapa natans*
Paddy's Pond	Plant	Eurasian watermilfoil	*Myriophyllum spicatum*
Panther Lake	Plant	Eurasian watermilfoil	*Myriophyllum spicatum*
Pennellville Pond	Plant	Curly leafed pondweed	*Potamogeton crispus*
Pleasant Lake	Plant	Eurasian watermilfoil	*Myriophyllum spicatum*
Pleasant Lake	Plant	Water chestnut	*Trapa natans*
Port Ontario, Lake Ontario	Plant	European frogbit	*Hydrocharis morsus-ranae*
Sage Creek	Plant	Eurasian watermilfoil	*Myriophyllum spicatum*
Salmon River Reservoir	**Plant**	**Eurasian watermilfoil**	***Myriophyllum spicatum***
Salmon River Reservoir	**Plant**	**Variable watermilfoil**	***Myriophyllum heterophyllum***
Seneca River	Plant	Water chestnut	*Trapa natans*
South Pond	Plant	Variable watermilfoil	*Myriophyllum heterophyllum*
South Pond	Plant	Eurasian watermilfoil	*Myriophyllum spicatum*
South Pond	Animal	Round goby	*Neogobius melanostomus*
South Sandy Pond	Plant	Variable watermilfoil	*Myriophyllum heterophyllum*
South Sandy Pond	Plant	Eurasian watermilfoil	*Myriophyllum spicatum*

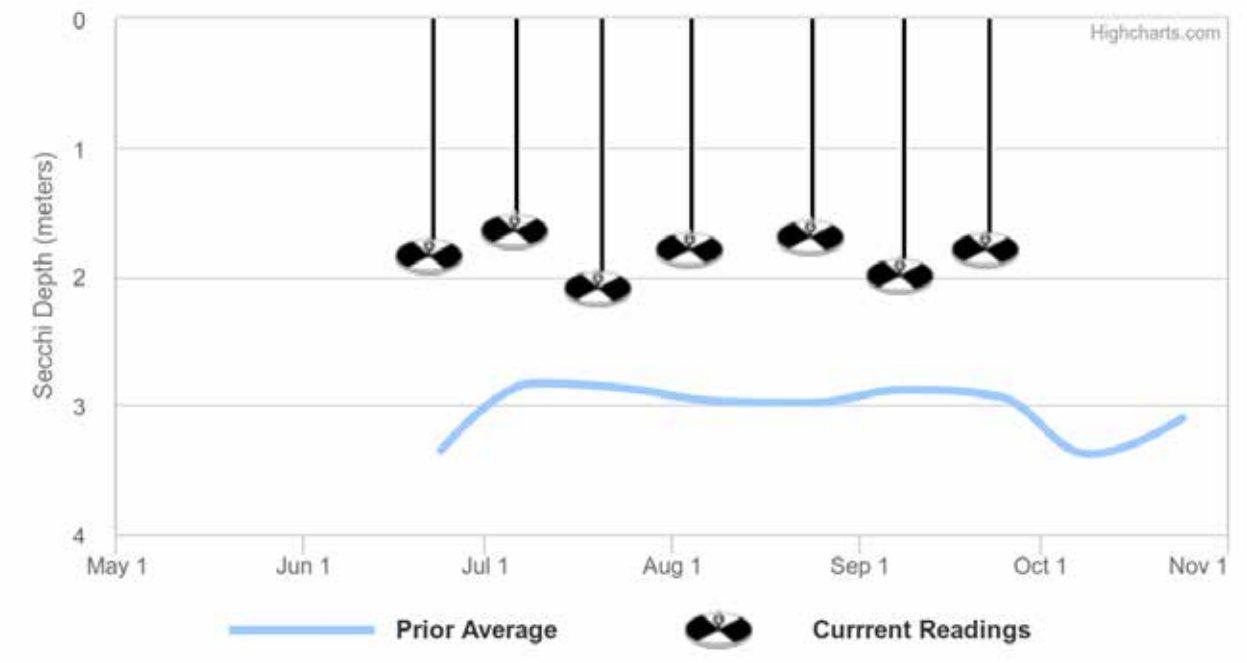
Appendix F: Current Year vs. Prior Averages for Panther Lake

Current Year Water Temperatures vs. Prior Average



This year's shallow water sample temperatures are tending to be higher than normal when compared to the average of readings collected from 1993 to 2014.

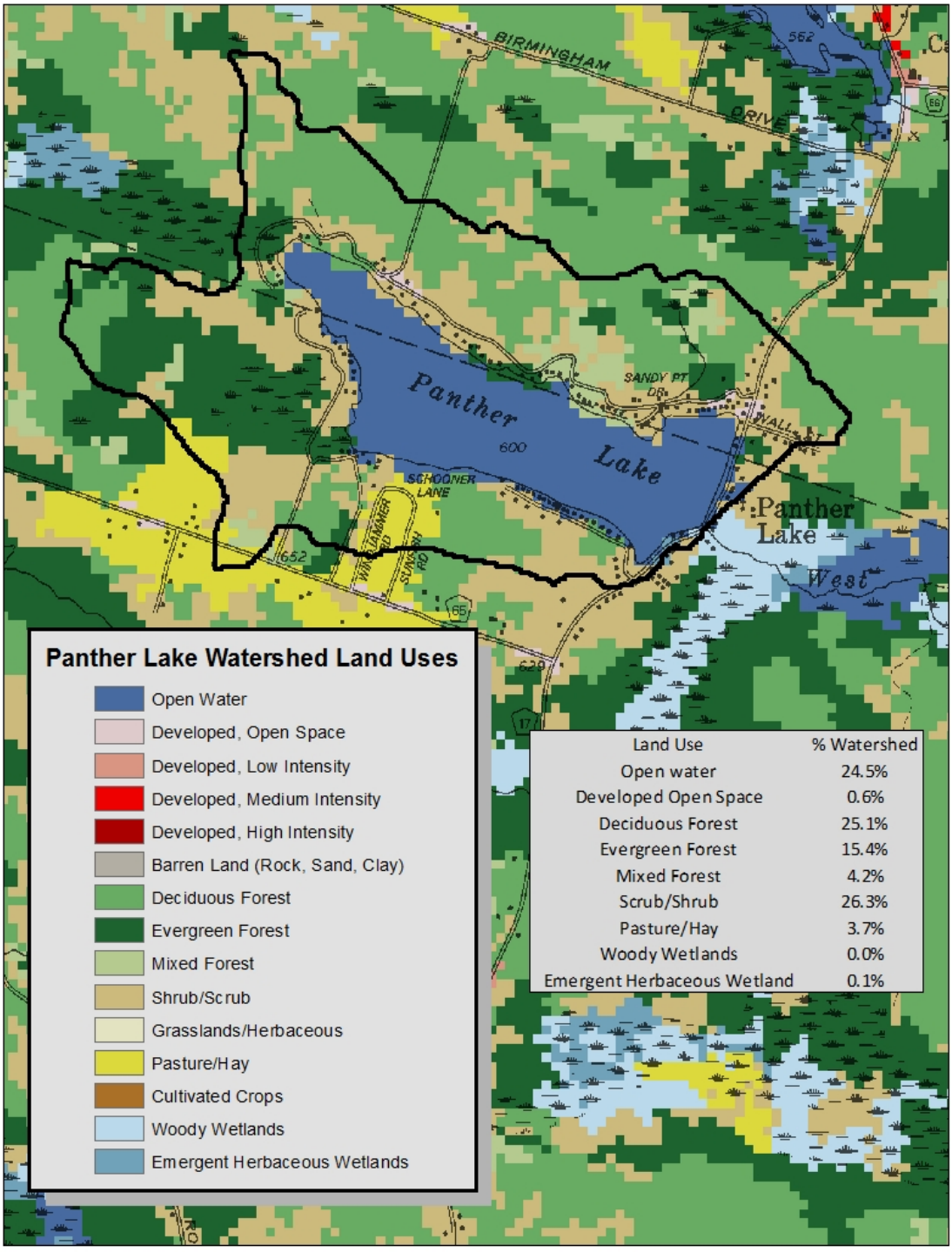
Current Year Secchi Readings vs. Prior Average



This year's session Secchi readings are tending to be lower than normal when compared to the average of readings collected from 1993 to 2014

Appendix G: Watershed and Land Use Map for Panther 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	24.5%
Developed Open Space	0.6%
Deciduous Forest	25.1%
Evergreen Forest	15.4%
Mixed Forest	4.2%
Scrub/Shrub	26.3%
Pasture/Hay	3.7%
Woody Wetlands	0.0%
Emergent Herbaceous Wetland	0.1%