Horseshoe Pond Questions and Answers, 2014 CSLAP

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

A1. The condition of Horseshoe Pond was slightly less favorable than normal in 2014, due to lower water clarity and higher nutrient and algae levels. More extensive weed growth and less favorable water quality assessments were also reported.

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

A2. The HABs testing includes information about the types of algae found in the water samples. These results showed a mix of algae species in all open water samples and the lack of any shoreline blooms in recent years.

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

A3. Horseshoe Pond had slightly lower water clarity, and slightly higher nutrient levels and algae levels, than other nearby lakes. Aquatic plant coverage is higher than in many of these other lakes.

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

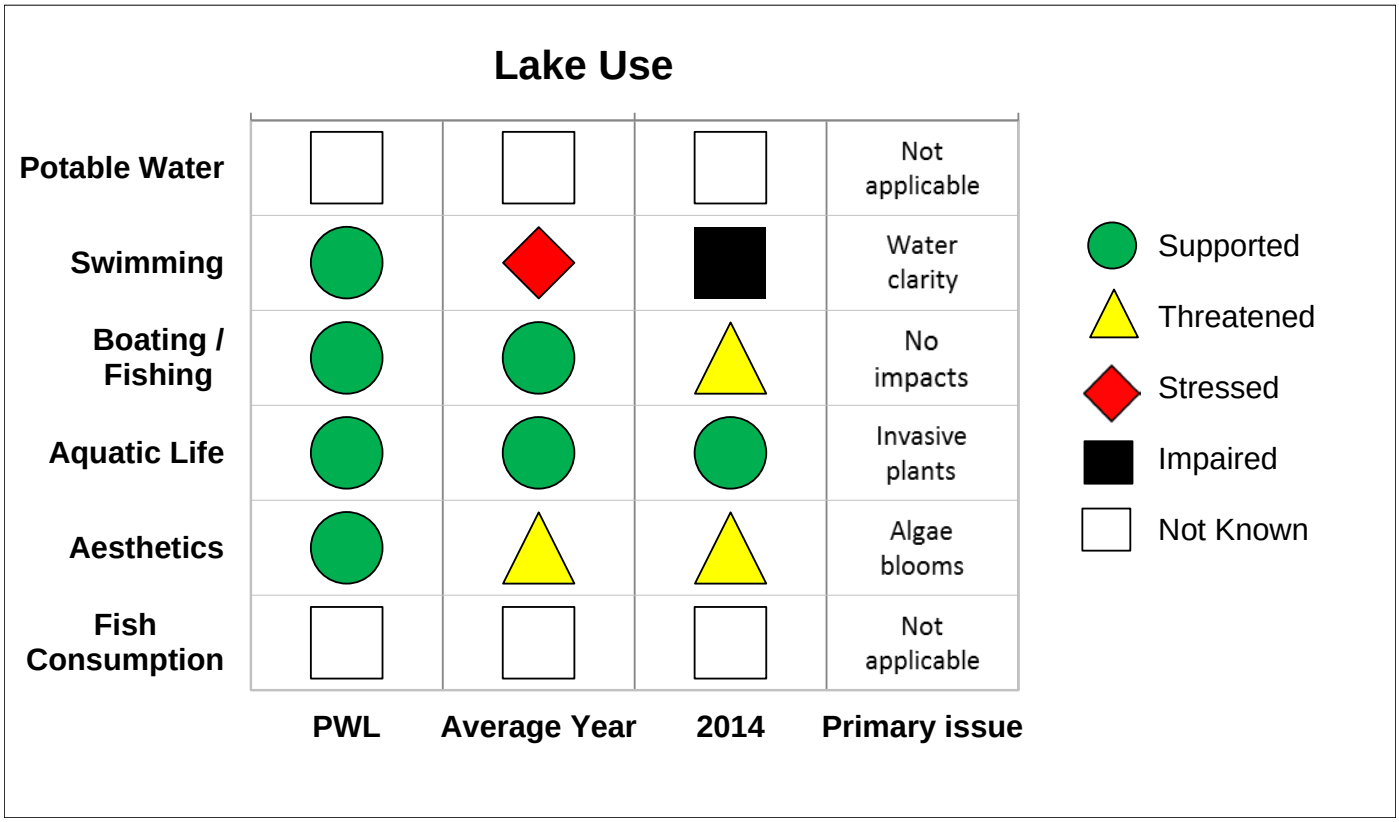
A4. pH readings have been higher since the early 2000s, and water quality and recreational assessments have been less favorable than normal (with more extensive weed growth) over much of the last decade.

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

A5. Water quality conditions indicate a fairly low susceptibility to blooms, but the risk for extensive invasive weed growth may be high.

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

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

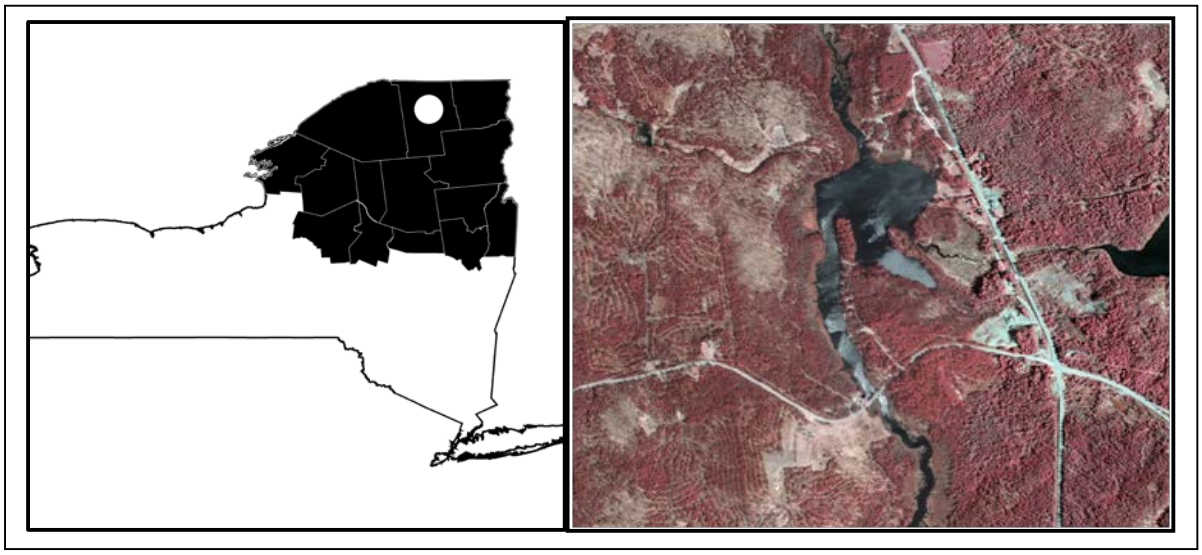


CSLAP 2014 Lake Water Quality Summary:
Horseshoe Pond/Deer River Flow

General Lake Information

Location	Town of Duane
County	Franklin
Basin	St. Lawrence River
Size	20.7 hectares (51.1 acres)
Lake Origins	Augmented by Dam
Watershed Area	588 hectares (1,453 acres)
Retention Time	0.08 years
Mean Depth	1.3 meters
Sounding Depth	2.8 meters
Public Access?	Boat launch at Cold Brook Road; informal launch near bridge
Major Tributaries	Rattle Brook; outlet from Eagle Pond
Lake Tributary To…	Deer River to St. Regis River to St. Lawrence River
WQ Classification	C (non-contact recreation = boating, angling)
Lake Outlet Latitude	44.663
Lake Outlet Longitude	-74.291
Sampling Years	2000-2010, 2012-2014
2014 Samplers	Robert, Nancy, Robert Jr and Francis Mayville
Main Contact	Robert Mayville

Lake Map



Background

Horseshoe Pond is a 51 acre, class C lake found in the Town of Duane in Franklin County, in the northeastern Adirondack region of New York State. It was sampled as part of CSLAP for the first time in 2000.

It is one of 16 CSLAP lakes among the more than 220 lakes found in Franklin County, and one of 29 CSLAP lakes among the more than 180 lakes and ponds in the St. Lawrence River drainage basin.

Lake Uses

Horseshoe Pond is a Class C lake; this means that the best intended use for the lake is non-contact recreation—boating and aesthetics—and support of aquatic life. However, it is likely that the lake also supports contact recreation—swimming and bathing. The lake is used by lake residents for boating and other recreation via shoreline properties and through the cited public access points. Some lake residents also use the lake for swimming and bathing.

About 4,400 four to five inch brook trout and 1,000 nine inch rainbow trout are stocked annually in Horseshoe Pond by New York State. It is not known by the report authors if private stocking also occurs. Fish species identified through the ALSC study include brown bullhead, common shiner, golden shiner, northern pike, pumpkinseed sunfish, rock bass, white sucker and yellow perch. The fish netting conducted in this study found brown bullhead to be the most abundant fish.

General statewide fishing regulations are applicable in Horseshoe Pond. In addition, open season on black bass runs from the 3rd Saturday in June through November 30th, with a size limit of 12 inches and a daily take limit of five fish. Open season on trout lasts from April 1st to October 15th, with no minimum size but a daily take limit of five fish and no more than five brook trout under eight inches in length. The open season on sunfish and yellow perch lasts all year, with no take or size limits.

Statewide fish consumption advisories apply to Horseshoe Pond—no site-specific advisories have been issued for the lake.

Historical Water Quality Data

CSLAP sampling was conducted on Horseshoe Pond from 2000 to 2010 and 2012 to 2014 (with Deer River Flow sampled in 2012). 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 Horseshoe Pond can also be found on the NYSDEC web page at http://www.dec.ny.gov/lands/77850.html.

Horseshoe Pond was sampled as part of the Adirondack Lake Survey Corporation (ALSC) survey of lakes and ponds in the Adirondacks and Catskills (and surrounding areas) in 1985. These data indicate that phosphorus readings were slightly higher than in the present CSLAP studies, although overall water quality conditions appear to be comparable. It is not known if local monitoring has been conducted as a fisheries management tool.

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

Lake Association and Management History

Horseshoe Pond is served by the Horseshoe Pond/Deer River Flow Association. The lake association focuses their efforts on shoreline development, recreational safety, fundraising, and other activities on the lake and within the Deer River flow watershed. The Association was formed in 1983, but became more involved in 2004 when the discovery and subsequent management of Eurasian watermilfoil required APA permitting and significant funds to support an active hand harvesting effort. At this time, the Association was formalized through by-laws, and incorporation as a registered New York State charitable organization. The association ultimately received federal 501(c)(3) approval for tax deferred donations.

The milfoil hand harvesting project was conducted with Paul Smiths College, involving a team of three divers and one on-the-water monitor. A total of fourteen pick-up truck loads of milfoil was collected by the divers in 2007 and transported to the compost bins.

The Horseshoe Pond/Deer River Flow Association maintains a website at http://www.hp-drf.org/.

Summary of 2014 CSLAP Sampling Results

Evaluation of 2014 Annual Results Relative to 2000-2013

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

Evaluation of Eutrophication Indicators

Water clarity readings were lower than normal in 2014, due to higher than normal phosphorus and chlorophyll *a* readings. There has been a slight decrease in water clarity since the mid-2000s, consistent with a slight increase in phosphorus readings over the same period. However, algae levels were close to normal over the same period. The 2012 data indicate that Deer River Flow and Horseshoe Pond trophic conditions are similar.

In a typical summer, phosphorus readings decrease slightly from May through June, resulting in a decrease in algae levels from June through October. However, these seasonal trends were not apparent in 2014; the slight drop in water clarity over the summer in 2014 was coincident with a slight increase in phosphorus readings.

The lake continues to be characterized as *mesoeutrophic*, based on water clarity (typical of *eutrophic* lakes), chlorophyll *a* and total phosphorus readings (both typical of *mesotrophic* lakes). Phosphorus readings were more typical of *eutrophic* lakes in 2014. The trophic state indices (TSI) evaluation suggests that these trophic indicators are "internally" consistent- each

can be predicted from 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 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 potable 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 close to normal in 2014, but pH has increased since the early 2000s. It is not known if these changes have resulted in any ecological impacts. Calcium and conductivity readings were slightly lower than normal, while color readings were slightly higher than normal in 2014, but no long-term changes were apparent. Total nitrogen levels have dropped slightly over the last decade, but they were close to normal in 2014. The similarity of readings from 2012 in Deer River Flow to the typical (Horseshoe Pond) sampling season indicates similar water quality conditions in both waterbodies. Overall limnological conditions are summarized in the Lake Scorecard and Lake Condition Summary Table.

Evaluation of Biological Condition

The ALSC and limited CSLAP macrophyte data indicate a high diversity of aquatic plants, including *Myriophyllum spicatum* (Eurasian watermilfoil), an exotic plant species. The modified floristic quality index (FQI) indicates that the quality of the aquatic plant community is "fair."

The limited information about the fish community in the lake is comprised of a mix of coolwater (at least two species) and warmwater (at least two species) fish, typical of shallow Adirondack lakes.

Phytoplankton, zooplankton and macroinvertebrate surveys have not been conducted through CSLAP at Horseshoe Pond. The fluoroprobe screening samples analyzed by SUNY ESF from the Deer River Flow and the Horseshoe Pond samples indicated low total algae and low blue green algae levels. A shoreline bloom in 2012 from Deer River Flow had slightly higher levels of blue green algae, but no evidence of blooms in the open water or shoreline.

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

Evaluation of Lake Perception

Recreational and water quality assessments have degraded since the mid-2000s, particularly in the last two years. Aquatic plant coverage has increased slightly over the last decade, but was close to normal in 2014. Water quality assessments degrades slightly and aquatic plant coverage increases slightly during the summer, although this does not significantly affect recreational assessments over the same period. These assessments are probably comparable in Deer River Flow and Horseshoe Pond, consistent with similar water quality conditions in both waterbodies.

Overall lake perception is summarized on the Lake Scorecard and Lake Condition Summary Table.

Evaluation of Local Climate Change

Water and air temperature readings in the summer index period were close to normal in 2014, although these temperature readings have not changed significantly since CSLAP sampling began in the lake. It is not known if this is indicative of a lack of local climate change in the lake, or if these changes cannot be evaluated by trends in temperature readings. These readings appear to be comparable in both Deer River Flow and Horseshoe Pond.

Evaluation of Algal Toxins

Algal toxin levels can vary significantly within blooms and from shoreline to lake, and the absence of toxins in a sample does not indicate safe swimming conditions. Phycocyanin readings were below the levels indicating susceptibility for harmful algal blooms (HABs), consistent with the fluoroprobe sampling results from Deer River Flow and Horseshoe Pond indicating low levels of blue green algae in the open water. However, shoreline blooms appear to have higher levels of blue green algae, at least in Deer River Flow in 2012. Microcystin levels in both the open water and shoreline blooms have consistently been near or below detection levels, and thus well below the levels needed to support safe swimming (slightly elevated toxin levels in a 2013 open water sample do not appear to be accurate or representative of conditions in the lake at that time). However, lake residents and their pets are advised to avoid exposure to shoreline blooms.

Lake Condition Summary

Category	Indicator	Min	00-14 Avg	Max	2014 Avg	Classification	2014 Change?	Long-term Change?
Eutrophication Indicators	Water Clarity	0.85	1.50	2.69	1.11	Eutrophic	Lower Than Normal	No Change
	Chlorophyll *a*	0.29	4.26	21.30	5.56	Mesotrophic	Within Normal Range	No Change
	Total Phosphorus	0.009	0.019	0.072	0.026	Mesotrophic	Higher than Normal	No Change
Potable Water Indicators	Hypolimnetic Ammonia							Not known
	Hypolimnetic Arsenic							Not known
	Hypolimnetic Iron							Not known
	Hypolimnetic Manganese							Not known
Limnological Indicators	Hypolimnetic Phosphorus	0.013	0.019	0.025		Close to Surface TP Readings	Higher than Normal	Not known
	Nitrate + Nitrite	0.00	0.03	0.15	0.04	Low NOx	Within Normal Range	No Change
	Ammonia	0.00	0.04	0.12	0.05	Low Ammonia	Higher than Normal	No Change
	Total Nitrogen	0.14	0.46	0.89	0.51	Low Total Nitrogen	Within Normal Range	No Change
	pH	6.22	7.38	9.01	7.37	Circumneutral	Within Normal Range	Increasing Slightly
	Specific Conductance	57	117	206	83	Softwater	Within Normal Range	No Change
	True Color	12	83	289	103	Colored	Within Normal Range	No Change
	Calcium	3.6	8.8	13.9	4.8	Not Susceptible to Zebra Mussels	Lower Than Normal	No Change
Lake Perception	WQ Assessment	1	1.4	3	2.6	Crystal Clear	Less Favorable than Normal	Highly Degrading
	Aquatic Plant Coverage	1	2.9	4	3.3	Surface Plant Growth	Less Favorable than Normal	Slightly Degrading
	Recreational Assessment	1	1.9	4	2.1	Excellent	Within Normal Range	No Change
Biological Condition	Phytoplankton					Open water-low blue green algae biomass; Shoreline-high blue green algae in bloom	Not known	Not known
	Macrophytes					Fair quality of the aquatic plant community	Not known	Not known
	Zooplankton					Not evaluated through CSLAP	Not known	Not known
	Macroinvertebrates					Not evaluated 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	8	22.5	36	23.0		Within Normal Range	No Change
	Water Temperature	9	20.3	30	19.3		Within Normal Range	No Change
Harmful Algal Blooms	Open Water Phycocyanin	0	4	13	3	No readings indicate high risk of BGA	Not known	Not known
	Open Water FP Chl.a	1	2	3	2	No readings indicate high algae levels	Not known	Not known
	Open Water FP BG Chl.a	0	0	1	0	No readings indicate high BGA levels	Not known	Not known
	Open Water Microcystis	0.3	0.5	4.9	<0.30	Mostly undetectable open water MC-LR	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	75	75	75		All readings indicate very high algae levels	Not known	Not known
	Shoreline FP BG Chl.a	34	34	34		All readings indicate very high BGA levels	Not known	Not known
	Shoreline Microcystis	0.6	0.8	1.0		Mostly undetectable shoreline bloom MC-LR	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

The 2008 NYSDEC Priority Waterbody Listings (PWL) for the St. Lawrence River drainage basin indicate that *no use impairments* occur in Horseshoe Pond. The PWL listing for Horseshoe Pond is shown in Appendix B.

Potable Water (Drinking Water)

The CSLAP dataset at Horseshoe Pond, including water chemistry data, physical measurements, and volunteer samplers' perception data, is inadequate to evaluate the use of the lake for potable water, and the lake is not used for this purpose. Any unofficial use of the lake for potable water might be impacted by shoreline blooms.

Contact Recreation (Swimming)

The CSLAP dataset at Horseshoe Pond, including water chemistry data, physical measurements, and volunteer samplers' perception data, suggests that swimming and contact recreation should be fully supported, although this use could eventually be *impaired* by poor water clarity (unsafe for swimmers), and *threatened* by excessive weeds, and occasional shoreline blooms. Additional information about bacterial levels is needed to evaluate the safety of the water for swimming.

Non-Contact Recreation (Boating and Fishing)

The CSLAP dataset on Horseshoe Pond, including water chemistry data, physical measurements, and volunteer samplers' perception data, suggest that non-contact recreation appears to be supported, although this use may be *threatened* in some years by excessive weeds, particularly Eurasian watermilfoil.

Aquatic Life

The CSLAP dataset on Horseshoe Pond, including water chemistry data, physical measurements, and volunteer samplers' perception data, suggest that aquatic life should be fully supported, although additional data are needed to evaluate the food and habitat conditions for aquatic organisms in the lake.

Aesthetics

The CSLAP dataset on Horseshoe Pond, including water chemistry data, physical measurements, and volunteer samplers' perception data, suggest that aesthetics may be *threatened* by shoreline algae blooms.

Fish Consumption

There are no fish consumption advisories posted for Horseshoe Pond.

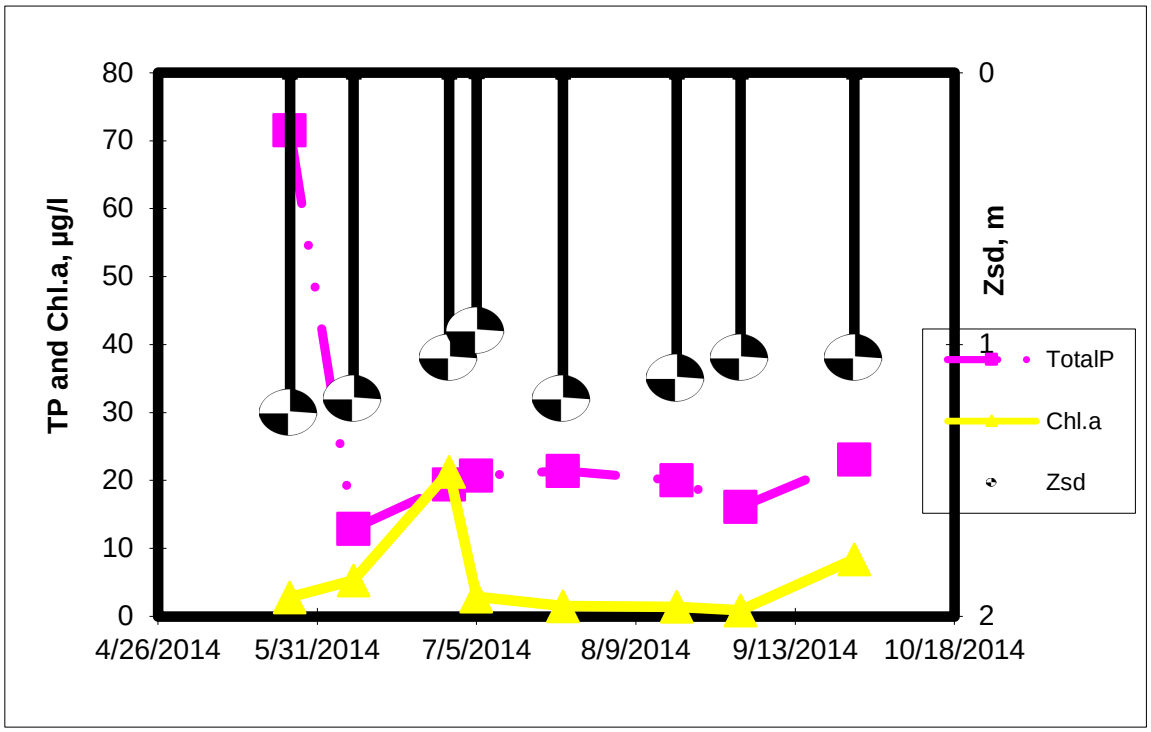
Additional Comments and Recommendations

Additional plant survey data should be collected to determine the extent to which invasive exotic species have impacted recreational uses of the lake. Lake residents are advised to report any occurrences of shoreline algae blooms, and to avoid exposure to surface scums or heavily discolored water.

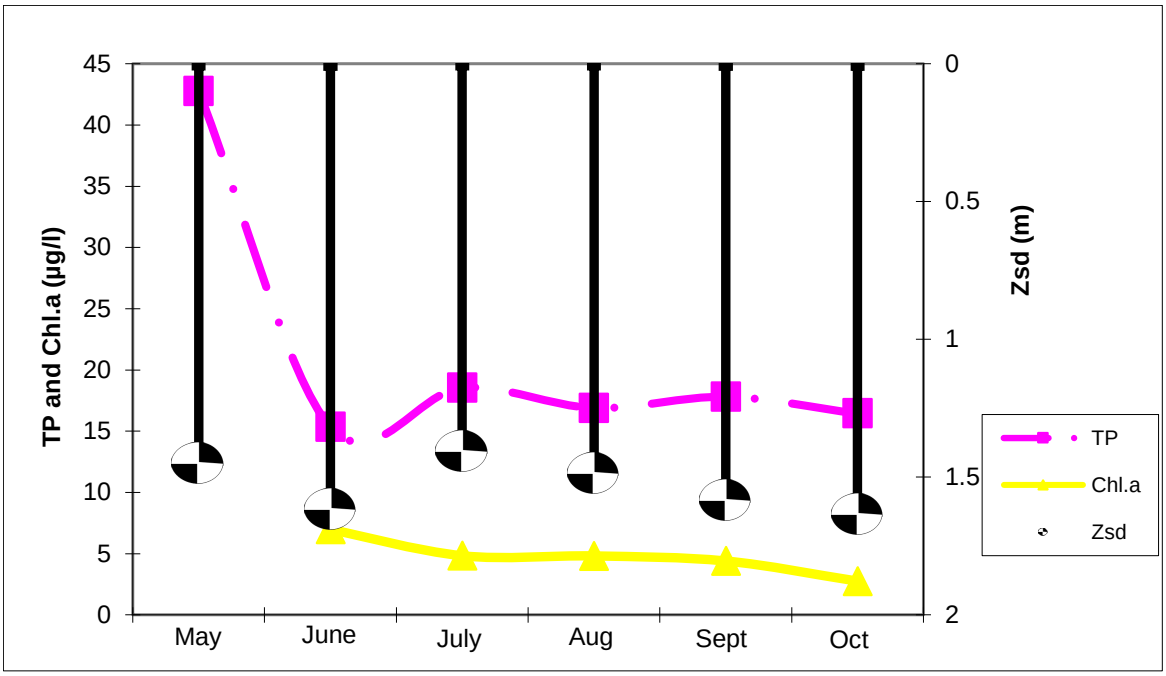
Aquatic Plant IDs-2014

None submitted for identification in 2014.

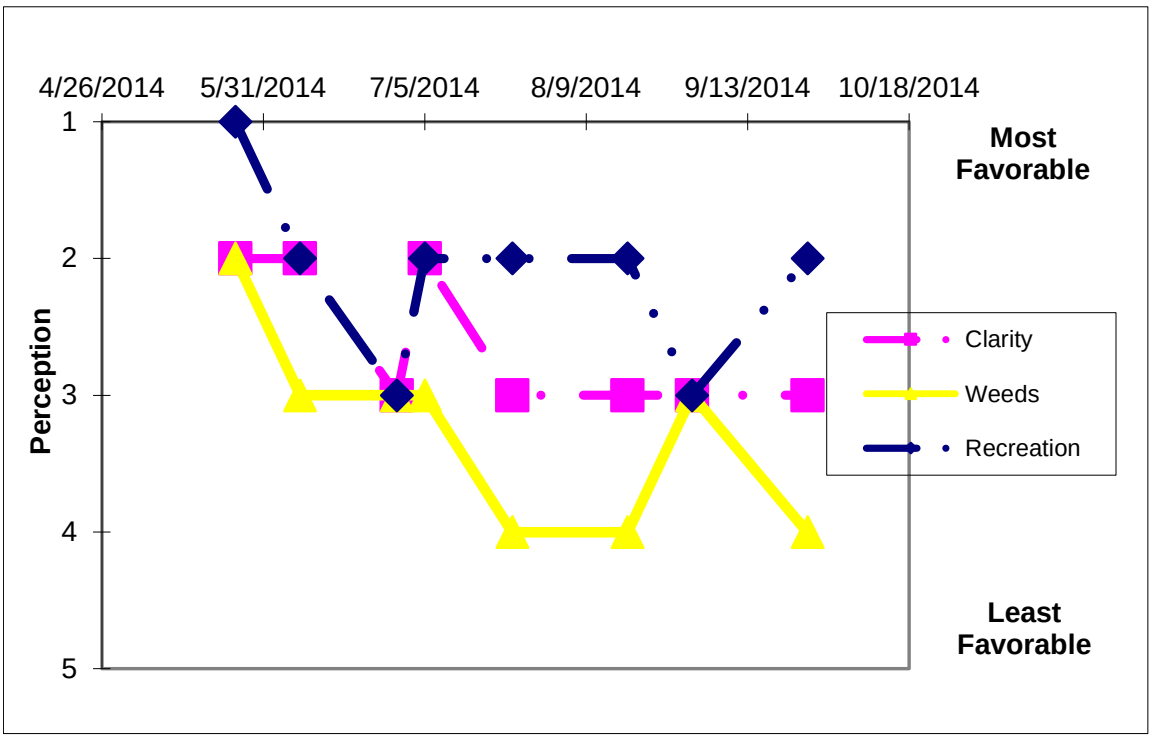
Time Series: Trophic Indicators, 2014



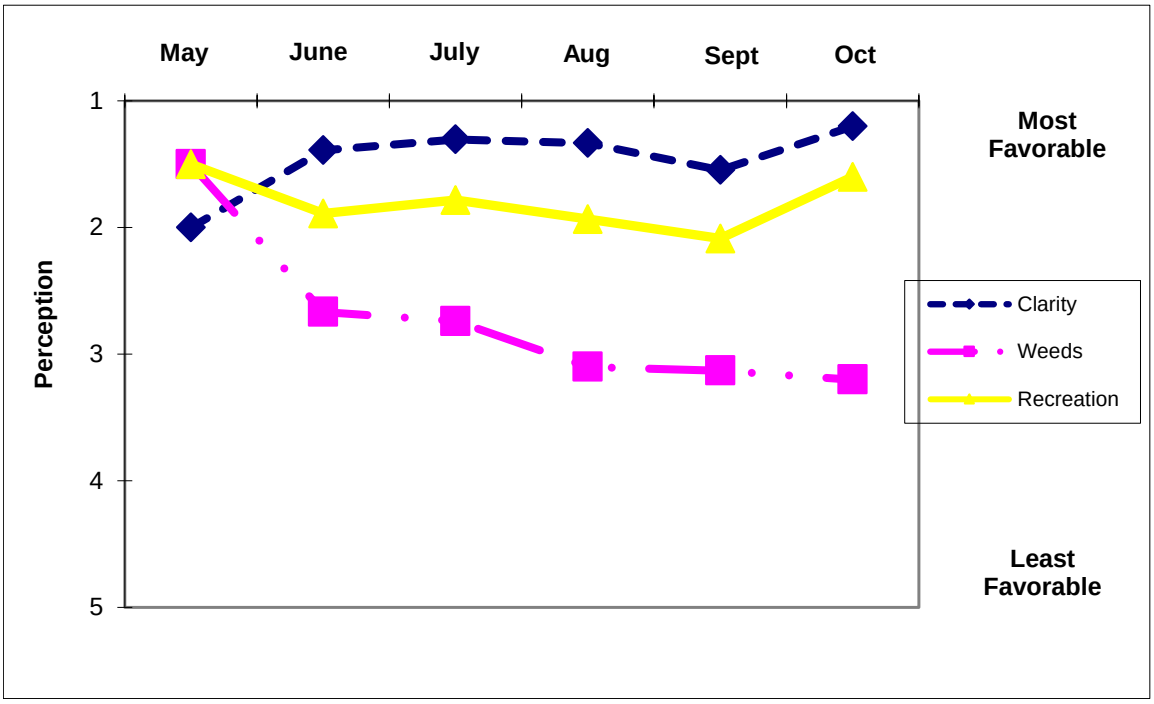
Time Series: Trophic Indicators, Typical Year (2000-2014)



Time Series: Lake Perception Indicators, 2014



Time Series: Lake Perception Indicators, Typical Year (2000-2014)



Appendix A- CSLAP Water Quality Sampling Results for Horseshoe Pond

LNum	PName	Date	Zbot	Zsd	Zsamp	Tot.P	NO3	NH4	TDN	TN/TP	TColor	pH	Cond25	Ca	Chl.a
170	Horseshoe P	5/28/2000	3.5	1.65	1.5	0.014	0.06				80	7.09	57		3.09
170	Horseshoe P	6/11/2000	3.3	2.30	1.5	0.016	0.06				86	6.93	64		3.00
170	Horseshoe P	6/24/2000	3.1	1.40	1.5	0.015	0.06				90	8.10	68		4.18
170	Horseshoe P	7/16/2000	3.7	1.15	1.5	0.020	0.06				12	6.86	68		4.24
170	Horseshoe P	7/30/2000	3.7	1.33	1.5	0.015	0.03				98	7.40	70		4.13
170	Horseshoe P	8/13/2000	3.7	1.69	1.5	0.011	0.04				96	6.66	76		2.08
170	Horseshoe P	9/3/2000	3.7	1.40	1.5	0.045	0.01				80	7.47	82		5.10
170	Horseshoe P	9/17/2000	3.5	1.65	1.5	0.020	0.02				80	7.64	82		2.30
170	Horseshoe P	6/3/2001	3.3	1.90	1.5	0.011	0.06				80	7.59	67		3.13
170	Horseshoe P	6/17/2001	3.5	1.45	1.5	0.016	0.01				100	7.71	66		1.92
170	Horseshoe P	7/1/2001	3.1	1.35	1.5	0.019	0.04				90	6.77	71		2.76
170	Horseshoe P	7/15/2001	3.7	1.55	1.5	0.017	0.05				90	6.93	76		3.66
170	Horseshoe P	8/5/2001	3.1	1.40	1.5	0.020	0.01				90	7.31	83		2.58
170	Horseshoe P	8/19/2001	3.3	1.73	1.5	0.026	0.01				80	7.54	88		1.82
170	Horseshoe P	9/3/2001	3.0	1.48	1.5	0.019	0.03				100	6.52	75		0.30
170	Horseshoe P	9/17/2001		1.28	1.5	0.022	0.04				160	7.39	77		0.29
170	Horseshoe P	06/15/02	3.6	1.10	1.5	0.018	0.14	0.06	0.89	109.00	118	6.82	59		1.92
170	Horseshoe P	7/1/2002	3.0	1.25	1.5	0.023	0.02	0.09	0.48	45.78	135	6.83	65		1.20
170	Horseshoe P	7/17/2002	3.5	1.15	1.5	0.020	0.05	0.07	0.74	82.44	111	7.04	77		1.35
170	Horseshoe P	7/30/2002	3.3	1.25	1.5	0.013	0.05	0.02	0.48	82.40	117	7.07	81		1.39
170	Horseshoe P	8/26/2002	3.2	1.35	1.5	0.016	0.06	0.11	0.44	60.73	71	7.34	94	3.9	1.13
170	Horseshoe P	9/8/2002	3.2	1.75	1.5	0.017	0.00	0.01	0.40	53.13	45	7.49	100		1.20
170	Horseshoe P	10/6/2002	3.2	1.25	1.5	0.019	0.02	0.05	0.57	66.49	87	6.97	87		1.05
170	Horseshoe P	6/14/2003	3.3	1.40	1.5		0.01	0.03	0.33		96	6.90	75	5.3	1.09
170	Horseshoe P	6/29/2003	3.0	1.35	1.5	0.020	0.02	0.02	0.34	37.93	101	7.09	81		4.38
170	Horseshoe P	7/19/2003	3.3	1.65	1.5	0.020	0.00	0.02	0.28	31.24	48	6.88	91		1.79
170	Horseshoe P	8/2/2003	3.3	1.60	1.5	0.021	0.01	0.00	0.14	14.87	82	7.04	92		3.10
170	Horseshoe P	8/16/2003	3.4	1.20	1.5	0.020	0.00	0.02	0.41	44.25	123	6.76	89	7.9	2.29
170	Horseshoe P	8/30/2003	3.3	1.10	1.5	0.018	0.01	0.00	0.32	39.38	115	7.08	93		1.59
170	Horseshoe P	9/6/2003	3.0	1.50	1.5	0.019	0.02	0.03	0.61	70.44	110	7.11	98		1.94
170	Horseshoe P	10/5/2003	3.3	1.45	1.5	0.022	0.02	0.02	0.44	43.25	87	7.23	89		1.76
170	Horseshoe P	6/26/2004		1.85	0.3	0.016	0.02	0.03	0.26	34.36	72	6.60	162	10.8	5.16
170	Horseshoe P	7/10/2004	2.7	1.55	0.4	0.012	0.01	0.02			48	6.59	163		4.00
170	Horseshoe P	7/24/2004	2.5	1.60	0.3	0.018	0.02	0.01	0.50	62.18	84	7.45	159		1.44
170	Horseshoe P	8/7/2004	2.5	1.18	0.3	0.010	0.01	0.02	0.26	55.26	188	7.50	107		3.10
170	Horseshoe P	8/22/2004	2.4	1.63		0.013	0.03	0.02	0.53	91.78	102	7.40	176	9.1	7.50
170	Horseshoe P	9/4/2004	2.6	1.25	0.2	0.015	0.03	0.02	0.50	73.17	289	8.11	103		1.30
170	Horseshoe P	9/20/2004	2.6	1.59	0.1	0.014	0.03	0.02			81	7.18	126		2.20
170	Horseshoe P	10/2/2004	2.2	1.43	1.2	0.016	0.07	0.05	0.36	50.72	49	7.30	142		
170	Horseshoe P	6/5/2005	2.6	2.69	1.0	0.015	0.03	0.02	0.20	29.57	48	7.15	143	9.4	13.00
170	Horseshoe P	6/26/2005	2.7	1.28	1.0	0.009	0.01	0.02	0.27	70.12	122	7.32	123		7.88
170	Horseshoe P	7/10/2005	2.6	1.38	1.0	0.021	0.05	0.06	0.24	25.25	56	7.14	141		9.23
170	Horseshoe P	7/24/2005	2.6	1.33	1.0	0.016	0.01	0.05	0.47	65.39	66	7.22	153		4.37
170	Horseshoe P	8/7/2005	2.7	1.38	1.0	0.014	0.02	0.02	0.30	46.35	95	7.39	149	10.0	5.63
170	Horseshoe P	8/23/2005	2.6	1.68	1.0	0.026	0.01	0.04	0.17	14.82	63	7.73	129		3.53
170	Horseshoe P	9/15/2005	2.7	1.53	1.0	0.019	0.01	0.02	0.20	22.51	74	7.08	134		3.39
170	Horseshoe P	9/18/2005	2.9	1.18	1.0	0.017	0.02	0.04	0.17	22.70	77	6.95	135		3.67
170	Horseshoe P	7/3/2006	3.5	1.23	1.5	0.019	0.05	0.03	0.72	84.54	77	7.56	93	6.4	1.70
170	Horseshoe P	7/20/2006	2.8	1.40	1.5	0.020	0.04	0.02	0.65	72.76	128	7.26	89		2.87
170	Horseshoe P	8/3/2006	3.7	1.33	1.5	0.017	0.05	0.02	0.65	82.41	130	8.39	63		2.49
170	Horseshoe P	8/7/2006	3.2	0.95	1.5	0.021	0.03	0.04	0.78	84.01	120	7.45	67		1.14
170	Horseshoe P	8/14/2006	3.3	0.85	1.5	0.019	0.03	0.03	0.72	83.88	156	6.93	88	6.8	0.91
170	Horseshoe P	9/2/2006	3.0	1.20	1.5	0.017					111	7.85	96		2.55
170	Horseshoe P	9/17/2006	2.9	1.70	1.5	0.013			0.51	87.57	91	7.46	86		1.12
170	Horseshoe P	6/26/2007	2.7	1.90	1.0	0.024	0.02	0.02	0.40	36.60	32	7.85	165	11.6	4.62
170	Horseshoe P	7/27/2007	2.5	1.60	1.5	0.019	0.02	0.09	0.77	90.54	61	7.13	151		1.60
170	Horseshoe P	8/9/2007	2.4	1.88	1.5	0.016	0.00	0.05	0.70	93.58	52	8.04	165		4.97
170	Horseshoe P	8/22/2007		2.30	1.5	0.013	0.01	0.04	0.59	100.16	35	7.56	170		0.92
170	Horseshoe P	9/3/2007	2.3	2.10	1.5	0.013	0.01	0.03	0.60	98.86	30	7.29	179	13.9	2.12
170	Horseshoe P	9/23/2007	2.7	2.35	1.5	0.012	0.15	0.06	0.77	144.42	24	7.45	178		3.98
170	Horseshoe P	7/6/2008	2.8	1.70	1.0	0.025	0.03	0.05	0.69	59.71	51	7.49	135	10.0	7.05
170	Horseshoe P	8/2/2008				0.018	0.06	0.02	0.35	43.58	81	7.37	159		10.64
170	Horseshoe P	8/11/2008	2.6	1.30	2.6	0.017	0.08	0.06	0.47	59.68	74	7.45	132		

LNum	PName	Date	Zbot	Zsd	Zsamp	Tot.P	NO3	NH4	TDN	TN/TP	TColor	pH	Cond25	Ca	Chl.a
170	Horseshoe P	8/17/2008	2.4	1.30	1.0	0.013	0.06	0.02	0.38	62.60	79	7.47	168		8.00
170	Horseshoe P	8/24/2008	2.7	1.40	1.0	0.020	0.03	0.01	0.44	50.18	62	7.62	165	7.9	7.24
170	Horseshoe P	8/31/2008	2.5	2.10	1.0	0.014	0.03	0.05	0.59	93.97	58	7.14	156		5.73
170	Horseshoe P	9/7/2008	2.5	1.75	1.0	0.013	0.04	0.08	0.46	79.99	61	8.06	206		3.22
170	Horseshoe P	10/12/2008	2.6	2.55	1.0	0.015	0.11	0.10	0.60	90.42	44	7.92	157		3.53
170	Horseshoe P	06/17/2009	2.4	1.15	1.0	0.027	0.02	0.02	0.34	27.81	62	6.78	130	10.1	4.04
170	Horseshoe P	07/10/2009	2.7	1.15	1.0	0.017	0.05	0.02	0.58	74.57	87	6.22	179		6.35
170	Horseshoe P	08/01/2009	2.6	1.30	1.0	0.020	0.05	0.07	0.42	45.74	76	6.95	143		3.30
170	Horseshoe P	08/09/2009	2.6	1.50	1.0	0.027	0.04	0.04	0.46	38.09	84	7.55	121		7.70
170	Horseshoe P	08/28/2009	2.5	1.90	1.0	0.017	0.01	0.02	0.24	31.56	75	8.55	85	11.7	2.10
170	Horseshoe P	09/07/2009	2.7	2.05	1.0	0.017	0.04	0.07	0.47	59.13	67	7.36	116		1.70
170	Horseshoe P	09/20/2009	2.6	2.00	1.0	0.022	0.06	0.06	0.23	23.83	77	7.27	151		10.55
170	Horseshoe P	10/04/2009	2.8	1.50	1.0	0.017	0.08	0.12	0.56	74.30	97	6.91	147		4.70
170	Horseshoe P	6/7/2010	2.7	1.58	1.0	0.022	0.03	0.04			51	7.30	163	10.3	8.50
170	Horseshoe P	6/23/2010	2.3	1.38	1.0	0.025	0.03	0.04	0.61	53.38	56	7.31	170		10.80
170	Horseshoe P	7/5/2010	2.5	1.25	1.0	0.028	0.05	0.04	0.46	36.14	66	7.26	163		15.70
170	Horseshoe P	7/18/2010	2.8	1.38	1.0	0.022	0.06	0.04	0.57	57.65	82	7.29	187		3.90
170	Horseshoe P	8/1/2010	2.5	1.88	1.0	0.018	0.04	0.04	0.50	60.96	58	7.61	191	13.6	5.60
170	Horseshoe P	8/15/2010	2.5	1.50	1.0	0.017	0.02	0.04	0.37	47.58	46	7.63	191		6.00
170	Horseshoe P	8/31/2010	2.5	1.38	1.0	0.020	0.02	0.04	0.47	50.25	72	7.40	186		10.50
170	Horseshoe P	9/16/2010	2.5	1.50	1.0	0.020	0.04	0.05	0.46	51.18	49	7.35	205		12.80
170.1	Deer River Flow	6/10/2012	3.9	1.68	1.5	0.015	0.01	0.01	0.42	63.44	71	7.24	99	6.8	4.00
170.1	Deer River Flow	6/20/2012	3.8	1.68	1.5	0.018	0.01	0.04	0.41	48.93	77	7.67	70		2.20
170.1	Deer River Flow	7/14/2012	3.4	1.50	1.5	0.017	0.01	0.02	0.42	52.47	65	8.16	109		4.70
170.1	Deer River Flow	7/27/2012	3.5	1.60	1.5	0.024	0.01	0.03	0.38	34.51	62	7.54	77		2.20
170.1	Deer River Flow	8/19/2012	3.4	1.68	1.5	0.017	0.01	0.02	0.38	49.45	47	7.13	113	8.8	2.20
170.1	Deer River Flow	8/19/2012													
170.1	Deer River Flow	9/2/2012	3.7	1.48	1.5	0.020	0.01	0.04	0.44	47.96	55	8.15	95		2.60
170.1	Deer River Flow	9/2/2012													
170.1	Deer River Flow	9/30/2012	3.6	1.35	1.5	0.020	0.07	0.03	0.53	57.44	89	9.01	102		5.50
170	Horseshoe P	7/15/2013				0.017	0.03	0.02	0.29	36.79	77	8.14	153		9.00
170	Horseshoe P	8/2/2013	2.1	1.65	1.5	0.015			0.51	74.31	43	7.75	185		
170	Horseshoe P	8/14/2013	2.0	1.65	1.5	0.015	0.01	0.02	0.36	52.89	55	8.19	192		6.00
170	Horseshoe P	9/1/2013	2.2	1.75	1.5	0.018			0.37	46.27	40	8.68	101		5.20
170	Horseshoe P	5/25/2014	2.6	1.25	1.5	0.072	0.07	0.05	0.84	25.72	100	7.61		3.6	2.80
170	Horseshoe P	6/8/2014	3.9	1.20	1.0	0.013			0.42	70.95	90	6.49	86		5.30
170	Horseshoe P	6/29/2014	2.6	1.05	1.5	0.019	0.04	0.06	0.53	60.10	110	7.15	81		21.30
170	Horseshoe P	7/5/2014	3.8	0.95	1.0	0.021			0.60	64.19	130	7.76	90		2.90
170	Horseshoe P	7/24/2014	2.7	1.20	1.5	0.021	0.03	0.07	0.44	44.82	95	7.82	83	5.9	1.50
170	Horseshoe P	8/18/2014	3.6	1.13	1.5	0.020			0.46	50.27	85	7.41	77		1.40
170	Horseshoe P	9/1/2014	3.5	1.05	1.5	0.016	0.02	0.04	0.40	54.39	130	6.81	75		0.90
170	Horseshoe P	9/26/2014	3.7	1.05	1.5	0.023			0.42	39.52	85	7.94	92		8.40
170	Horseshoe P	6/5/2005	2.6			0.015									
170	Horseshoe P	6/26/2005	2.7		2.0	0.013									
170	Horseshoe P	7/10/2005	2.6		2.0	0.025									
170	Horseshoe P	7/24/2005	2.6		2.0	0.024									
170	Horseshoe P	8/7/2005	2.7		2.0	0.015									
170	Horseshoe P	8/23/2005	2.6		2.0	0.025									
170	Horseshoe P	9/15/2005	2.7		2.0	0.017									
170	Horseshoe P	9/18/2005	2.9		2.0	0.018									

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
170	Horseshoe P	5/28/2000	epi	15	13	2	1	2	5											
170	Horseshoe P	6/11/2000	epi	11	17	2	1	2	5											
170	Horseshoe P	6/24/2000	epi	26	21	1	2	2												
170	Horseshoe P	7/16/2000	epi	22	21	1	2	1	5											
170	Horseshoe P	7/30/2000	epi	27	26	1	2	2												
170	Horseshoe P	8/13/2000	epi	29	23	1	3	2	3											
170	Horseshoe P	9/3/2000	epi	18	21	1	3	2												
170	Horseshoe P	9/17/2000	epi	15	15	1	3	2	5											
170	Horseshoe P	6/3/2001	epi	12	9	2	2	2	5											
170	Horseshoe P	6/17/2001	epi	25	28	1	3	1	0											
170	Horseshoe P	7/1/2001	epi	20	26	1	2	3	5											
170	Horseshoe P	7/15/2001	epi	26	20	1	2	2	6											
170	Horseshoe P	8/5/2001	epi	31	26	1	3	1	6											

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
170	Horseshoe P	8/19/2001	epi	30	28	1	3	1												
170	Horseshoe P	9/3/2001	epi	25	18	1	2	2												
170	Horseshoe P	9/17/2001	epi	23	17	1	2	2	6											
170	Horseshoe P	06/15/02	epi	13	15	1	3	2	5											
170	Horseshoe P	7/1/2002	epi	30	23	1	3	1												
170	Horseshoe P	7/17/2002	epi	24	23	1	3	2												
170	Horseshoe P	7/30/2002	epi	28	24	1	3	1												
170	Horseshoe P	8/26/2002	epi	25	21	1	3	1												
170	Horseshoe P	9/8/2002	epi	30	20	1	3	2	2											
170	Horseshoe P	10/6/2002	epi	14	15	1	3	1												
170	Horseshoe P	6/14/2003	epi	17	18	1	3	1	58											
170	Horseshoe P	6/29/2003	epi	21	30	1	3	1	0											
170	Horseshoe P	7/19/2003	epi	21	23	1	3	1	0											
170	Horseshoe P	8/2/2003	epi	28	23	1	3	2	0											
170	Horseshoe P	8/16/2003	epi	20	25	1	3	2	0											
170	Horseshoe P	8/30/2003	epi	15	19	1	3	2	0											
170	Horseshoe P	9/6/2003	epi	23	20	1	3	1	0											
170	Horseshoe P	10/5/2003	epi	8	10	1	3	1	0											
170	Horseshoe P	6/26/2004	epi	17	20	1	3	2	0											
170	Horseshoe P	7/10/2004	epi	23	25	2	2	2	2											
170	Horseshoe P	7/24/2004	epi	25	24	1	3	2	2											
170	Horseshoe P	8/7/2004	epi	17	20	2	3	3	2											
170	Horseshoe P	8/22/2004	epi	24	22	1	4	3	2											
170	Horseshoe P	9/4/2004	epi	24	21	2	4	3	2											
170	Horseshoe P	9/20/2004	epi	18	17	2	4	3	2											
170	Horseshoe P	10/2/2004	epi	17	15	2	4	3	2											
170	Horseshoe P	6/5/2005	epi	27	22	1	2	2	1											
170	Horseshoe P	6/26/2005	epi	29	23	1	3	3	1											
170	Horseshoe P	7/10/2005	epi	30	23	2	3	2	2											
170	Horseshoe P	7/24/2005	epi	30	22	1	2	2	2											
170	Horseshoe P	8/7/2005	epi	30	25	1	2	2	2											
170	Horseshoe P	8/23/2005	epi	20	19	1	4	4	2											
170	Horseshoe P	9/15/2005	epi	22	20	1	4	3	2											
170	Horseshoe P	9/18/2005	epi	25	17	2	3	3	2											
170	Horseshoe P	7/3/2006	epi	28	23	1	3	1	0											
170	Horseshoe P	7/20/2006	epi	29	26	1	3	2	0											
170	Horseshoe P	8/3/2006	epi	29	26	1	3	2	0											
170	Horseshoe P	8/7/2006	epi	26	25	1	3	2	0											
170	Horseshoe P	8/14/2006	epi	24	20	1	3	2												
170	Horseshoe P	9/2/2006	epi	17	20	1	3	1	5											
170	Horseshoe P	9/17/2006	epi	20	17	1	3	1	0											
170	Horseshoe P	6/26/2007	epi	23	24	1	3	2	2											
170	Horseshoe P	7/27/2007	epi	29	21	1	3	2	2											
170	Horseshoe P	8/9/2007	epi	21	20	1	3	1	2											
170	Horseshoe P	8/22/2007	epi	20	18	1	3	2	5											
170	Horseshoe P	9/3/2007	epi	22	19	1	3	2	2											
170	Horseshoe P	9/23/2007	epi	16	12		3	2	0											
170	Horseshoe P	7/6/2008	epi	25	22	1	3	2	0											
170	Horseshoe P	8/11/2008	epi	20	19	1	3	2	0											
170	Horseshoe P	8/17/2008	epi	19	20	1	3	1	0											
170	Horseshoe P	8/24/2008	epi	25	19	1	3	1	0											
170	Horseshoe P	8/31/2008	epi	16	20	1	3	1	0											
170	Horseshoe P	9/7/2008	epi	19	20	1	3	2	0											
170	Horseshoe P	10/12/2008	epi	16	13	1	3	1	0											
170	Horseshoe P	06/17/2009	epi	26	22	1	3	2	6											
170	Horseshoe P	07/10/2009	epi	26	26	1	2	1	0											
170	Horseshoe P	08/01/2009	epi	25	22	1	3	2	2											
170	Horseshoe P	08/09/2009	epi	24	20	1	3	2	2											
170	Horseshoe P	08/28/2009	epi	24	22	2	3	2	2											
170	Horseshoe P	09/07/2009	epi	22	18	1	3	2	0											
170	Horseshoe P	09/20/2009	epi	20	15	1	3	1	0											
170	Horseshoe P	10/04/2009	epi	11	11	1	3	2	5											
170	Horseshoe P	6/7/2010	epi	19	18	1	2	1	0	0	0									
170	Horseshoe P	6/23/2010	epi	23	21	1	3	2	0	0	0									
170	Horseshoe P	7/5/2010	epi	28	21	1	3	2	0	0	0									

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
170	Horseshoe P	7/18/2010	epi	27	22	1	3	2	6	0	0									
170	Horseshoe P	8/1/2010	epi	26	21	1	3	2	0	0	0									
170	Horseshoe P	8/15/2010	epi	27	22	1	3	1	0	0	0									
170	Horseshoe P	8/31/2010	epi	36	28	2	3	2	0	4	4									
170	Horseshoe P	9/16/2010	epi	11	14	1	3	2	5	0	0									
170.1	Deer River Flow	6/10/2012	epi	29	21	2	3	2	8	0	0	3.40	0.90	<0.3	<0.417		0.92	0.07		
170.1	Deer River Flow	6/20/2012	epi	28	24	2	3	2	0	0	0	12.8	0.70	<0.3	<0.428		2.42	1.36		
170.1	Deer River Flow	7/14/2012	epi	31	24	2	3	2	0	0	0	4.70	0.80	<0.3	<0.328		2.23	0.57		
170.1	Deer River Flow	7/27/2012	epi	24	23	2	3	2	0	0	0	6.40	0.80	<0.3	<0.292		2.34	0.74		
170.1	Deer River Flow	8/19/2012	epi	21	20	2	3	2	0	4	0	5.20	0.70	<0.3	<0.552		2.37	1.19		
170.1	Deer River Flow	8/19/2012	bloom											1.04	<1.314		74.9	34.3		
170.1	Deer River Flow	9/2/2012	epi	23	21	3	3	2	2	4	4	5.30	0.70	0.50	<3.299		1.57	0.79		
170.1	Deer River Flow	9/2/2012	epi											0.57	<1.099					
170.1	Deer River Flow	9/30/2012	epi	13	14	2	3	2	0	0	4	4.40	0.80	<0.3	<3.205		1.18	0.00		
170	Horseshoe P	7/15/2013	epi									4.20	3.10	<0.30	<0.370		2.70	0.00		
170	Horseshoe P	8/2/2013	epi	21	20	3	3	2	2	0	0	6.30	3.30	4.87	<0.400		3.00	0.00		
170	Horseshoe P	8/14/2013	epi	24	23	3	4	4	2	0	0	3.10	1.80	0.40	<0.570		1.39	0.15		
170	Horseshoe P	9/1/2013	epi	14	13	3	4	3	2	0	0			0.34	<19.13		1.30	0.00		
170	Horseshoe P	5/25/2014	epi	24	18	2	2	1	0	0	0	0.20	2.40	<0.53	<0.09	<0.001	1.60	0.00	i	i
170	Horseshoe P	6/8/2014	epi	23	16	2	3	2	0	0	0	0.40	2.20	<1.83	<0.17	<0.001	1.00	0.00	i	i
170	Horseshoe P	6/29/2014	epi	28	21	3	3	3	1	0	0	3.50	0.90	<0.62	<0.03	<0.002	2.10	0.00	fi	i
170	Horseshoe P	7/5/2014	epi	22	24	2	3	2	0	0	0	3.60	0.60	<0.63	<0.03	<0.001	1.40	0.00	i	i
170	Horseshoe P	7/24/2014	epi	22	21	3	4	2	2	0	0	4.40	0.50	<0.63	<0.03	<0.001	1.50	0.00	i	i
170	Horseshoe P	8/18/2014	epi	20	17	3	4	2	25	0	0	3.50	0.40	<1.06	<0.16	<0.002	0.90	0.00	fi	cdi
170	Horseshoe P	9/1/2014	epi	23	21	3	3	3	2	0	0	2.60	0.60	<0.64	<0.03	<0.001	1.90	0.00	i	d
170	Horseshoe P	9/26/2014	epi	22	16	3	4	2	12	0	0	3.00	0.50	<0.19	<0.12	<0.001	1.60	0.00	ei	e
170	Horseshoe P	6/26/2005	hypo		19															
170	Horseshoe P	7/10/2005	hypo		19															
170	Horseshoe P	7/24/2005	hypo		21															
170	Horseshoe P	8/7/2005	hypo		22															
170	Horseshoe P	8/23/2005	hypo		18															
170	Horseshoe P	9/15/2005	hypo		18															
170	Horseshoe P	9/18/2005	hypo		17															

Legend Information

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

Appendix B- Priority Waterbody Listing for Horseshoe Pond

Horseshoe Pond, Eagle Pond (0902-0104) NoKnownImpct

Waterbody Location Information

Revised: 11/13/2008

Water Index No:	SL(C)-32- 6-P73-26-P78,P83			**Drain Basin:**	Saint Lawrence River
Hydro Unit Code:	04150306/040	**Str Class:**	C		Saint Regis River
Waterbody Type:	Lake			**Reg/County:**	5/Franklin Co. (17)
Waterbody Size:	66.9 Acres			**Quad Map:**	LAKE TITUS (C-23-2)
Seg Description:	total area of both 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
Horseshoe Pond has been sampled as part of the NYSDEC Citizen Statewide Lake Assessment Program (CSLAP) beginning in 2000 and continuing through 2006. An Interpretive Summary report of the findings of this sampling was published in 2007. These data indicate that the lake continues to be best characterized as mesotrophic, or moderately productive, although productivity evaluations are confounded by the high (probably natural) color readings in the lake (and resulting low water transparency). Phosphorus levels in the lake occasionally exceed the state guidance values indicating impacted/stressed recreational uses. Corresponding transparency measurements at times fail to meet what is the recommended minimum for swimming beaches, although the latter is probably more a function of higher (natural) color than excessive algae growth. Measurements of pH typically fall within the state water quality range of 6.5 to 8.5. The lake water is highly colored, and natural color does limit water transparency. (DEC/DOW, BWAM/CSLAP, October 2007)

Monitoring of Horseshoe Pond was included in the Adirondack Lake Survey Corporation (ALSC) lake monitoring and assessment effort conducted in the mid-1980s (1984-86). Generally these were one-time samples analyzed for variety of parameters, including total phosphorus, pH and water color. These data revealed no indication of impacts to aquatic life support or recreational at the time. (DEC, DOW, BWAM/WQAS, January 2009 and ALSC, 1984-86)

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 generally 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 "crystal clear," an assessment that is more favorable than indicated by measured water quality characteristics, but consistent with highly colored waters. Assessments have noted that aquatic plants grow to the lake surface and are occasionally cited as having an impact on recreational use. Aquatic plants include Eurasian milfoil. (DEC/DOW, BWAM/CSLAP, October 2007)

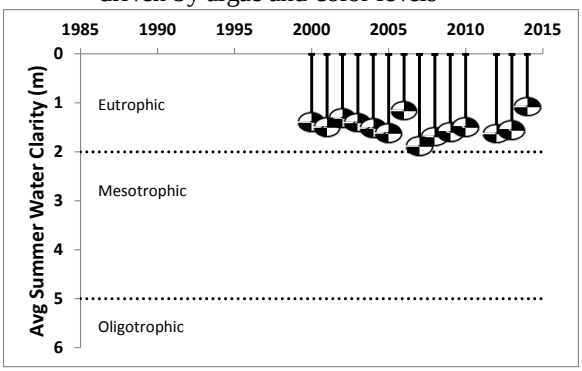
Lake Uses

This lake waterbody is designated class C, suitable for general recreation use and aquatic life support, but not for a water supply or public bathing beach. 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: Horseshoe Pond/Deer River Flow

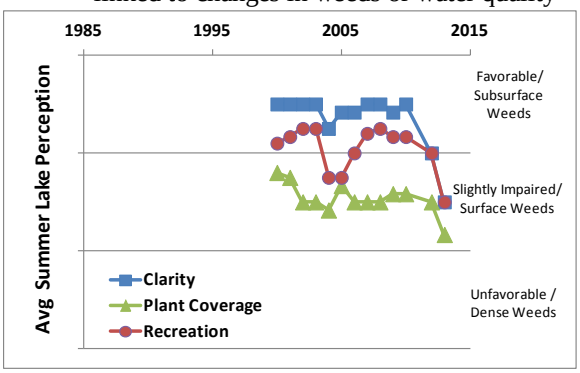
Long Term Trends: Water Clarity

- Slight decrease since mid-00s
- Most readings typical of *eutrophic* lakes, driven by algae and color levels



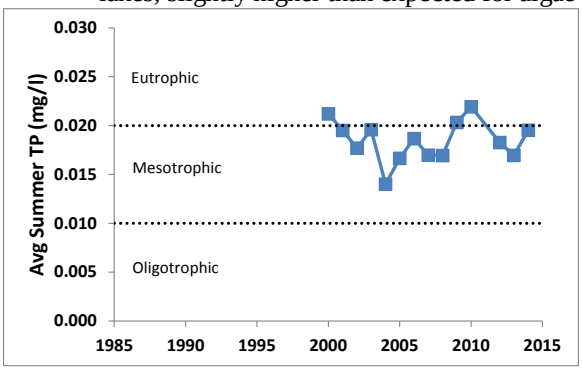
Long Term Trends: Lake Perception

- Worsening perception since mid-2010s
- Recreational perception usually not closely linked to changes in weeds or water quality



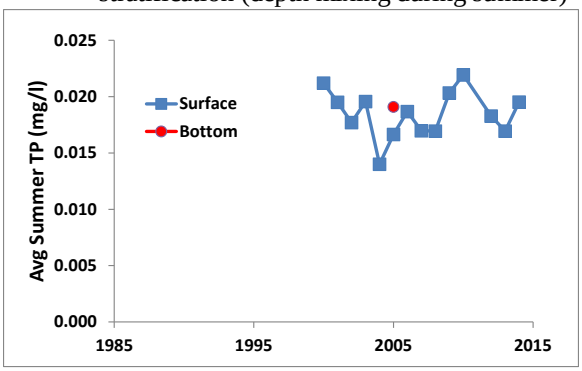
Long Term Trends: Phosphorus

- No trends apparent; readings variable
- Most readings typical of *mesoeutrophic* lakes, slightly higher than expected for algae



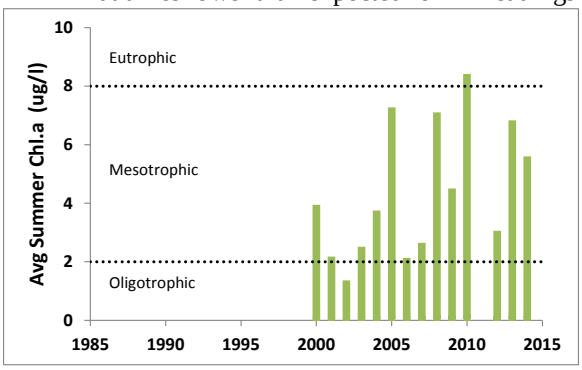
Long Term Trends: Bottom Phosphorus

- Very similar surface and bottom TP readings
- Similar readings due to lack of thermal stratification (depth mixing during summer)



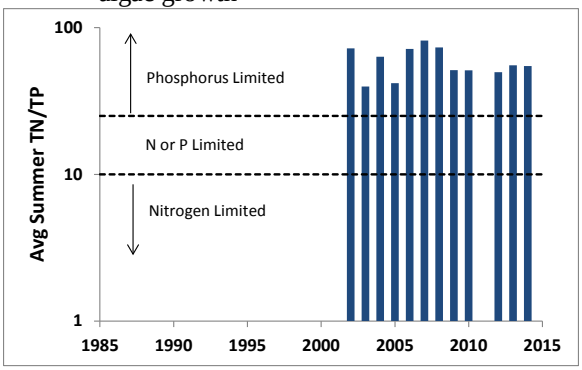
Long Term Trends: Chlorophyll a

- No trends apparent; highly variable readings
- Most readings typical of *mesotrophic* lakes, at times lower than expected for TP readings



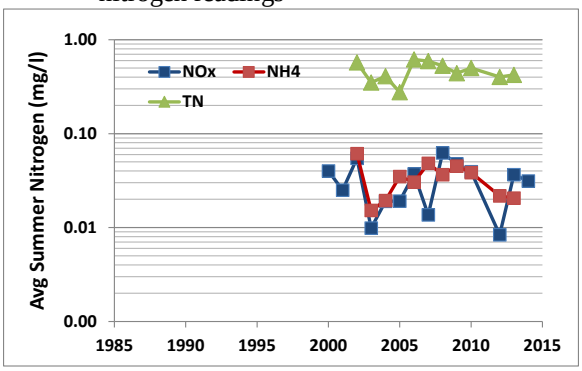
Long Term Trends: N: P Ratio

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



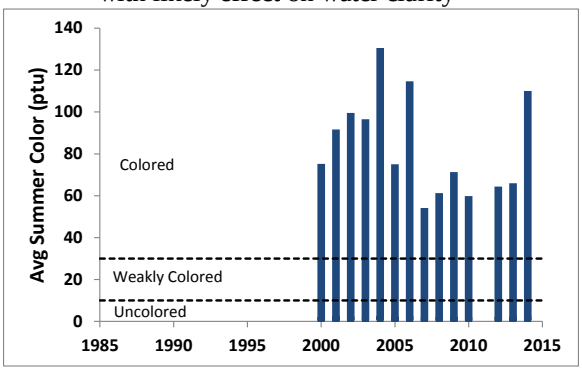
Long Term Trends: Nitrogen

- Recent slight decrease in NOx and NH4
- Generally low NOx, ammonia, and total nitrogen readings



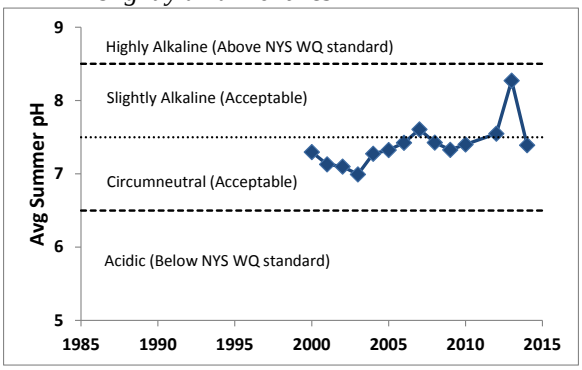
Long Term Trends: Color

- No trends, but variable color
- Most readings typical of *highly colored* lakes, with likely effect on water clarity



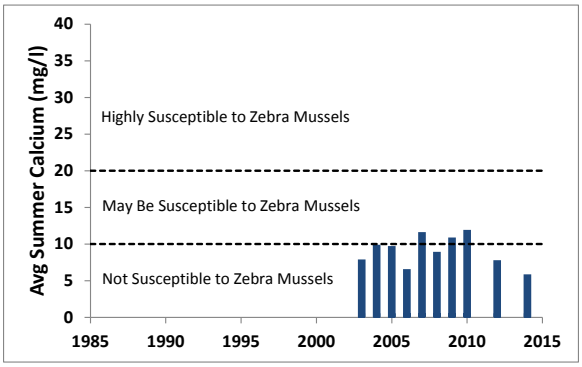
Long Term Trends: pH

- Increasing pH since mid-2000s but not '14
- Most readings typical of *circumneutral* to *slightly alkaline* lakes



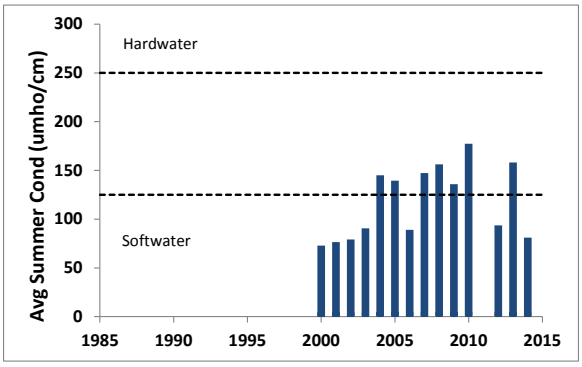
Long Term Trends: Calcium

- No trends apparent, though recent decrease
- Most readings indicate low susceptibility to zebra mussels



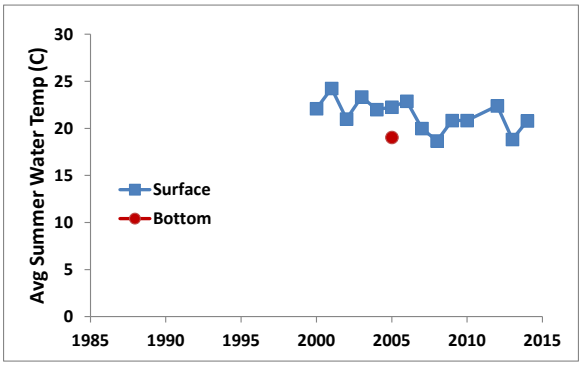
Long Term Trends: Conductivity

- No clear trends
- Most readings typical of lakes with *soft water* to *intermediate hardness*



Long Term Trends: Water Temperature

- Slight decrease in surface temperatures
- Similar surface and bottom temperatures are common in shallow lakes



Appendix D:
Algae Testing Results from SUNY ESF Study

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

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

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

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

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

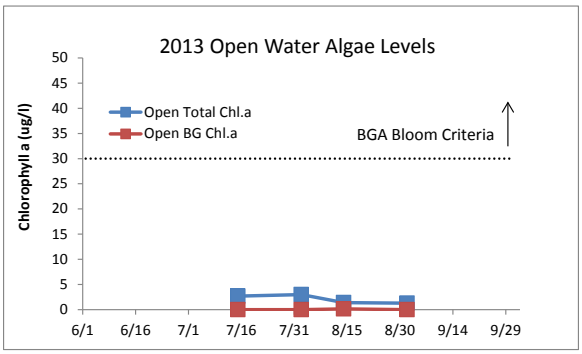


Figure D1:
2013 Open Water Total and BGA Chl.a

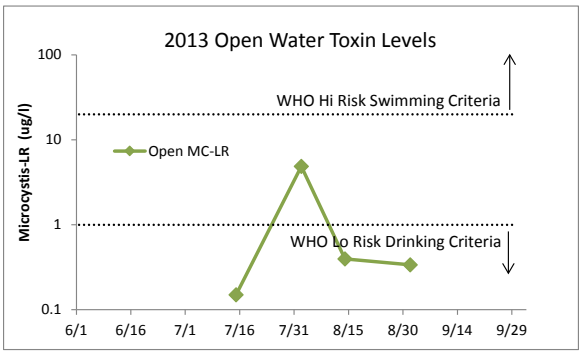


Figure D2:
2013 Open Water Microcystin-LR

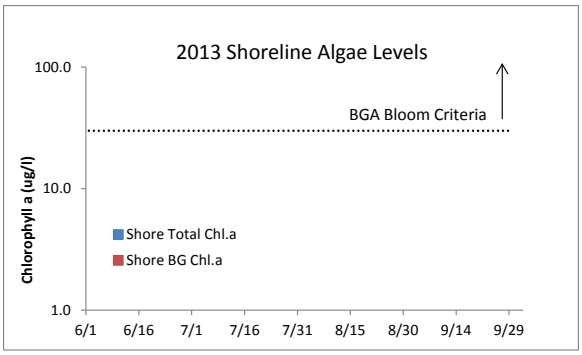


Figure D3:
2013 Shoreline Total and BGA Chl.a

Figure D4:
2013 Shoreline Microcystin-LR

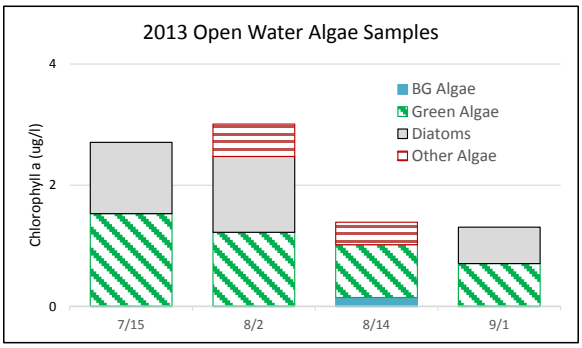


Figure D5:
2013 Open Water Algae Types

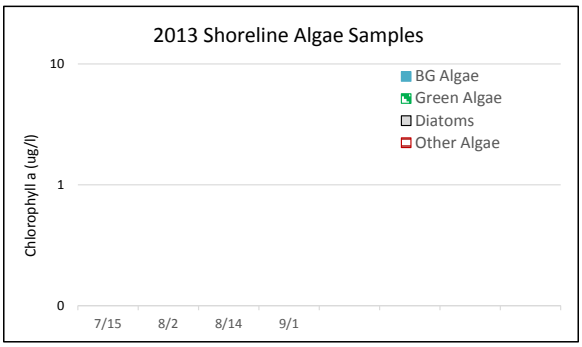


Figure D6:
2013 Shoreline Algae Types

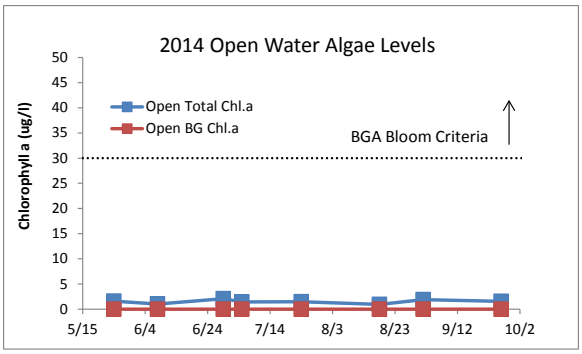


Figure D7:
2014 Open Water Total and BGA Chl.a

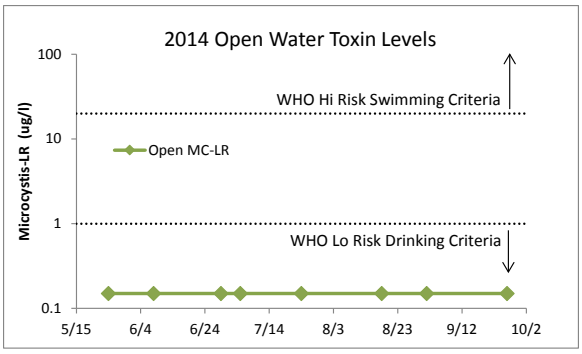


Figure D8:
2014 Open Water Microcystin-LR

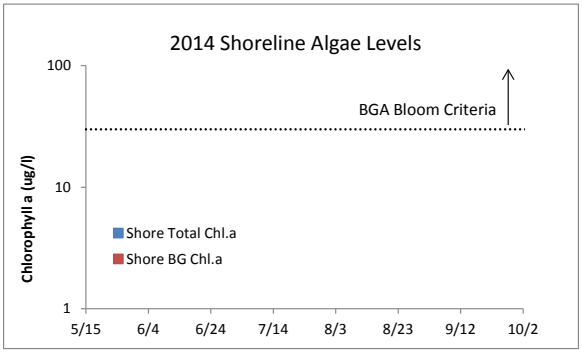


Figure D9:
2014 Shoreline Total and BGA Chl.a

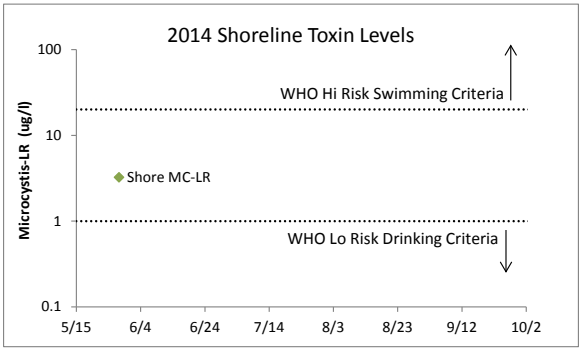


Figure D10:
2014 Shoreline Microcystin-LR

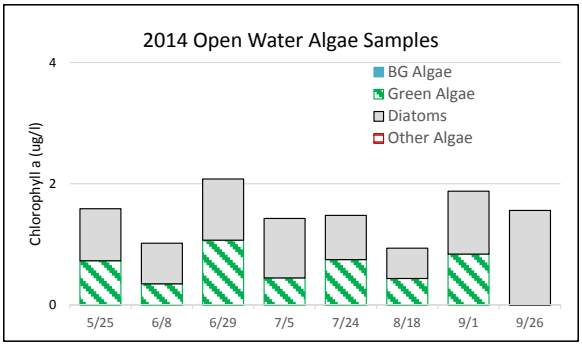


Figure D11:
2014 Open Water Algae Types

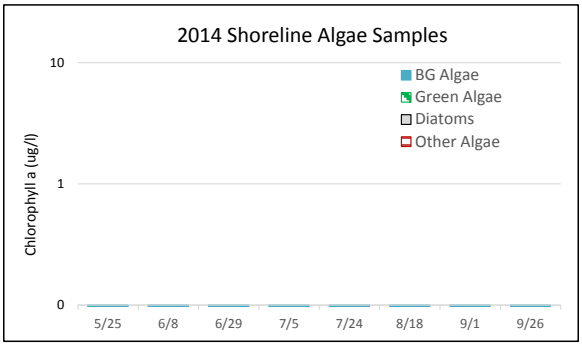


Figure D12:
2014 Shoreline Algae Types

Appendix E:
AIS Species in Franklin County

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

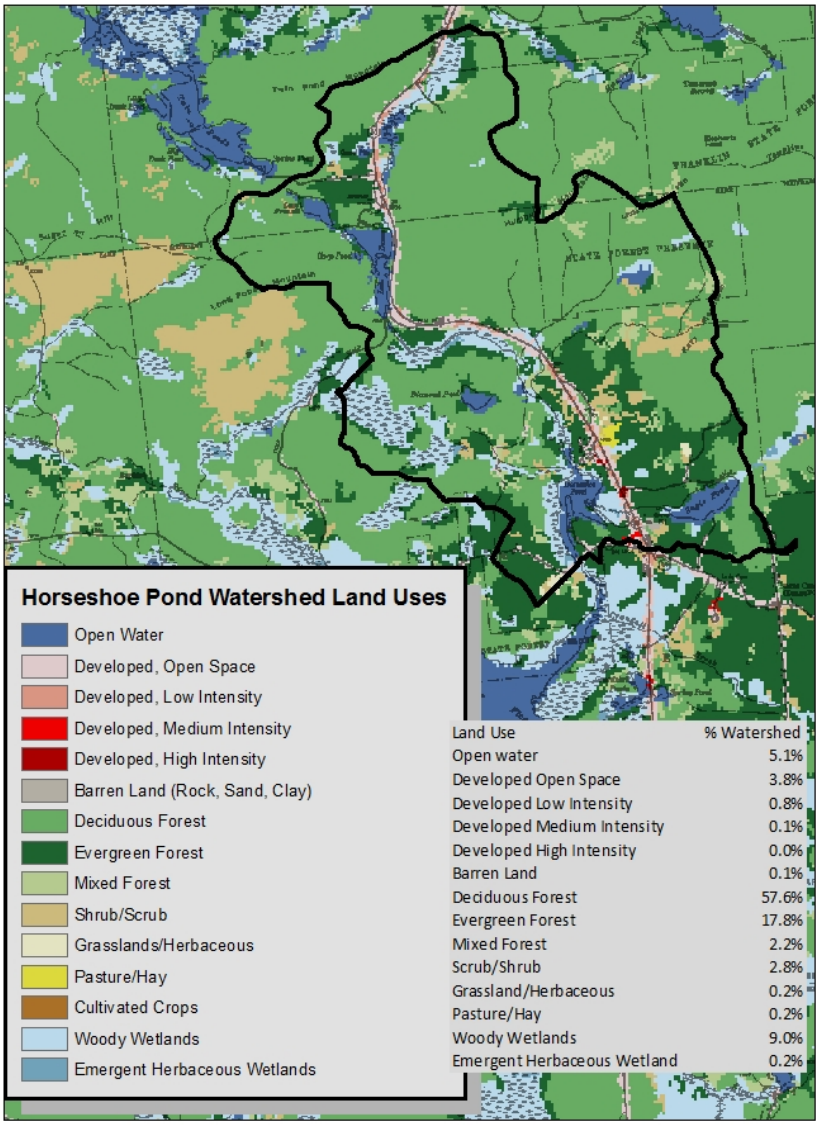
This list is not complete, but instead represents only those species that have been reported and verified within the county. If any additional aquatic invasive species (AIS) are known or suspected in these or other waterbodies in the county, this information should be reported through iMap invasives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

Aquatic Invasive Species - Franklin County			
Waterbody	**Kingdom**	**Common name**	**Scientific name**
Copperas Pond	Plant	Eurasian watermilfoil	*Myriophyllum spicatum*
Deer River Flow	Plant	Eurasian watermilfoil	*Myriophyllum spicatum*
First Pond	Plant	Variable watermilfoil	*Myriophyllum heterophyllum*
First Pond	Plant	Variable watermilfoil	*Myriophyllum heterophyllum*
First Pond	Plant	Eurasian watermilfoil	*Myriophyllum spicatum*
Fish Creek Ponds	Plant	Variable watermilfoil	*Myriophyllum heterophyllum*
Fish Creek Ponds	Plant	Eurasian watermilfoil	*Myriophyllum spicatum*
Floodwood Pond	Plant	Eurasian watermilfoil	*Myriophyllum spicatum*
Follensby Clear Pond	Plant	Eurasian watermilfoil	*Myriophyllum spicatum*
Franklin Falls Pond	Plant	Eurasian watermilfoil	*Myriophyllum spicatum*
Franklin Falls Pond	Plant	Curly leafed pondweed	*Potamogeton crispus*
Horseshoe Pond	Plant	Eurasian watermilfoil	*Myriophyllum spicatum*
Indian Lake	Plant	Eurasian watermilfoil	*Myriophyllum spicatum*
Kiwassa Lake	Plant	Eurasian watermilfoil	*Myriophyllum spicatum*
Lake Colby	Plant	Eurasian watermilfoil	*Myriophyllum spicatum*
Lake Flower	Plant	Variable watermilfoil	*Myriophyllum heterophyllum*
Lake Flower	Plant	Eurasian watermilfoil	*Myriophyllum spicatum*
Lake Flower	Plant	Curly leafed pondweed	*Potamogeton crispus*
Lake Flower	Plant	Curly leafed pondweed	*Potamogeton crispus*
Lake Titus	Plant	Eurasian watermilfoil	*Myriophyllum spicatum*
Little Colby Pond	Plant	Eurasian watermilfoil	*Myriophyllum spicatum*
Little Simon Pond	Plant	Variable watermilfoil	*Myriophyllum heterophyllum*
Little Simon Pond	Plant	Variable watermilfoil	*Myriophyllum heterophyllum*
Little Square Pond	Plant	Eurasian watermilfoil	*Myriophyllum spicatum*

Waterbody	Kingdom	Common name	Scientific name
Lower Chateaugay Lake	Plant	Eurasian watermilfoil	*Myriophyllum spicatum*
Lower Chateaugay Lake	Plant	Curly leafed pondweed	*Potamogeton crispus*
Lower Fish Creek Pond	Plant	Variable watermilfoil	*Myriophyllum heterophyllum*
Lower Fish Creek Pond	Plant	Eurasian watermilfoil	*Myriophyllum spicatum*
Lower Saranac Lake	Plant	Eurasian watermilfoil	*Myriophyllum spicatum*
Lower Saranac Lake	Plant	Curly leafed pondweed	*Potamogeton crispus*
Meacham Lake	Plant	Eurasian watermilfoil	*Myriophyllum spicatum*
Middle Saranac Lake	Plant	Eurasian watermilfoil	*Myriophyllum spicatum*
Mountain View Lake	Plant	Eurasian watermilfoil	*Myriophyllum spicatum*
Oseetah Lake	Plant	Eurasian watermilfoil	*Myriophyllum spicatum*
Second Pond	Plant	Variable watermilfoil	*Myriophyllum heterophyllum*
Simon Pond	Plant	Variable watermilfoil	*Myriophyllum heterophyllum*
Square Pond	Plant	Variable watermilfoil	*Myriophyllum heterophyllum*
Square Pond	Plant	Eurasian watermilfoil	*Myriophyllum spicatum*
Tupper Lake	Plant	Variable watermilfoil	*Myriophyllum heterophyllum*
Union Falls Pond	Plant	Variable watermilfoil	*Myriophyllum heterophyllum*
Union Falls Pond	Plant	Variable watermilfoil	*Myriophyllum heterophyllum*
Union Falls Pond	Plant	Eurasian watermilfoil	*Myriophyllum spicatum*
Upper Fish Creek Pond	Plant	Variable watermilfoil	*Myriophyllum heterophyllum*
Upper Fish Creek Pond	Plant	Eurasian watermilfoil	*Myriophyllum spicatum*
Upper Saranac Lake	Plant	Eurasian watermilfoil	*Myriophyllum spicatum*

Appendix F: Watershed and Land Use Map for Horseshoe Pond

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	5.1%
Developed Open Space	3.8%
Developed Low Intensity	0.8%
Developed Medium Intensity	0.1%
Developed High Intensity	0.0%
Barren Land	0.1%
Deciduous Forest	57.6%
Evergreen Forest	17.8%
Mixed Forest	2.2%
Scrub/Shrub	2.8%
Grassland/Herbaceous	0.2%
Pasture/Hay	0.2%
Woody Wetlands	9.0%
Emergent Herbaceous Wetland	0.2%