

Mariaville Lake Questions and Answers, 2015 CSLAP

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

A1. Water quality conditions in Mariaville Lake were probably similar in 2015 to those measured in previous years. Water clarity continues to be relatively low, though close to normal in 2015, while algae levels were higher than usual. These conditions are less favorable in late summer, and a shoreline blue green algae bloom was reported at that time. However, nutrient readings were close to normal in 2015.

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

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

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

A3. Mariaville Lake had lower water clarity, and higher nutrient and algae levels, than the typical lake in the area. Plant coverage was lower than in these other lakes in 2015, but this may vary in response to management.

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

A4. Algae levels have decreased and pH has increased since the early 2000s, despite a slight increase in phosphorus readings over the same period. Conductivity may have also increased since the early 2000s.

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

A5. Mariaville Lake is susceptible to shoreline blue green algae blooms, but it is not known how extensive the blooms are in the lake. This susceptibility will likely decrease with reductions in nutrient loading to the lake.

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.

Lake Use				
Potable Water				Not applicable
Swimming				Algae levels
Recreation				Algae levels
Aquatic Life				High pH
Aesthetics				Poor perception
Habitat				Invasive plants
Fish Consumption				
	PWL	Average Year	2015	Primary issue

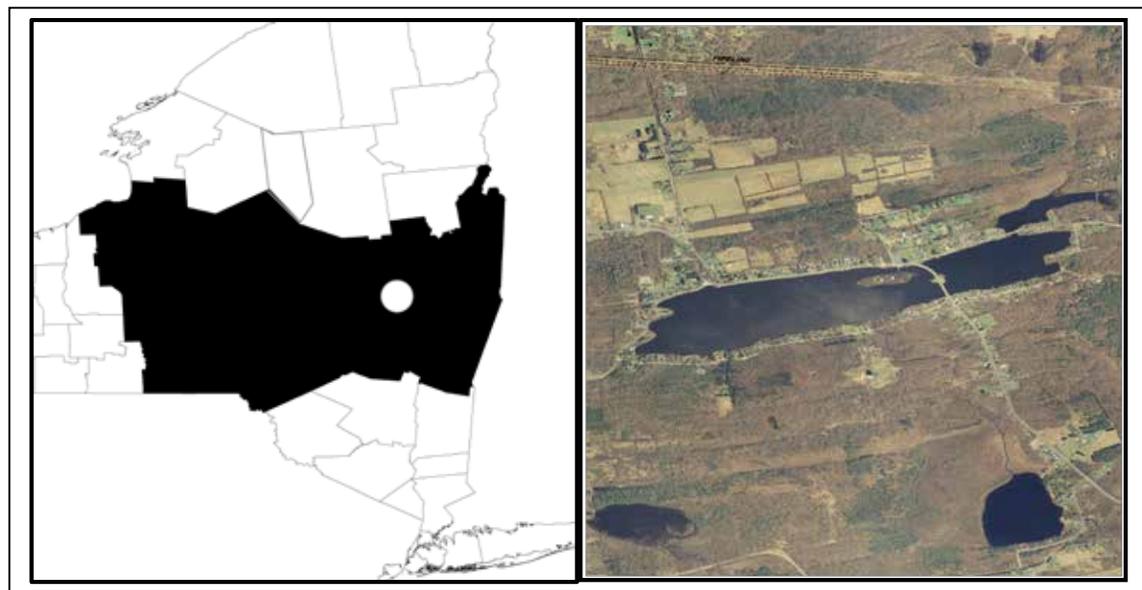
 Supported / Good
 Threatened / Fair
 Stressed / Poor
 Impaired
 Not Known

CSLAP 2015 Lake Water Quality Summary: Mariaville Lake

General Lake Information

Location	Town of Duanesburg
County	Schenectady
Basin	Mohawk River
Size	80.3 hectares (198.3 acres)
Lake Origins	Augmented by 16ft by 136ft earthen/masonry dam (1925)
Watershed Area	730 hectares (1,803 acres)
Retention Time	0.4 years
Mean Depth	1.7 meters
Sounding Depth	3.5 meters
Public Access?	private launch
Major Tributaries	no named tribs
Lake Tributary To...	unnamed outlet to South Chuctanunda Creek to Mohawk River
WQ Classification	B (contact recreation = swimming)
Lake Outlet Latitude	42.828
Lake Outlet Longitude	-74.136
Sampling Years	1999-2011, 2014-2015
2015 Samplers	Michael Blood
Main Contact	Michael Blood

Lake Map



Background

Mariaville Lake is a 198 acre, class B lake found in the Town of Duaneburg in Schenectady County, in the Capital District region of New York State. It was first sampled as part of CSLAP in 1999.

It is one of two CSLAP lakes among the nearly 90 lakes and ponds found in Schenectady County, and one of 67 CSLAP lakes among the more than 3680 lakes and ponds in the Lower Hudson River drainage basin.

Lake Uses

Mariaville Lake is a Class B lake; this means that the best intended use for the lake is for contact recreation—swimming and bathing, non-contact recreation—boating and fishing; aesthetics and aquatic life. The lake is used by lake residents and invited guests for boating and swimming, and by visitors for triathlon events. There is no public access to the lake, although some non-lake residents access the lake through a private boat launching area on the northeast side of the lake.

It is not known by the report authors if Mariaville Lake has been stocked by lake residents or municipal officials. Fish species in the lake include black crappie, bluegill, brown bullhead, largemouth bass, pumpkinseed sunfish, rock bass, smallmouth bass, and yellow perch.

General statewide fishing regulations are applicable in Mariaville Lake. No site-specific regulations have been issued by the state for this lake.

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

Historical Water Quality Data

CSLAP sampling was conducted on Mariaville Lake from 1999 to 2011, and 2014 to 2015. The CSLAP reports for each of the past several years can be found on the NYSFOLA website at <http://nysfola.mylaketown.com>. The most recent CSLAP reports for Mariaville Lake can also be found on the NYSDEC web page at <http://www.dec.ny.gov/lands/77842.html>.

Mariaville Lake was sampled by the NYSDEC as part of the Lake Classification and Inventory (LCI) survey, the Division of Water ambient lake monitoring program, in 1989 and 1997. These data indicate that lake productivity in 1989 was much lower than in later years, as indicated by higher water transparency and much lower phosphorus and algae levels. Conductivity readings were also much lower. By 1997, the lake was much more productive, with water clarity, nutrient, and chlorophyll *a* readings within the range measured through CSLAP. Mariaville Lake was sampled as part of the NYSDEC biomonitoring study in 2010.

The lake was also sampled by the Conservation Department (the predecessor to the NYSDEC) in 1934 as part of the Biological Survey of the Hudson River basin. The sampling associated with this survey was mostly to evaluate water quality impacts on fisheries, and thus there is not a significant overlap with the more contemporary datasets. However, the limited water quality data do indicate high oxygen and pH levels throughout the lake; the latter suggests that high algae levels may have been common even in the 1930s.

The lake was described as follows:

“This is an artificial lake with an area of 153 acres and a maximum depth of 15 ft. Most of the bottom is clay. The vegetation is scant”

There are no RIBS monitoring sites on or near Mariaville Lake, and the primary outlet (tributary to South Chuctanuda Creek) has not been sampled through any statewide monitoring programs.

Lake Association and Management History

Mariaville Lake is served by the Mariaville Civic Association. The lake was formed in 1778 and took its present shape in the 1920s. The Association was originally organized in 1918, and incorporated in 1970. The Association is involved in a variety of lake management and social activities, including:

- dam maintenance and inspection- the Association purchased in the dam in 1987
- water level control to minimize flood or drought damage
- boat launch maintenance
- secure DEC permits for weed harvesting, including hand pulling of weeds
- securing insurance for the lake, dam, launch and volunteers
- participating in Adopt-A-Highway program (spring and fall)
- publishing an award winning biannual newsletter
- sponsoring community events, e.g. boat parade and weed harvesting day
- seeking funding and grants for projects

The Civic Association maintains a web site at <http://mariavillecivicassociation.com/>.

Summary of 2015 CSLAP Sampling Results

Evaluation of 2015 Annual Results Relative to 1999-2014

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 – Mariaville Lake” section in Appendix C.

Evaluation of Eutrophication Indicators

Algae levels, as measured by chlorophyll *a*, were slightly higher than usual, consistent with the observation of shoreline blue green algae blooms. However, overall algae levels have decreased over the last 10-15 years. Phosphorus readings were slightly lower than normal in 2015, but these readings have increased over the last 10-15 years, consistent with a decrease in water clarity over the same period. These ‘findings’ suggest that the lake exhibits a wide range of variability from year to year.

Lake productivity usually increases significantly during the summer (May through August), as manifested in decreasing water clarity and increasing nutrient and algae levels. These seasonal trends were also apparent in 2015, although lake productivity did decrease slightly in the fall in 2015.

The lake can be characterized as *eutrophic*, or highly productive, based on water clarity, total phosphorus, and chlorophyll *a* readings (all typical of *eutrophic* lakes). The trophic state indices (TSI) evaluation suggests that algae levels are slightly higher than expected given the nutrient levels and water clarity. This suggests that algae growth is patchy, typically of lakes with wind-

swept blooms. Overall trophic conditions are summarized on the Lake Scorecard and Lake Condition Summary Table.

Evaluation of Potable Water Indicators

Algae levels are high enough to render the lake susceptible to taste and odor compounds or elevated DBP (disinfection by product) compounds that could affect the potability of the water, although the lake is not used for drinking water. Potable water conditions, at least as measurable through CSLAP, are summarized in the Lake Scorecard and Lake Condition Summary Table.

Evaluation of Limnological Indicators

Conductivity readings were higher than usual in 2014 and 2015, and both conductivity and pH have increased slightly since the early 2000s, despite a decrease in algae levels over much of this period. It is likely that the small changes in each of the other 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 47 to 50 mg/l. These values fall within the range of “major” 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 but above the typical range of values found in most NYS lakes. These readings suggest a moderate to high 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

Macrophyte surveys conducted through CSLAP, the LCI, and the 2010 NYSDEC biomonitoring study found at least 11 aquatic plant species, including at least two exotic plant species (*Myriophyllum spicatum*, Eurasian watermilfoil, and *Potamogeton crispus*, curly-leafed pondweed). The modified floristic quality index (FQI) for the lake indicates that the quality of the aquatic plant community is “fair”.

The fish community is comprised of at least six warmwater fish species and at least two coolwater fish species. This suggests that the lake can most likely be characterized as a warmwater fishery, although the inventory of fish species in the lake is probably incomplete.

The macroinvertebrate samples collected as part of the NYSDEC biomonitoring study in 2010 are presently being evaluated. Zooplankton has not been evaluated through CSLAP in Mariaville Lake. The fluoroprobe screening results from the last few years indicate increasing levels of total and blue green algae as the summer progresses, and a shoreline blue green algae bloom was reported in mid-summer of 2014 after some reports of “green streaks” and “green clumps” along the margins of the lake. Similar blooms were reported in late summer of 2015.

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

Evaluation of Lake Perception

Recreational assessments were slightly more favorable than usual in 2014 and 2015; the latter may have been due to less surface coverage of aquatic plants. It is not known to what extent changes in plant coverage reflect changes in management as opposed to “natural” changes in plant community dynamics.

Recreational and water quality assessments typically degrade during the summer, coincident with an early summer increase in plant coverage. Less favorable water quality and recreational assessments were apparent in late summer of 2015. Overall lake perception is summarized on the Lake Scorecard and Lake Condition Summary Table.

Evaluation of Local Climate Change

Air and water temperature readings in the summer index period were close to normal in 2014 and 2015, and neither air nor water temperature readings has exhibited any long-term trends. It is not known if this is an indication of the lack of local climate change or if these changes cannot be well evaluated through CSLAP.

Evaluation of Algal Toxins

Algal toxin levels can vary significantly within blooms and from shoreline to lake, and the absence of toxins in a sample does not indicate safe swimming conditions. Fluoroprobe readings at times exceed the threshold for harmful algal blooms (HABs) in open water and especially in shoreline blooms. This is particularly apparent later in the summer. However, open water and bloom toxin levels have been below the threshold to support safe swimming, although lake residents and pets are advised to avoid exposure to surface scums or heavily discolored water.

Lake Condition Summary

Category	Indicator	Min	Overall Avg	Max	2015 Avg	Classification	2015 Change?	Long-term Change?
Eutrophication Indicators	Water Clarity	0.40	1.70	4.15	1.69	Eutrophic	Within Normal Range	No Change
	Chlorophyll <i>a</i>	0.10	22.38	102.56	25.99	Eutrophic	Within Normal Range	No Change
	Total Phosphorus	0.012	0.036	0.086	0.030	Eutrophic	Within Normal Range	No Change
Potable Water Indicators	Hypolimnetic Ammonia							
	Hypolimnetic Arsenic							
	Hypolimnetic Iron							
	Hypolimnetic Manganese							
Limnological Indicators	Hypolimnetic Phosphorus							
	Nitrate + Nitrite	0.00	0.02	0.34	0.01	Low NOx	Within Normal Range	No Change
	Ammonia	0.00	0.03	0.20	0.02	Low Ammonia	Within Normal Range	No Change
	Total Nitrogen	0.01	0.57	1.41	0.63	Intermediate Total Nitrogen	Within Normal Range	No Change
	pH	6.83	7.95	9.44	7.94	Alkaline	Within Normal Range	No Change
	Specific Conductance	79	193	277	264	Intermediate Hardness	Higher than Normal	No Change
	True Color	10	27	106	21	Intermediate Color	Within Normal Range	No Change
	Calcium	7.2	15.6	41.0	15.2	May be Susceptible to Zebra Mussels	Within Normal Range	Increasing Slightly
Lake Perception	WQ Assessment	1	3.0	5	3.1	Definite Algal Greenness	Within Normal Range	No Change
	Aquatic Plant Coverage	1	2.9	5	2.1	Surface Plant Growth	Within Normal Range	No Change
	Recreational Assessment	1	3.2	5	2.7	Slightly Impaired	More Favorable Than Normal	No Change

Category	Indicator	Min	Overall Avg	Max	2015 Avg	Classification	2015 Change?	Long-term Change?
Biological Condition	Phytoplankton					Open water-moderate blue algae biomass	Not known	Not known
	Macrophytes					Poor quality of the aquatic plant community	Not known	Not known
	Zooplankton					Not measured through CSLAP	Not known	Not known
	Macroinvertebrates					2009 results not yet available	Not known	Not known
	Fish					Warmwater fishery	Not known	Not known
	Invasive Species					Eurasian watermilfoil, curly-leaved pondweed	Not known	Not known
Local Climate Change	Air Temperature	9	21.9	33	21.4		Within Normal Range	No Change
	Water Temperature	12	22.1	28	22.4		Within Normal Range	No Change
Harmful Algal Blooms	Open Water Phycocyanin	0	45	296	48	Most readings indicate low risk of BGA	Not known	Not known
	Open Water FP Chl.a	1	9	41	11	Few readings indicate high algae levels	Not known	Not known
	Open Water FP BG Chl.a	0	7	40	9	Few readings indicate high BGA levels	Not known	Not known
	Open Water Microcystis	<DL	<DL	0.9	<DL	Low to undetectable open water microcystins	Not known	Not known
	Open Water Anatoxin a	<DL	<DL	0.1	<DL	Open water Anatoxin-a at times detectable	Not known	Not known
	Shoreline Phycocyanin	90.0	242.5	395.0		Most readings indicate high risk of BGA	Not known	Not known
	Shoreline FP Chl.a	20.6	46.4	87.5	25.9	Most readings indicate high algae levels	Not known	Not known
	Shoreline FP BG Chl.a	19.1	43.8	85.0	23.3	Most readings indicate high BGA levels	Not known	Not known
	Shoreline Microcystis	<DL	<DL	1.0	<DL	Low to undetectable shoreline microcystins	Not known	Not known
	Shoreline Anatoxin a	<DL	<DL	<DL	<DL	Shoreline bloom Anatoxin-a consistently not detectable	Not known	Not known

Evaluation of Lake Condition Impacts to Lake Uses

Mariaville Lake is presently among the lakes listed on the Mohawk/Lower Hudson River Basin Priority Waterbody Listing (PWL), with recreation listed as *impaired* and aesthetics listed as *stressed* due to excessive algae and weed growth. The PWL listing for Mariaville Lake is listed in Appendix B. The lake is cited on the federal impaired waters (303d) list for excessive nutrients and algae.

Potable Water (Drinking Water)

The CSLAP dataset at Mariaville Lake, including water chemistry data, physical measurements, and volunteer samplers' perception data, is inadequate to evaluate the use of the lake for potable water, and the lake is not used for this purpose. The high algae levels suggest that any "unofficial" potable water use may be impacted.

Public Bathing

The CSLAP dataset at Mariaville Lake, including water chemistry data, physical measurements, and volunteer samplers' perception data, suggests that public bathing, if conducted at a public swimming beach, is *stressed* by excessive algae and nutrients, poor water clarity, and shoreline blue green algae blooms. 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 Mariaville Lake, including water chemistry data, physical measurements, and volunteer samplers' perception data, suggest that recreation is *impaired* by excessive algae and shoreline blue green algae blooms.

Aquatic Life

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

Aesthetics

The CSLAP dataset on Mariaville Lake, including water chemistry data, physical measurements, and volunteer samplers' perception data, suggest that aesthetics may be *poor* due to poor perception as a result of excessive algae, shoreline algae blooms, excessive weeds and reports that the lake "looks bad". Habitat may be only *fair* at times due to invasive weeds, particularly Eurasian watermilfoil, although these impacts may vary from year to year.

Fish Consumption

There are no fish consumption advisories posted for Mariaville Lake.

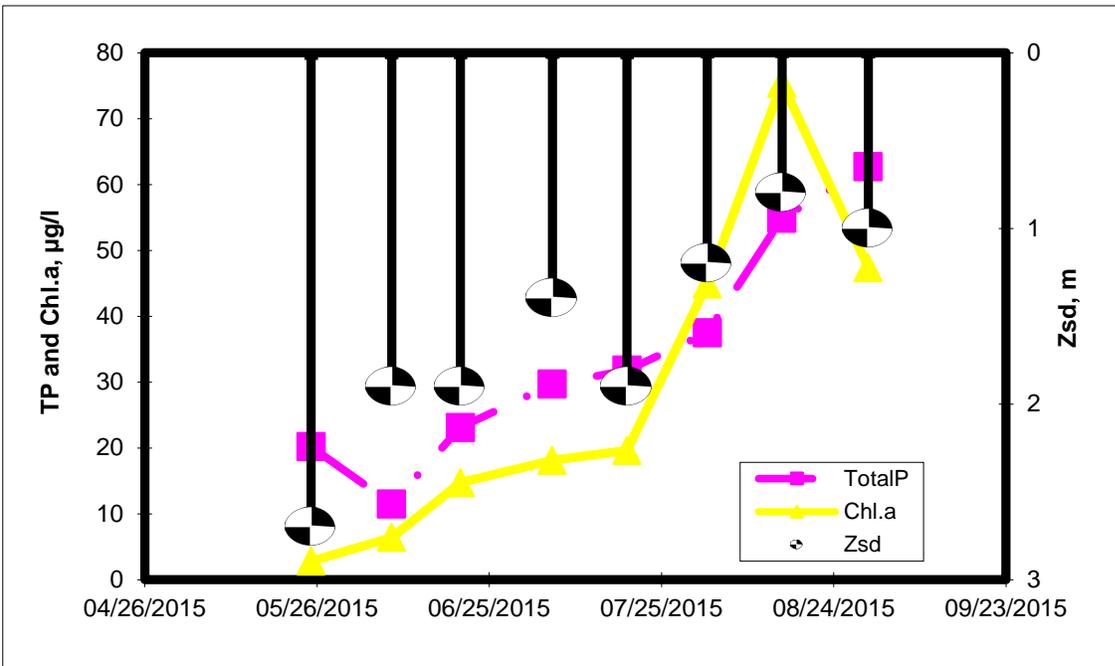
Additional Comments and Recommendations

The lake association is advised to report and avoid exposure to any surface scums or heavily discolored water often associated with blue green algae blooms. Aquatic plant communities should be evaluated to determine if native plant communities have changed in recent years.

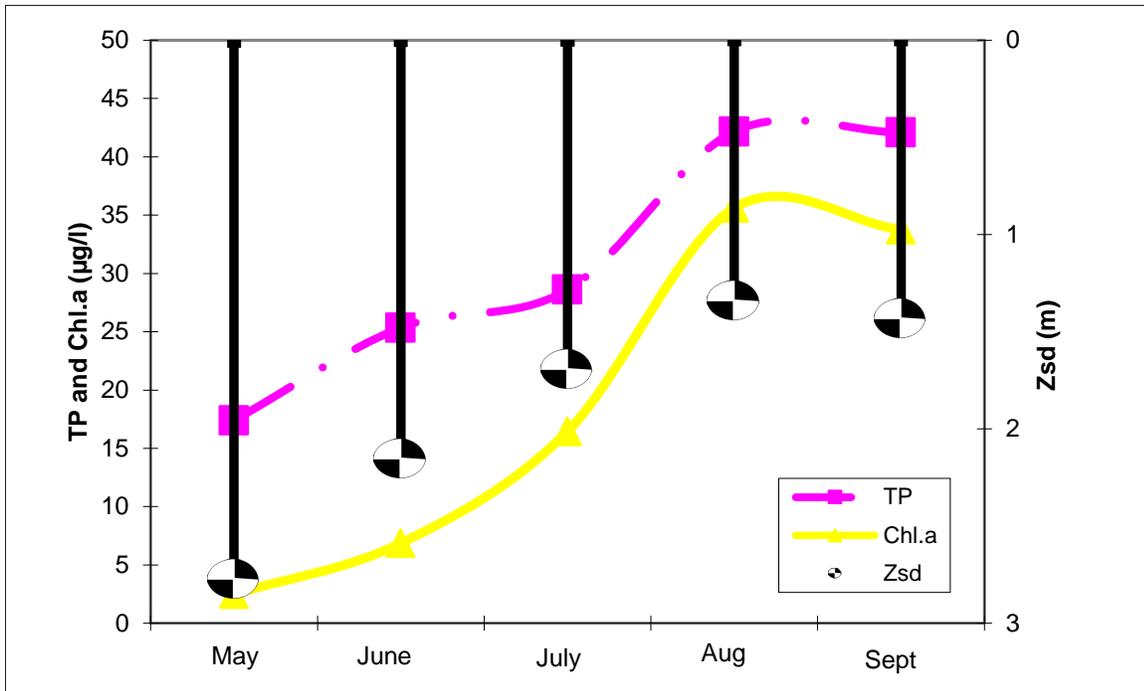
Aquatic Plant IDs-2015

None submitted for identification in 2015.

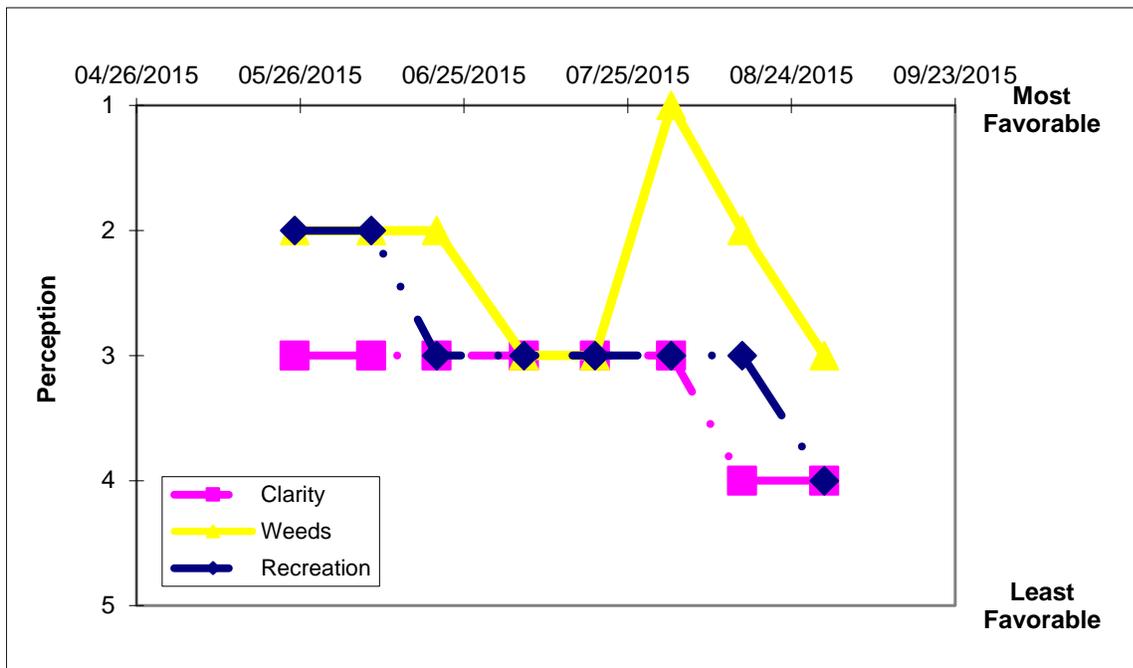
Time Series: Trophic Indicators, 2015



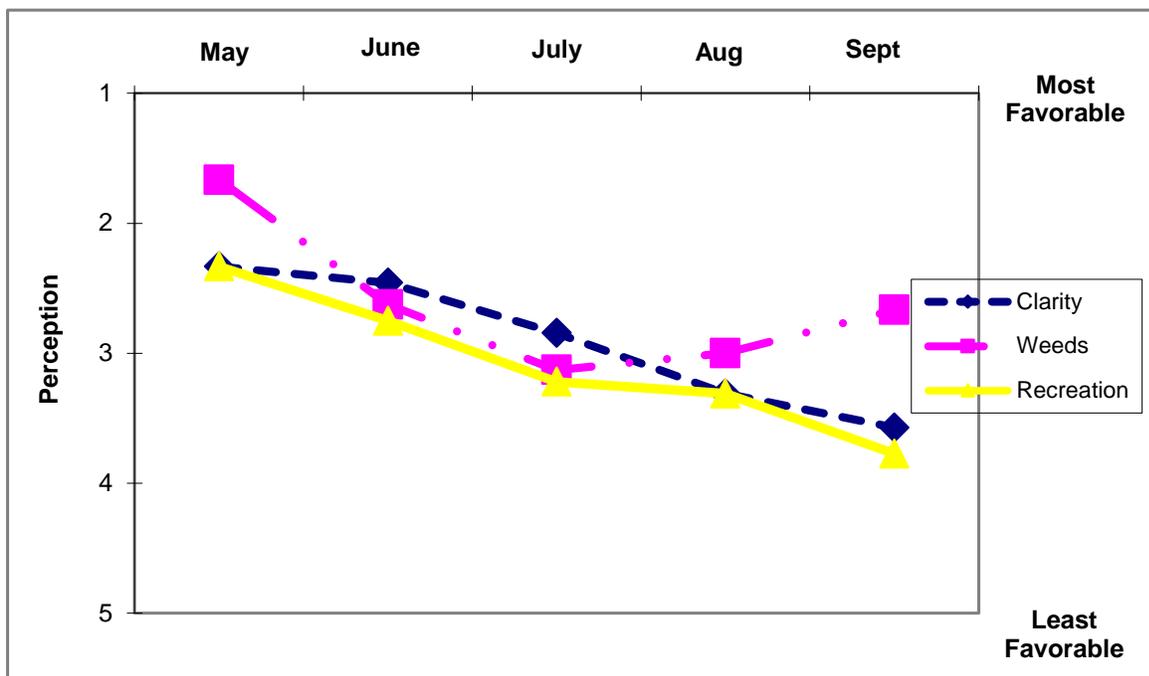
Time Series: Trophic Indicators, Typical Year (1999-2015)



Time Series: Lake Perception Indicators, 2015



Time Series: Lake Perception Indicators, Typical Year (1999-2015)



Appendix A- CSLAP Water Quality Sampling Results for Mariaville Lake

LNum	PName	Date	Zbot	Zsd	Zsamp	Tot.P	NO3	NH4	TDN	TN/TP	TColor	pH	Cond25	Ca	Chl.a	Cl
163	Mariaville L	6/15/1999	4.2	2.00	1.5	0.016	0.01				18	7.82	207		4.43	
163	Mariaville L	6/27/1999		1.85	1.5	0.019	0.01				17	7.25	211		6.40	
163	Mariaville L	7/11/1999	4.1	1.20	1.5	0.040	0.01				16	6.83	210		6.83	
163	Mariaville L	7/25/1999	4.1	1.00	1.5	0.030	0.01				18	9.07	212		28.90	
163	Mariaville L	8/8/1999	3.9	0.80	1.5	0.044	0.04				12	7.87	222		50.50	
163	Mariaville L	8/22/1999	3.9	0.75	1.5	0.056	0.01				15	7.44	216		43.20	
163	Mariaville L	9/5/1999	4.9	1.10	1.5	0.036	0.01				15	7.76	219		20.10	
163	Mariaville L	9/19/1999	4.5	0.85	1.5	0.043	0.01				22	7.78	191		27.40	
163	Mariaville L	6/3/2000	4.1	1.50	1.5	0.022	0.01				33	8.04	165		8.70	
163	Mariaville L	6/19/2000	4.4	1.40	1.5	0.025	0.01				46	7.47	145		20.50	
163	Mariaville L	7/2/2000	4.1	0.70	1.5	0.032	0.01				46	9.00	147		66.00	
163	Mariaville L	7/16/2000	4.0	1.75	1.5	0.038	0.02				42	7.23	152		9.55	
163	Mariaville L	8/6/2000	4.1	0.50	1.5	0.026	0.01				28	7.58	151		91.50	
163	Mariaville L	8/20/2000	4.1	1.00	1.5	0.053	0.03				27	7.78	151		26.50	
163	Mariaville L	9/3/2000	4.2	0.70	1.5	0.047	0.01				25	7.57	151		53.50	
163	Mariaville L	9/17/2000	4.0	0.90	1.5	0.047	0.01				28	7.96	152		33.00	
163	Mariaville L	6/24/2001	4.2	1.40	1.5		0.01				18	7.19	177		14.70	
163	Mariaville L	7/8/2001	4.2	0.80		0.030	0.01				23	7.38	179		45.00	
163	Mariaville L	7/23/2001	4.1	1.00	1.5	0.023	0.01				19	7.80	182		2.41	
163	Mariaville L	8/5/2001	4.0	1.15		0.037	0.01				17	6.94	185		31.44	
163	Mariaville L	8/19/2001	3.9	0.59	1.5	0.041	0.01				17	8.76	191		102.56	
163	Mariaville L	9/3/2001	4.8	0.70		0.054	0.01				18	7.77	193		45.39	
163	Mariaville L	9/16/2001	3.9	0.40	1.5		0.01				17	7.80	194		63.06	
163	Mariaville L	9/30/2001	3.8	0.60	1.5	0.077	0.01				16	6.91	190			
163	Mariaville L	06/09/02	4.0	2.10	1.5	0.022	0.01	0.06	0.73	32.44	38	7.49	194		3.21	
163	Mariaville L	06/23/02		3.28	1.5		0.00	0.02	0.64		16	7.63	190		3.33	
163	Mariaville L	07/07/02		2.93	1.5	0.027	0.01	0.05	0.60	22.27	35	7.44	189		8.93	
163	Mariaville L	07/21/02		3.20	1.5	0.020	0.00	0.05	0.81	41.16	17	7.69	196			
163	Mariaville L	08/04/02		2.75	1.5	0.019	0.03	0.02	0.74	39.39	18	8.02	200	7.2		
163	Mariaville L	08/18/02		2.58	1.5	0.018	0.00	0.03	0.58	31.96	17	8.10	204		6.69	
163	Mariaville L	09/01/02		2.40		0.042	0.00	0.01			25	8.42	200		41.02	
163	Mariaville L	09/15/02		2.40	1.5		0.01	0.03	0.80						43.57	
163	Mariaville L	6/1/2003	4.0	2.90	1.5	0.026					28	7.19	205	13.0	3.12	
163	Mariaville L	6/15/2003	4.4	3.20	1.5	0.030	0.03	0.07	0.37	12.48	30	7.25	199		5.08	
163	Mariaville L	6/29/2003	4.2	4.15	1.5	0.018	0.01	0.01	0.38	21.42	29	7.65	199		5.79	
163	Mariaville L	7/13/2003	4.1	2.70	1.5	0.033	0.01	0.00	0.31	9.12	33	7.57	196		9.17	
163	Mariaville L	7/29/2003	4.0	2.55	1.5	0.051	0.01	0.01	0.09	1.79	40	7.42	199	14.0	5.15	
163	Mariaville L	8/10/2003	4.1	2.45	1.5	0.033	0.00	0.02	0.48	14.29	21	8.43	196		33.22	
163	Mariaville L	8/24/2003	4.0	2.30	1.5	0.063	0.00	0.02	0.64	10.12	25	7.73	199		45.75	
163	Mariaville L	9/7/2003	4.8	2.80	1.5	0.046	0.02	0.05	0.81	17.64	19	7.80	202		35.27	
163	Mariaville L	5/14/2004		3.40	1.5	0.015	0.01	0.01	0.01	0.34	28	6.98	218	14.8	2.49	
163	Mariaville L	6/27/2004		2.90	1.5	0.019	0.01	0.01	0.11	5.91	22	7.15	236		6.80	
163	Mariaville L	7/11/2004		2.75	1.5	0.018	0.02	0.04	0.38	21.45	19	7.05	239		6.90	
163	Mariaville L	7/25/2004		2.55	1.5	0.020	0.01	0.01	0.23	11.37	15	7.84	239		11.77	
163	Mariaville L	8/8/2004		2.48	1.5	0.036	0.01	0.02	0.53	14.57	55	7.58	231		32.20	
163	Mariaville L	8/23/2004		2.55	1.5	0.037	0.02	0.03	0.66	17.85	32	7.86	205		32.94	
163	Mariaville L	9/6/2004		2.45	1.5	0.029	0.05	0.03	0.59	20.38	66	7.86	167		18.90	
163	Mariaville L	9/19/2004		2.78	1.5	0.031	0.07	0.06	0.71	22.66	20	7.27	192		10.50	
163	Mariaville L	5/30/2005	4.0	3.00	1.5	0.015	0.01	0.01	0.09	5.71	28	7.96	197	14.1	2.20	
163	Mariaville L	6/19/2005	4.4	2.05	1.5	0.019	0.01	0.01	0.21	11.10					7.14	
163	Mariaville L	7/7/2005	4.4	1.60	1.5	0.019	0.01	0.01	0.17	9.17	16	7.80	227		12.70	
163	Mariaville L	7/17/2005	4.1	1.40	1.5	0.025	0.01	0.01	0.20	7.89	14	8.60	148		16.73	
163	Mariaville L	7/31/2005	4.1	0.80	1.5	0.026	0.22	0.01	0.30	11.64	22	8.42	224	18.2	32.58	
163	Mariaville L	8/14/2005	4.0	0.60	1.5	0.034	0.34	0.01	0.42	12.10	19	9.00	226		38.99	
163	Mariaville L	8/28/2005	4.0	0.60	1.5	0.057	0.01	0.01	0.50	8.74	22	8.97	214		74.14	
163	Mariaville L	9/10/2005	3.9	0.70	1.5	0.046	0.01	0.02	0.39	8.58	14	7.92	232		30.42	
163	Mariaville L	6/4/2006	4.2	2.20	1.5	0.031	0.04	0.03	0.69	22.30	25		210	12.9	3.42	
163	Mariaville L	6/18/2006	4.1	1.85	1.5	0.018	0.01	0.04	0.60	33.78	24	7.85	177		3.24	
163	Mariaville L	7/4/2006	4.1	1.50	1.5	0.026	0.01	0.03	0.57	21.97	29	7.86	156		11.65	
163	Mariaville L	7/16/2006	4.3	1.10	1.5	0.022	0.09	0.09	1.41	64.51		8.53	125		16.13	
163	Mariaville L	7/30/2006	4.1	1.00	1.5											
163	Mariaville L	8/15/2006	4.0	1.00	1.5	0.037	0.02	0.06	0.97	26.15	15	8.02	189		23.05	
163	Mariaville L	9/4/2006	4.4	0.80	1.5	0.043			0.75	17.67	17	7.34	180		17.86	

LNum	PName	Date	Zbot	Zsd	Zsamp	Tot.P	NO3	NH4	TDN	TN/TP	TColor	pH	Cond25	Ca	Chl.a	Cl
163	Mariaville L	9/17/2006	4.4	1.50	1.5	0.031	0.01	0.02	0.58	18.54	21	7.60	150		10.77	
163	Mariaville L	7/8/2007		2.50	1.5	0.022	0.01	0.03	0.63	64.24	27	7.95	175	13.4	14.24	
163	Mariaville L	7/20/2007		2.43	1.5	0.046	0.00	0.01	0.47	22.42	16	7.54	158		23.32	
163	Mariaville L	7/22/2007		2.45	1.5	0.031	0.00	0.01	0.75	53.37	15	7.99	150		24.08	
163	Mariaville L	8/4/2007		2.40	1.5	0.035	0.00	0.01	0.80	50.12	15	8.51	210		27.98	
163	Mariaville L	9/5/2007		2.50	1.5	0.044	0.01	0.01	0.78	39.29	14	8.80	161	14.6	29.50	
163	Mariaville L	9/16/2007		2.48	1.5	0.044	0.00	0.05	1.05	52.51	13	8.07	186		26.54	
163	Mariaville L	9/29/2007		2.40	1.5	0.041	0.02	0.02	0.68	36.50	36	8.42	181		31.52	
163	Mariaville L	10/14/2007				0.034	0.06	0.03	0.81	52.00	10	8.35	249		37.00	
163	Mariaville L	6/8/2008		1.60	1.5	0.017	0.01	0.02	0.31	41.11	16	7.74	250	11.9	8.87	
163	Mariaville L	6/25/2008		1.25	1.5	0.026	0.01	0.02	0.72	60.79	22	7.50	201		20.98	
163	Mariaville L	7/6/2008		1.20	1.5	0.033	0.01	0.02	0.67	44.51	49	8.67	179		21.24	
163	Mariaville L	7/20/2008		1.00	1.5	0.047	0.02	0.03	1.16	53.94	58	8.79	127		32.28	
163	Mariaville L	8/2/2008		0.85	1.5	0.062	0.00	0.20	0.43	15.18	82	7.41	147	13.6	28.96	
163	Mariaville L	8/20/2008		0.80	1.5	0.063	0.01	0.11	0.56	19.67	31	8.49	204		49.92	
163	Mariaville L	9/1/2008		0.45	1.5	0.072	0.01	0.05	0.50	15.20	28	8.52	159		78.72	
163	Mariaville L	9/14/2008		0.50	1.5	0.078	0.01	0.18	0.53	14.90	25	7.83	176		65.70	
163	Mariaville L	07/11/2009	2.8	1.75	1.0	0.042	0.00	0.01	0.48	25.14	83	9.26	142	14.6	7.82	
163	Mariaville L	07/27/2009	2.9	1.40	1.0	0.046	0.01	0.04	0.69	33.48	106	9.41	102		1.15	
163	Mariaville L	08/16/2009	2.9	1.65	1.0	0.028	0.01	0.02	0.45	35.59	61	8.91	119		3.40	
163	Mariaville L	08/24/2009	2.8	1.45	1.0	0.038	0.01	0.02	0.48	27.89	53	9.34	105		3.00	
163	Mariaville L	09/08/2009	2.9	2.05	1.0	0.046	0.01	0.01	0.55	26.27	40	8.51	79	12.6	11.00	
163	Mariaville L	5/23/2010		2.00		0.020	0.02	0.02			24	7.11	181	13.2		
163	Mariaville L	6/8/2010		2.35	1.5	0.019	0.02	0.05			12	7.41	189		0.10	
163	Mariaville L	6/22/2010		1.90		0.016	0.03	0.02	0.52	71.53	24	7.80	192		3.00	
163	Mariaville L	7/6/2010		1.15	1.5	0.020	0.03	0.02	0.44	49.05	12	7.39	187		4.90	
163	Mariaville L	7/18/2010		1.00	1.5	0.025	0.02	0.03	0.47	41.68	15	7.56	149	15.5	8.10	
163	Mariaville L	8/1/2010		0.40	1.5	0.038	0.03	0.02	0.54	31.54	47	8.24	203		4.00	
163	Mariaville L	8/15/2010		1.50	0.8	0.054	0.01	0.02	0.67	27.10	14	9.05	202		18.00	
163	Mariaville L	8/29/2010		0.80	1.5	0.044	0.02	0.02	0.51	26.00	20	8.30	204		21.00	
163	Mariaville L	9/6/2010				Bloom										
163	Mariaville L	10/3/2010				bloom										
163	Mariaville L	6/6/2011	2.9	1.65	1.0	0.086	0.05	0.03	0.52	13.13	56	9.42	171	21.9	0.30	
163	Mariaville L	6/27/2011	2.8	2.15	1.0	0.058	0.03	0.05	0.47	17.80	50	8.91	170		0.20	
163	Mariaville L	7/24/2011	2.9	1.85	1.0	0.061	0.04	0.08	0.53	19.06	46	9.44	145		10.20	
163	Mariaville L	August 11				bloom										
163	Mariaville L	8/21/2011	2.8	1.85	1.5	0.061	0.01	0.02	0.78	27.97	29	8.59	182		5.70	
163	Mariaville L	6/8/2014	4.2	2.15	1.5	0.028	0.02	0.04	0.38	30.40	33	7.25	221	41.0	9.90	
163	Mariaville L	6/22/2014	4.2	2.10	1.5	0.034			0.43	28.42	33	7.88	222		4.50	
163	Mariaville L	7/6/2014	4.3	1.80	1.5	0.040	0.01	0.05	0.61	33.80	30	7.76	224		7.90	
163	Mariaville L	7/20/2014	4.1	1.85	1.5	0.031			0.53	37.61	27	7.37	231		10.40	
163	Mariaville L	8/3/2014	3.9	1.50	1.5	0.031	0.01	0.03	0.67	47.73	16	7.86	234	15.4	12.70	
163	Mariaville L	8/3/2014														
163	Mariaville L	8/17/2014	4.0	0.75	1.5	0.057			0.76	28.99	22	7.34	231		22.00	
163	Mariaville L	9/1/2014	3.9	0.85	1.5	0.055	0.01	0.01	1.17	46.85	22	8.41	236		29.50	
163	Mariaville L	9/14/2014	4.0	0.78	1.5	0.062			0.79	28.05	18	7.49	240		19.10	
163	Mariaville L	6/8/2015	4.0	1.90	1.5	0.012			0.34	29.57	18	7.30	266		6.40	
163	Mariaville L	6/20/2015	4.0	1.90	1.5	0.023	0.00	0.03	0.46	19.91	17	7.95	251		14.70	47.0
163	Mariaville L	7/6/2015	4.0	1.40	1.5	0.030			0.70	23.50	26	7.63	255		18.10	
163	Mariaville L	7/19/2015	4.0	1.90	1.5	0.032			0.58	18.30	20	7.78	262	15.3	19.60	
163	Mariaville L	8/2/2015	4.2	1.20	1.5	0.038			0.84	22.32	27	8.58	263		44.90	
163	Mariaville L	8/15/2015	4.0	0.80	1.5	0.055	0.01	0.02	1.15	20.95	20	8.76	276		75.40	49.2
163	Mariaville L	8/24/2015				Bloom										
163	Mariaville L	8/30/2015				bloom										
163	Mariaville L	8/30/2015	4.0	1.00	1.5	0.063			1.01	16.12	17	7.84	268		47.40	
163	Mariaville L	7/8/2007		2.50	1.5	0.022	0.01	0.03	0.63	64.24	27	7.95	175	13.4	14.24	
163	Mariaville L	7/20/2007		2.43	1.5	0.046	0.00	0.01	0.47	22.42	16	7.54	158		23.32	
163	Mariaville L	7/22/2007		2.45	1.5	0.031	0.00	0.01	0.75	53.37	15	7.99	150		24.08	
163	Mariaville L	5/30/2005	4.0			0.010										
163	Mariaville L	6/19/2005	4.4			0.018										
163	Mariaville L	7/7/2005	4.4			0.022										
163	Mariaville L	7/17/2005	4.1			0.026										
163	Mariaville L	7/31/2005	4.1			0.033										
163	Mariaville L	8/14/2005	4.0			0.049										
163	Mariaville L	8/28/2005	4.0			0.062										
163	Mariaville L	9/10/2005	3.9			0.051										

LNum	PName	Date	Zbot	Zsd	Zsamp	Tot.P	NO3	NH4	TDN	TN/TP	TColor	pH	Cond25	Ca	Chl.a	Cl
163	Mariaville L - Site 2	7/8/2007	2.9	2.20	1.0	0.031	0.01	0.01	0.76	54.47	26	9.3	158	13.2	9.00	
163	Mariaville L - Site 2	7/22/2007	3.8	1.60	1.0	0.040	0.00	0.01	0.73	40.67	25	9.0	137		9.49	
163	Mariaville L - Site 2	8/5/2007	2.7	1.70	1.0	0.045	0.00	0.01	0.83	40.57	31	9.2	126		10.45	
163	Mariaville L - Site 2	8/19/2007	2.6	1.95	1.0	0.069	0.00	0.01	0.71	22.96	22	8.8	135		1.24	
163	Mariaville L - Site 2	9/2/2007	2.7	1.68	1.0	0.067	0.00	0.01	0.83	27.43	25	9.1	147	12.8	7.20	
163	Mariaville L - Site 2	9/16/2007	2.6	2.60	1.0	0.058	0.00	0.01	0.71	27.05	19	8.6	180		6.29	
163	Mariaville L - Site 2	6/8/2008	2.8	1.83		0.034	0.01	0.02	0.71	46.25	35	9.19	128	10.7	0.20	
163	Mariaville L - Site 2	6/23/2008	3.0	1.25	1.0	0.071	0.01	0.02	0.80	24.67	34	9.10	135		9.32	
163	Mariaville L - Site 2	7/6/2008	2.9	1.80	1.0	0.054	0.01	0.02	0.87	35.37	40	9.61	148		7.05	
163	Mariaville L - Site 2	8/2/2008	2.8	1.45	1.0	0.079	0.01	0.01	1.39	38.83	58	7.55	104	11.0	5.12	
163	Mariaville L - Site 2	8/18/2008	2.9	1.45	1.0	0.057	0.01	0.04	0.67	25.76	45	9.22	105		2.46	
163	Mariaville L - Site 2	9/1/2008	2.8	1.55	1.0	0.068	0.01	0.00	0.47	15.29	48	9.24	123		9.69	
163	Mariaville L - Site 2	9/19/2008	2.6	1.15		0.056	0.02	0.03	0.56	21.95	29	8.75	105		11.78	

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
163	Mariaville L	6/15/1999	Epi	25	24	2	3	2	6											
163	Mariaville L	6/27/1999	Epi	27	25	2	3	2	2											
163	Mariaville L	7/11/1999	Epi	21	23	3	3	4	5											
163	Mariaville L	7/25/1999	Epi	27	27	3	4	3	1											
163	Mariaville L	8/8/1999	Epi	21		3	3	4	12											
163	Mariaville L	8/22/1999	Epi	18	22	3	4	4	125											
163	Mariaville L	9/5/1999	Epi	24	24	3	4	3	125											
163	Mariaville L	9/19/1999	Epi	19	17	3	1	4	15											
163	Mariaville L	6/3/2000	Epi	21	19	3	2	2												
163	Mariaville L	6/19/2000	Epi	20	19	3	3	4	1235											
163	Mariaville L	7/2/2000	Epi	25	23	4	4	4	1234											
163	Mariaville L	7/16/2000	Epi	22	21	2	4	3	12											
163	Mariaville L	8/6/2000	Epi	21	22	4	3	4	12345											
163	Mariaville L	8/20/2000	Epi	13	21	3	2	4	1345											
163	Mariaville L	9/3/2000	Epi	19	24			4	1345											
163	Mariaville L	9/17/2000	Epi	17	18	4	1	5	1345											
163	Mariaville L	6/24/2001	Epi	18	20	3	1	2	5											
163	Mariaville L	7/8/2001	Epi	24	22	3	1	4	145											
163	Mariaville L	7/23/2001	Epi	30	27	4	2	3	134											
163	Mariaville L	8/5/2001	Epi	27	27	4	2	3	13											
163	Mariaville L	8/19/2001	Epi	27	26	5	3	4	134											
163	Mariaville L	9/3/2001	Epi	23	22	5	1	4	134											
163	Mariaville L	9/16/2001	Epi	18	19	5	3	4	134											
163	Mariaville L	9/30/2001	Epi	17	17	3	1	4	1345											
163	Mariaville L	06/09/02	Epi	23	20	2	2	2	5											
163	Mariaville L	06/23/02	Epi	23	23	2	3	2	5											
163	Mariaville L	07/07/02	Epi	21	23	2	3	3	5											
163	Mariaville L	07/21/02	Epi	29	24	2	3	2	8											
163	Mariaville L	08/04/02	Epi	33	28	3	2	1												
163	Mariaville L	08/18/02	Epi	28	27	3	3	2	8											
163	Mariaville L	09/01/02	Epi	21	13	3	3	4	135											
163	Mariaville L	09/15/02	Epi	24	21	3	3	4	1345											
163	Mariaville L	6/1/2003	Epi	12	15	2	1	4	5											
163	Mariaville L	6/15/2003	Epi	21	18	2	3	4	5											
163	Mariaville L	6/29/2003	Epi	24	24	2	3	1	8											
163	Mariaville L	7/13/2003	Epi	18	23	3	4	4	125											
163	Mariaville L	7/29/2003	Epi	18	23	3	3	4	1257											
163	Mariaville L	8/10/2003	Epi	28	26	4	4	3	123											
163	Mariaville L	8/24/2003	Epi	16	22	3	3	4	12345											
163	Mariaville L	9/7/2003	Epi	20	19	4	3	3	128											
163	Mariaville L	5/14/2004	Epi	23	21	2	2	1	5											
163	Mariaville L	6/27/2004	Epi	18	21	2	2	3	1258											
163	Mariaville L	7/11/2004	Epi	21	23	3	3	4	1234											

LNum	PName	Date	Type	TAir	TH20	QA	QB	QC	QD	QE	QF	QG	AQ-PC	AQ-Chla	MC-LR	Ana-a	Cyl	FP-Chl	FP-BG	HABform	ShoreHAB
163	Mariaville L	7/25/2004	Epi	24	24	3		3	12												
163	Mariaville L	8/8/2004	Epi	16	21	3	3	3	1357												
163	Mariaville L	8/23/2004	Epi	19	21	4	3	4	123												
163	Mariaville L	9/6/2004	Epi	17	21	4	3	4	12345												
163	Mariaville L	9/19/2004	Epi	9	18	3	3	4	125												
163	Mariaville L	5/30/2005	Epi	16	16	2	1	4	5												
163	Mariaville L	6/19/2005	Epi	18	21	2	3	3	5												
163	Mariaville L	7/7/2005	Epi	21	22	2	4	2	258												
163	Mariaville L	7/17/2005	Epi	24	26	2	4	4	25												
163	Mariaville L	7/31/2005	Epi	19	24	3	4	3	12												
163	Mariaville L	8/14/2005	Epi	27	27	4	4	3	12348												
163	Mariaville L	8/28/2005	Epi	22	23	5	4	4	12345												
163	Mariaville L	9/10/2005	Epi	17	21	5	3	4	1234												
163	Mariaville L	6/4/2006	Epi	13	18	2	2	4	5												
163	Mariaville L	6/18/2006	Epi	28	21	3	3	2	26												
163	Mariaville L	7/4/2006	Epi	23	23	3	3	4	124												
163	Mariaville L	7/16/2006	Epi	26	26	3	3	2	1248												
163	Mariaville L	7/30/2006	Epi	23	25	3	3	4	125												
163	Mariaville L	8/15/2006	Epi	20	23	3	3	4	12345												
163	Mariaville L	9/4/2006	Epi	15	18	4	4	5	12345												
163	Mariaville L	9/17/2006	Epi	17	18	3	4	4	1245												
163	Mariaville L	7/8/2007	Epi	27	23	3	3	4	1245												
163	Mariaville L	7/20/2007	Epi	19	21	4	3	3	1234												
163	Mariaville L	7/22/2007	Epi	25	22	3	3	2	12												
163	Mariaville L	8/4/2007	Epi	23	25	4	3	2	1234												
163	Mariaville L	9/5/2007	Epi	21	22	4	2	3	1234												
163	Mariaville L	9/16/2007	Epi	17	12	3	3	4	125												
163	Mariaville L	9/29/2007	Epi	25	18	3	3	3	124												
163	Mariaville L	10/14/2007	Epi			4	3	5	1235												
163	Mariaville L	6/8/2008	Epi	26	22	3	1	2	15												
163	Mariaville L	6/25/2008	Epi	22	21	3	1	2	15												
163	Mariaville L	7/6/2008	Epi	23	25	3	2	2	134												
163	Mariaville L	7/20/2008	Epi	21	25	3	2	3	134												
163	Mariaville L	8/2/2008	Epi	21	23	3	1	4	135												
163	Mariaville L	8/20/2008	Epi	21	22	3	2	3	145												
163	Mariaville L	9/1/2008	Epi	22	22	4	1	3	134												
163	Mariaville L	9/14/2008	Epi	24	21																
163	Mariaville L	07/11/2009	Epi	24	24	2	5	4	25												
163	Mariaville L	07/27/2009	Epi	24	24	3	4	4	2												
163	Mariaville L	08/16/2009	Epi	31	27	3	5	4	2												
163	Mariaville L	08/24/2009	Epi	23	25	1	4	4	2												
163	Mariaville L	09/08/2009	Epi	28	23	3	5	4	2				51.53								
163	Mariaville L	5/23/2010	Epi		19				0	0											
163	Mariaville L	6/8/2010	Epi	19	20	2	3	4	58	0	4										
163	Mariaville L	6/22/2010	Epi	21	22	2	3	2	0	0	0										
163	Mariaville L	7/6/2010	Epi	31	26	3	3	1	2	0	0										
163	Mariaville L	7/18/2010	Epi	23	25	3	2	4	25												
163	Mariaville L	8/1/2010	Epi	21	23	3	3	2	12	0	4	296.00		0.00							
163	Mariaville L	8/15/2010	Epi	21	23	2	3	3	12												
163	Mariaville L	8/29/2010	Epi		20	3	3	3	1	0	0										
163	Mariaville L	9/6/2010	Epi									395.00		0.06							
163	Mariaville L	10/3/2010	Epi									90.00		0.01							
163	Mariaville L	6/6/2011	Epi	24	22	3	5	4	2	0	0										
163	Mariaville L	6/27/2011	Epi	27	25	2	5	4	2	0	0	8.30	6.20								
163	Mariaville L	7/24/2011	Epi	29	28	1	5	4	2	0	0	23.80	3.70								
163	Mariaville L	7/31/2011	Epi											0.10							
163	Mariaville L	8/11/2011	Epi											1.00	<0.360					df	
163	Mariaville L	8/21/2011	Epi	27	25	3	5	4	2	0	0	23.90	7.20	<0.30	<0.178						

LNum	PName	Date	Type	TAir	TH2O	QA	QB	QC	QD	QF	QG	AQ-PC	AQ-Chla	MC-LR	Ana-a	Cyl	FP-Chl	FP-BG	HAB form	Shore HAB
163	Mariaville L	9/17/2011	Epi											0.50						
163	Mariaville L	6/8/2014	Epi	30	23	3	3	3	1	0	0	0.40	2.30	<1.83	<0.17	<0.001	1.47	0.00		
163	Mariaville L	6/22/2014	Epi	24	23	3	4	3	12	0	0	4.50	0.60	<0.58	<0.44	<0.002	2.00	0.00	i	
163	Mariaville L	7/6/2014	Epi	20	22	3	2	3	1	0	0	9.80	0.60	<0.62	<0.03	<0.002	2.86	0.77	i	
163	Mariaville L	7/20/2014	Epi	21	23	3	2	3	1	4	0	13.90	0.50	<0.39	<0.21	<0.003	4.84	3.25	i	
163	Mariaville L	8/3/2014	Epi	26	24	3	3	3	1	4	0	20.10	0.50	<0.33	<0.01	<0.002	5.43	4.35	d	
163	Mariaville L	8/3/2014	Epi											<0.67	<0.03	<0.003	87.49	84.95	a	
163	Mariaville L	8/17/2014	Epi	19	19	3	3	3	1	0	0	32.40	0.80	<0.39	<0.03	<0.001	9.77	7.44	i	
163	Mariaville L	9/1/2014	Epi	25	23	3	2	3	12	0	0	42.90	0.90	<0.29	<0.14	<0.002	14.02	11.06	i	
163	Mariaville L	9/14/2014	Epi	11	17	3	3	3	1	0	0	44.50	0.60	<0.24	<0.03	<0.001	10.58	8.46	i	
163	Mariaville L	5/25/2015	Epi	24	18	3	2	2	1	0	0	16.50	0.50	<1.34	<0.032	<0.080	1.63	0.43	l	l
163	Mariaville L	6/8/2015	Epi	14	18	3	2	2	5	0	0	11.00	0.40	<0.77	<0.126	<1.739	2.00	0.88	l	l
163	Mariaville L	6/20/2015	Epi	18	23	3	2	3	5	0	0	26.90	0.70	<0.55	<0.004	<0.003	6.49	4.76	l	l
163	Mariaville L	7/6/2015	Epi	23	23	3	3	3	1	0	0	37.50	0.90	<0.86	<0.008	<0.046	8.19	6.39	l	l
163	Mariaville L	7/19/2015	Epi	26	26	3	3	3	1	0	0	26.10	1.10	<0.30	<0.009	<0.049	5.62	3.38	l	l
163	Mariaville L	8/2/2015	Epi	22	25	3	1	3	1	0	0	46.73	0.65	<0.25	<0.004	<0.015	11.32	9.94	l	l
163	Mariaville L	8/15/2015	Epi	23	24	4	2	3	3	4	0	167.80	1.40	<0.44	0.06	<0.014	41.43	40.17	FH	l
163	Mariaville L	8/24/2015	Epi											<0.57	<0.017	<0.042	31.26	27.46		
163	Mariaville L	8/30/2015	Epi											<0.56	<0.012	<0.048	20.59	19.10		
163	Mariaville L	8/30/2015	Epi	20	22	4	3	4	134	4	4			<0.27	<0.004	<0.012	21.53	20.47	BC	BC
163	Mariaville L-2	5/30/2005	Epi																	
163	Mariaville L-2	6/19/2005	Epi																	
163	Mariaville L-2	7/7/2005	Epi																	
163	Mariaville L-2	7/17/2005	Epi																	
163	Mariaville L-2	7/31/2005	Epi																	
163	Mariaville L-2	8/14/2005	Epi																	
163	Mariaville L-2	8/28/2005	Epi																	
163	Mariaville L-2	9/10/2005	Epi																	
163	Mariaville L-2	7/8/2007	Epi	26	23	2	5	4	2											
163	Mariaville L-2	7/22/2007	Epi	23	22	3	5	3	2											
163	Mariaville L-2	8/5/2007	Epi	22	25	2	4	4	2											
163	Mariaville L-2	8/19/2007	Epi	20	21	2	3	2	2											
163	Mariaville L-2	9/2/2007	Epi	19	22	2	4	4	2											
163	Mariaville L-2	9/16/2007	Epi	15	17	2	4	4	256											
163	Mariaville L-2	6/8/2008	Epi	27	24	3	3	4	2											
163	Mariaville L-2	6/23/2008	Epi	21	22	3	4	4	2											
163	Mariaville L-2	7/6/2008	Epi	27	25	3	4	4	2											
163	Mariaville L-2	8/2/2008	Epi	35	23	3	4	4	5											
163	Mariaville L-2	8/18/2008	Epi	26	24	3	5	5	2											
163	Mariaville L-2	9/1/2008	Epi	34	23	2	5	5	2											
163	Mariaville L-2	9/19/2008	Epi	20	17	3	5	4	2											

Legend Information

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

Appendix B- Priority Waterbody Listing for Mariaville Lake

Mariaville Lake (1201-0113)

Impaired Seg

Waterbody Location Information

Revised: 04/06/2010

Water Index No:	H-240- 70-P570	Drain Basin:	Mohawk River
Hydro Unit Code:	02020004/310	Str Class:	B
Waterbody Type:	Lake (Eutrophic)	Reg/County:	4/Schenectady Co. (47)
Waterbody Size:	193.1 Acres	Quad Map:	AMSTERDAM (J-24-1)
Seg Description:	entire lake		

Water Quality Problem/Issue Information

(CAPS indicate MAJOR Use Impacts/Pollutants/Sources)

Use(s) Impacted	Severity	Problem Documentation
RECREATION	Impaired	Known
Aesthetics	Stressed	Known

Type of Pollutant(s)

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

Source(s) of Pollutant(s)

Known: - - -
Suspected: AGRICULTURE, URBAN/STORM RUNOFF
Possible: On-Site/Septic Syst

Resolution/Management Information

Issue Resolvability:	1 (Needs Verification/Study (see STATUS))	
Verification Status:	3 (Cause Identified, Source Unknown)	
Lead Agency/Office:	DOW/Reg4	Resolution Potential: Medium
TMDL/303d Status:	n/a->4b?	

Further Details

Overview

Public bathing and other recreational uses (swimming, fishing, boating) in Mariaville Lake are impaired due to high nutrient loads, excessive aquatic weed growth, occasional algal blooms and reduced water clarity. Inadequate on-site septic systems are considered the source of greatest concern.

Water Quality Sampling

Mariaville Lake has been sampled as part of the NYSDEC Citizen Statewide Lake Assessment Program (CSLAP) beginning in 2002 continuing through the present. An Interpretive Summary report of the findings of this sampling was published in 2009. These data indicate that the lake continues to be best characterized as eutrophic, or highly productive. Phosphorus levels in the lake typically exceed the state guidance values indicating impacted/stressed recreational uses. Corresponding transparency measurements have begun to occasionally fail to meet the recommended minimum for swimming beaches. Measurements of pH are occasionally high but typically fall within the state water quality range of 6.5 to 8.5. The lake water is weakly to moderately colored, but color does not influence water transparency. (DEC/DOW, BWAM/CSLAP, January 2009)

Recreational Assessment

Public perception of the lake and its uses is also evaluated as part of the CSLAP program. This assessment indicates

recreational suitability of the lake to be mostly unfavorable. The recreational suitability of the lake is described most frequently as "slightly" or "substantially" impacted. The lake itself is most often described as "having a definite algal greenness," an assessment that is consistent measured water quality characteristics. Assessments have noted that aquatic plants regularly grow to the lake surface, often densely and are routinely cited as impacting recreational uses. (DEC/DOW, BWAM/CSLAP, January 2009)

Lake Uses

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

Previous Assessment

The lake is relatively shallow (11 feet) and subject to summer algal blooms and dense aquatic weed growth. Conversion of summer cottages to year-round residences with inadequate and/or failing on-site septic systems all along the lake shore was previously noted as a major contributing source of pollution to the lake. However the lake shore area was sewered in 2006 with the creation of the Mariaville Lake SD#2 and onsite impacts are no longer considered a significant source. Other nonpoint sources as well as previous nutrient loadings remaining in the lake are the most likely current sources. (DEC/DOW, Region 4, April 2010)

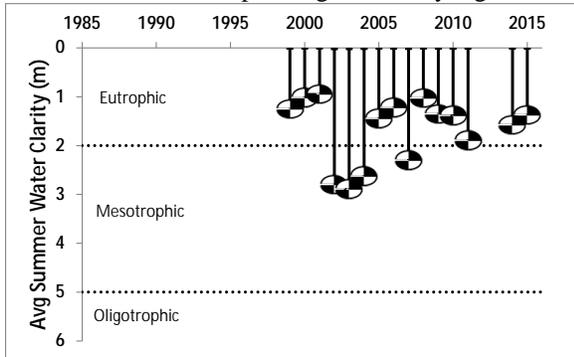
Section 303(d) Listing

Mariaville Lake is not currently included on the NYS 2008 Section 303(d) List of Impaired Waters. However this updated assessment suggests it is appropriate to consider this waterbody for future listing due to elevated phosphorus. Alternatively, a listing as a Category 4b water for which other required control measures (i.e., the WWTP) are adequate to address the impairment may be more appropriate. (DEC/DOW, BWAM/WQAS, January 2010)

Appendix C- Long Term Trends: Mariaville Lake

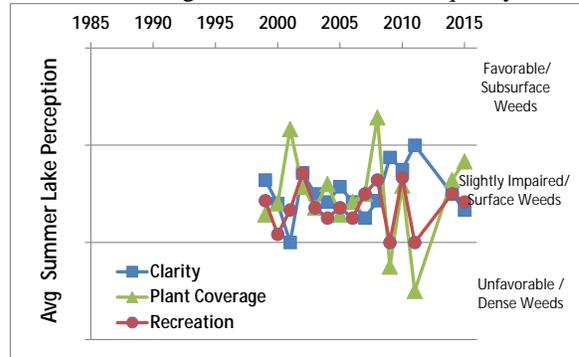
Long Term Trends: Water Clarity

- No clear trends; lower since early 2000s
- Most readings typical of *eutrophic* lakes, lower than expected given clarity/algae levels



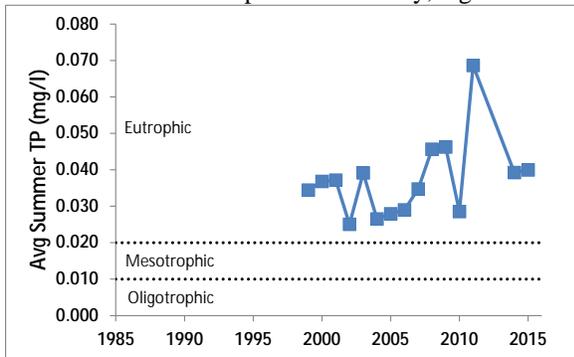
Long Term Trends: Lake Perception

- Highly variable plant coverage
- Recreational perception more closely linked to changes in weeds than water quality



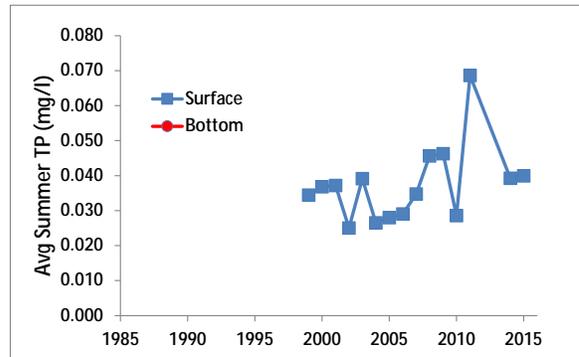
Long Term Trends: Phosphorus

- TP ↑ since early 2000s
- Most readings typical of *eutrophic* lakes, lower than expected for clarity, algae



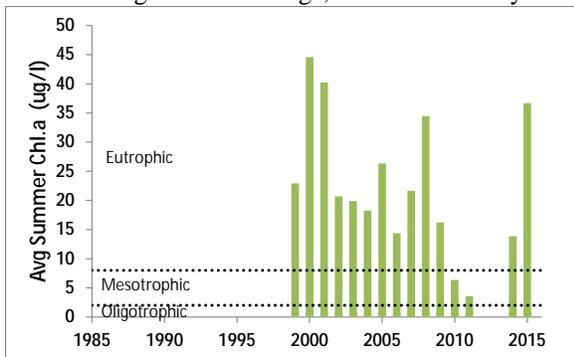
Long Term Trends: Bottom Phosphorus

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



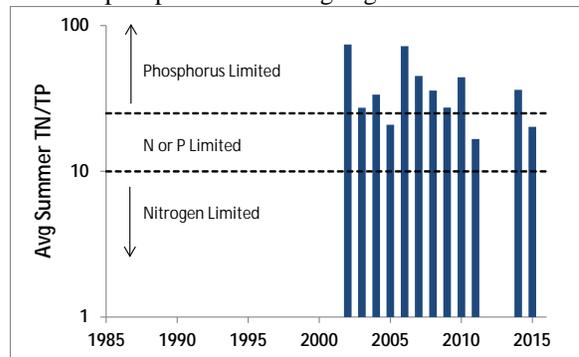
Long Term Trends: Chlorophyll a

- ↓ algae levels but variable since early 00s
- Most readings typical of *eutrophic* lakes, in range of TP readings; lower than clarity



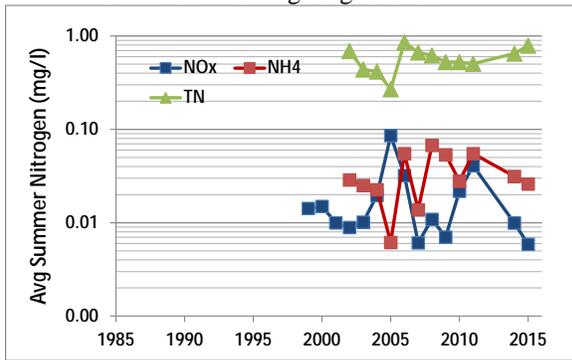
Long Term Trends: N:P Ratio

- Decreasing ratios since early 2000s
- These readings still likely indicate phosphorus limits algae growth



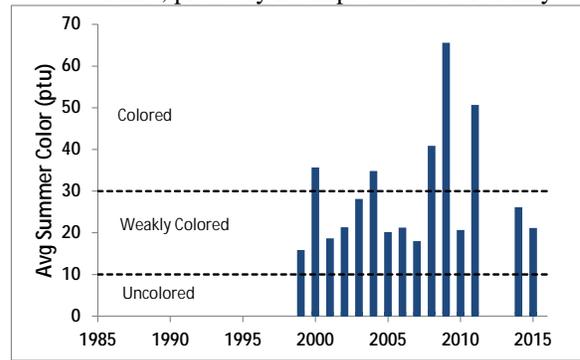
Long Term Trends: Nitrogen

- ↑ NH₄ since mid-00s; NO_x & TN variable
- Moderate to high total nitrogen readings consistent with high algae levels



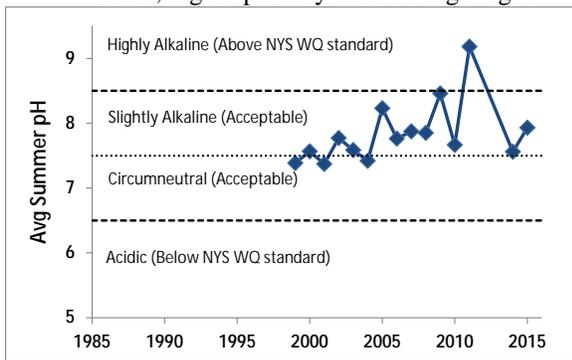
Long Term Trends: Color

- Variable readings since late 1990s
- Most readings typical of *weakly colored* lakes; probably no impact on water clarity



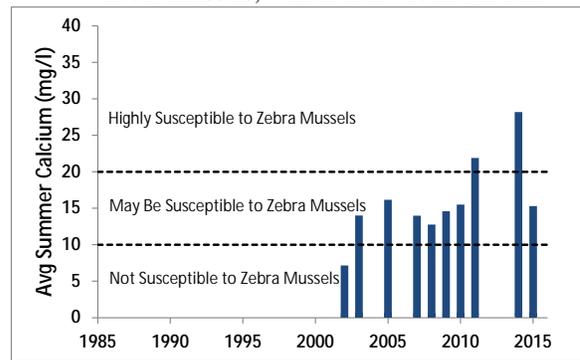
Long Term Trends: pH

- ↑ pH since early 2000s, but variable
- Most readings typical of *slightly alkaline* lakes; higher pH may indicate high algae



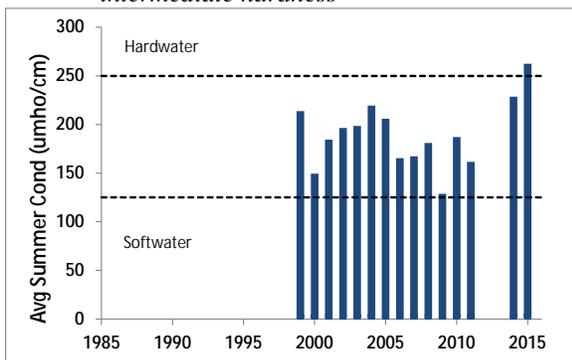
Long Term Trends: Calcium

- No trends in calcium levels
- Most readings indicate some susceptibility to zebra mussels, which aren't found in lake



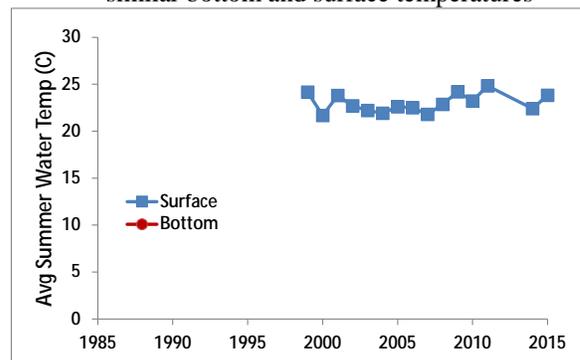
Long Term Trends: Conductivity

- Higher in 2015; may be increasing
- Most readings typical of lakes with *intermediate hardness*



Long Term Trends: Water Temperature

- No clear trends
- Lack of thermal stratification suggests similar bottom and surface temperatures



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.

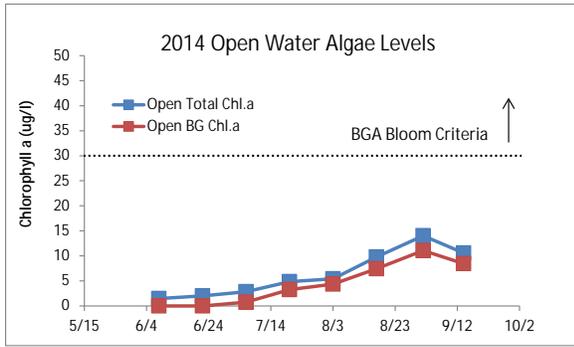


Figure D1:
2014 Open Water Total and BGA Chl.a

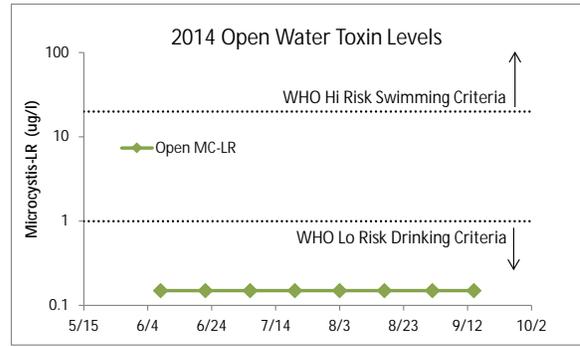


Figure D2:
2014 Open Water Microcystin-LR

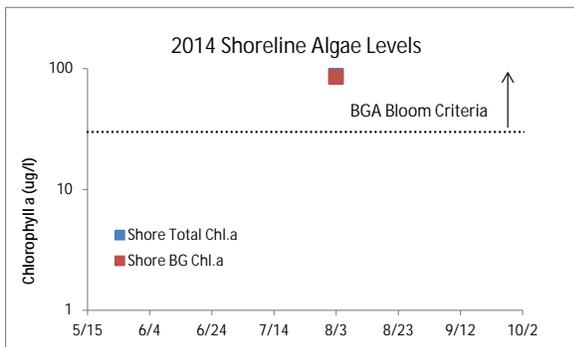


Figure D3:
2014 Shoreline Total and BGA Chl.a

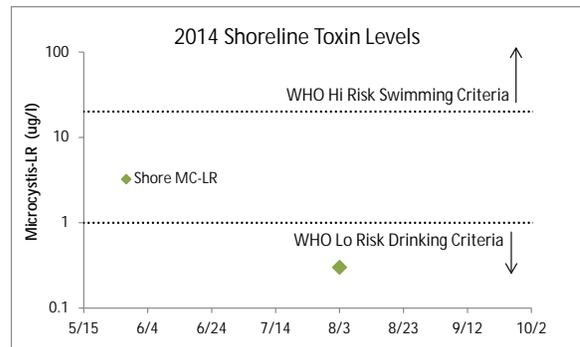


Figure D4:
2014 Shoreline Microcystin-LR

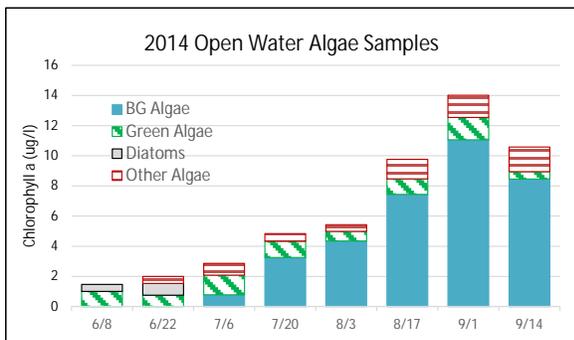


Figure D5:
2014 Open Water Algae Types

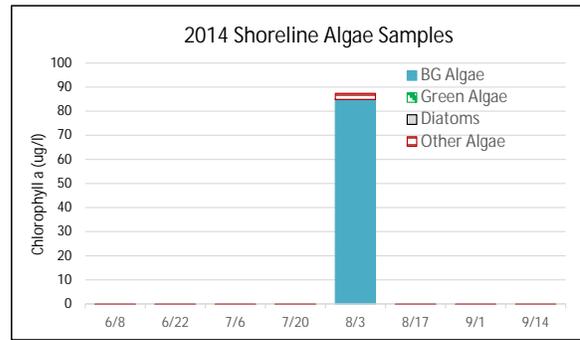


Figure D6:
2014 Shoreline Algae Types

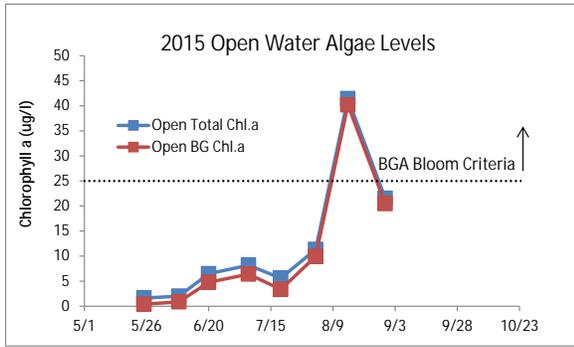


Figure D7:
2015 Open Water Total and BGA Chl.a

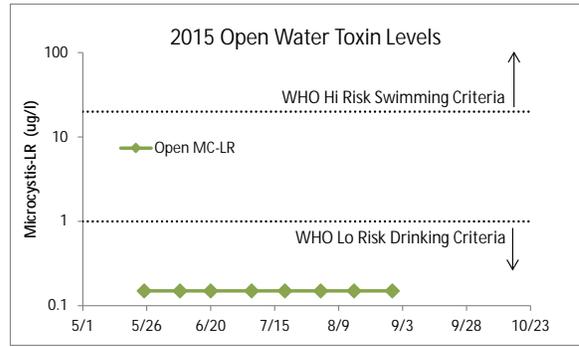


Figure D8:
2015 Open Water Microcystin-LR

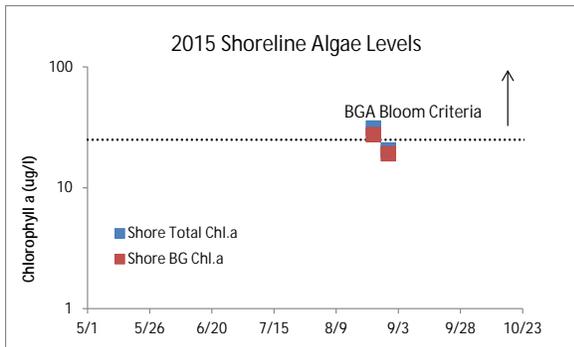


Figure D9:
2015 Shoreline Total and BGA Chl.a

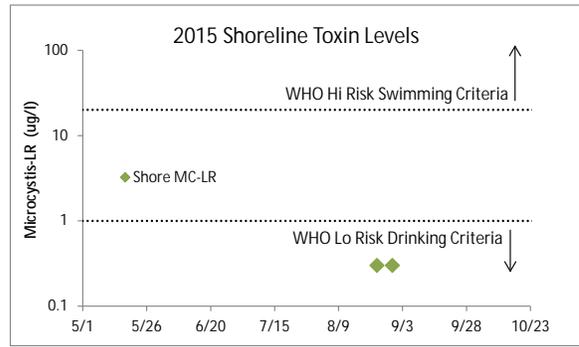


Figure D10:
2015 Shoreline Microcystin-LR

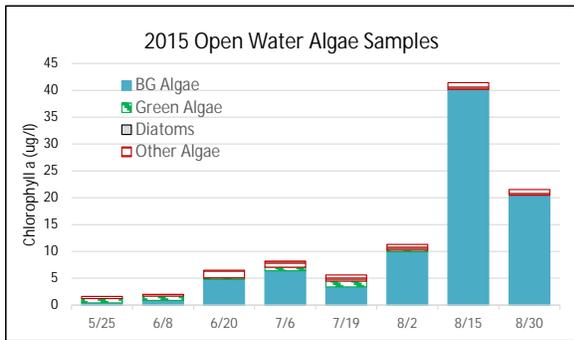


Figure D11:
2015 Open Water Algae Types

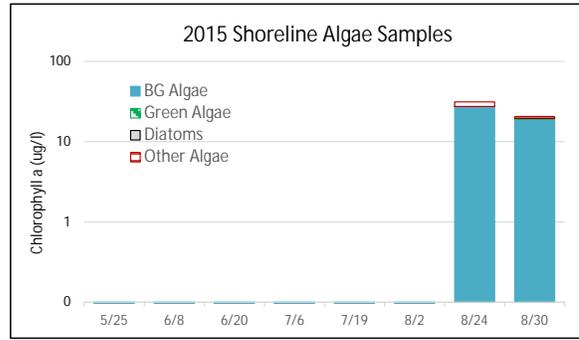


Figure D12:
2015 Shoreline Algae Types

Appendix E: AIS Species in Schenectady County

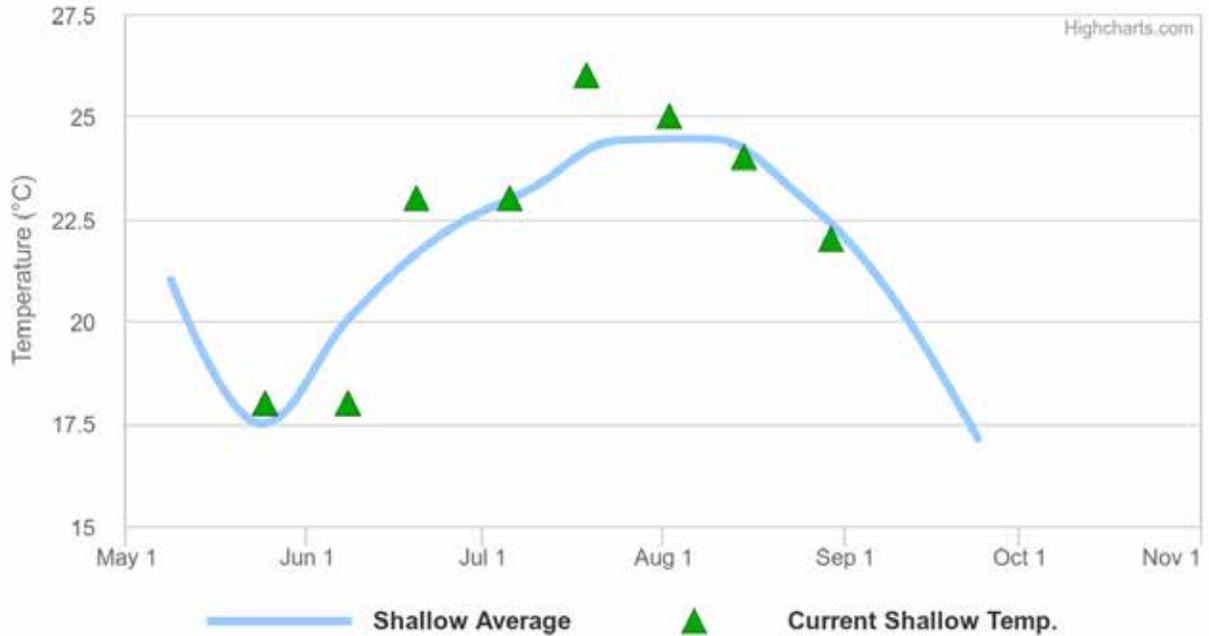
The table below shows the invasive aquatic plants and animals that have been documented in Schenectady County, as cited in either the iMapInvasives database (<http://www.imapinvasives.org/>) or in the NYSDEC Division of Water database. These databases may include some, but not all, non-native plants 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 – Schenectady County			
Waterbody	Kingdom	Common name	Scientific name
Blatnick Pond	Plant	Curly leafed pondweed	<i>Potamogeton crispus</i>
Blatnick Pond	Plant	Water chestnut	<i>Trapa natans</i>
Collins Lake	Plant	Eurasian watermilfoil	<i>Myriophyllum spicatum</i>
Collins Lake	Plant	Curly leafed pondweed	<i>Potamogeton crispus</i>
Collins Lake	Plant	Water chestnut	<i>Trapa natans</i>
Duane Lake	Plant	Curly leafed pondweed	<i>Potamogeton crispus</i>
Duck Pond	Plant	Eurasian watermilfoil	<i>Myriophyllum spicatum</i>
Featherstonhaugh Lake	Plant	Eurasian watermilfoil	<i>Myriophyllum spicatum</i>
Iroquois Lake	Plant	Eurasian watermilfoil	<i>Myriophyllum spicatum</i>
Iroquois Lake	Plant	Brittle naiad	<i>Najas minor</i>
Iroquois Lake	Animal	Virile crayfish	<i>Orconectes virilis</i>
Iroquois Lake	Plant	Curly leafed pondweed	<i>Potamogeton crispus</i>
Iroquois Lake	Plant	Water chestnut	<i>Trapa natans</i>
Mariaville Lake	Plant	Curly leafed pondweed	<i>Potamogeton crispus</i>
Mariaville Lake	Plant	Eurasian watermilfoil	<i>Myriophyllum spicatum</i>
Mohawk River	Animal	Zebra mussel	<i>Dreissena polymorpha</i>
Mohawk River	Plant	Eurasian watermilfoil	<i>Myriophyllum spicatum</i>
Mohawk River	Plant	Water chestnut	<i>Trapa natans</i>
Steinmetz Lake	Plant	Eurasian watermilfoil	<i>Myriophyllum spicatum</i>
Steinmetz Lake	Plant	Curly leafed pondweed	<i>Potamogeton crispus</i>

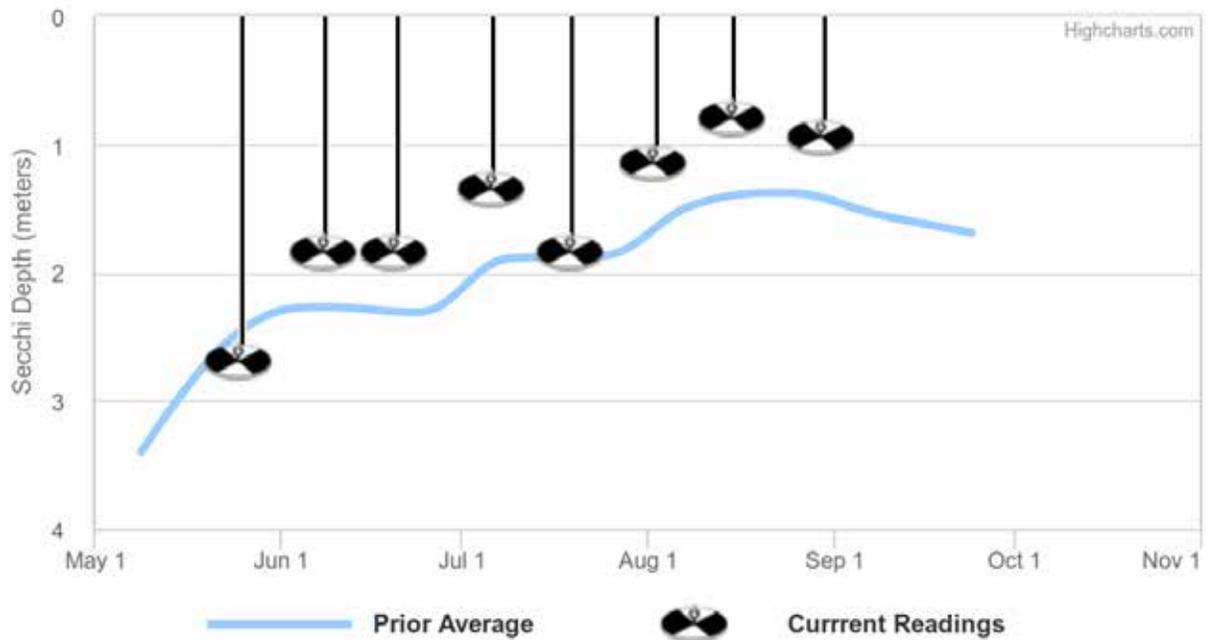
Appendix F: Current Year vs. Prior Averages for Mariaville Lake

Current Year Water Temperatures vs. Prior Average



This year's shallow water sample temperatures are about the same as the average of readings collected from 1999 to 2014.

Current Year Secchi Readings vs. Prior Average



This year's session Secchi readings are about the same as the average of readings collected from 1999 to 2014

Appendix G: Watershed and Land Use Map for Mariaville 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.

