Montgomery Lake Questions and Answers, 2015 CSLAP

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

A1. Water quality conditions in Montgomery Lake were probably similar in 2015 to conditions in 2013 through 2014. Algae levels were slightly lower than usual, but shoreline bloom occurrence and extent was greater than in 2014 but less extensive than in 2013. Most of the other water quality indicators were similar in each of the last few years.

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

A2. Chloride sampling results were typical of lakes with moderate to high levels of road salt runoff, although no biological impacts have been reported or measured in Montgomery Lake.

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

A3. Montgomery Lake had slightly lower water clarity, but lower nutrient levels and algae levels, than nearby lakes. Aquatic plant coverage is higher than in many nearby lakes, but does not appear to affect use (and may be comprised solely of native plants).

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

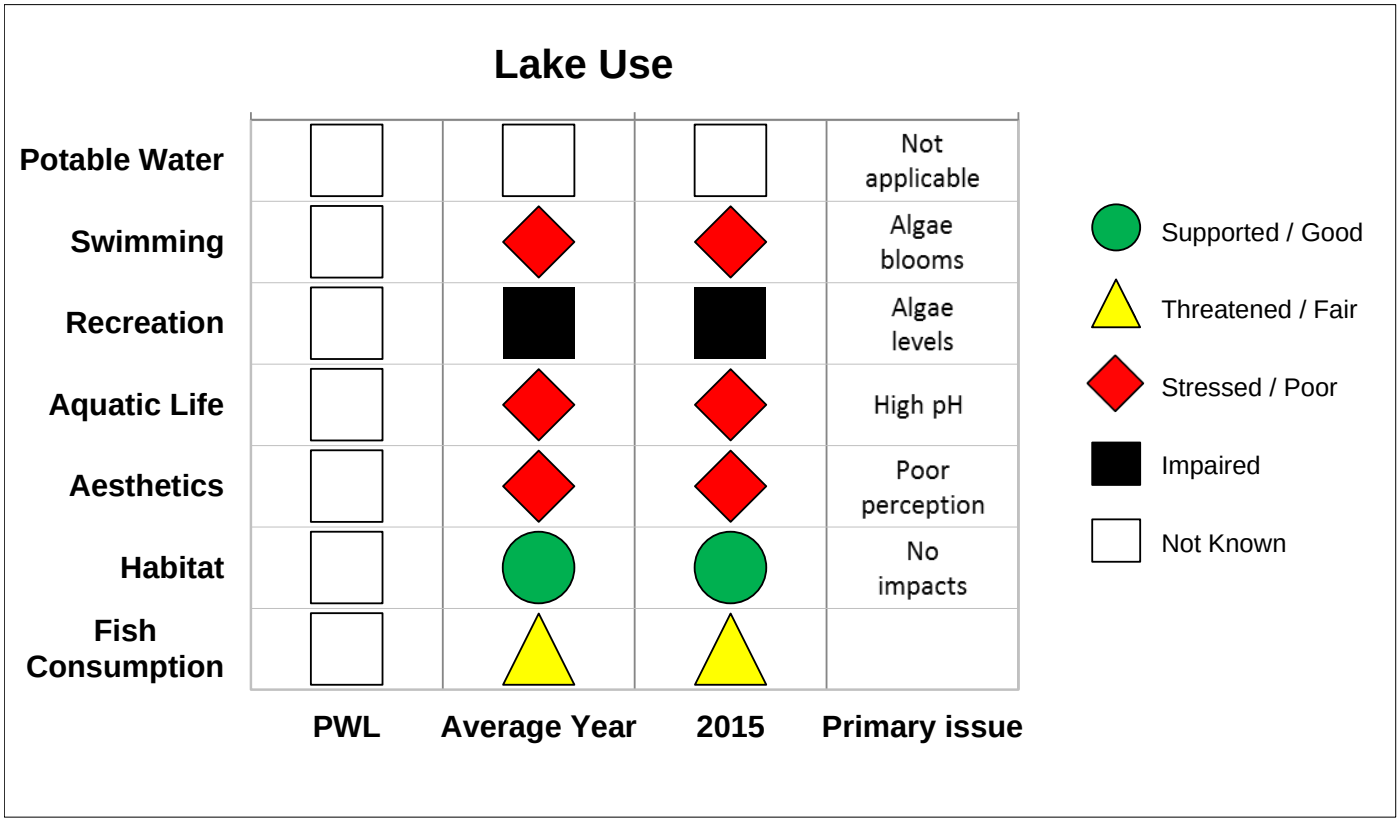
A4. No trends are yet apparent (as expected given only three years of data), but chlorophyll *a*, total nitrogen, ammonia, conductivity and water temperatures have increased slightly over this period.

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

A5. The lake continues to be susceptible to shoreline blue green algae blooms, despite only moderately high nutrient levels. Nutrient controls may reduce the likelihood or intensity of these blooms, although the actual cause of these blooms is not yet known.

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

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

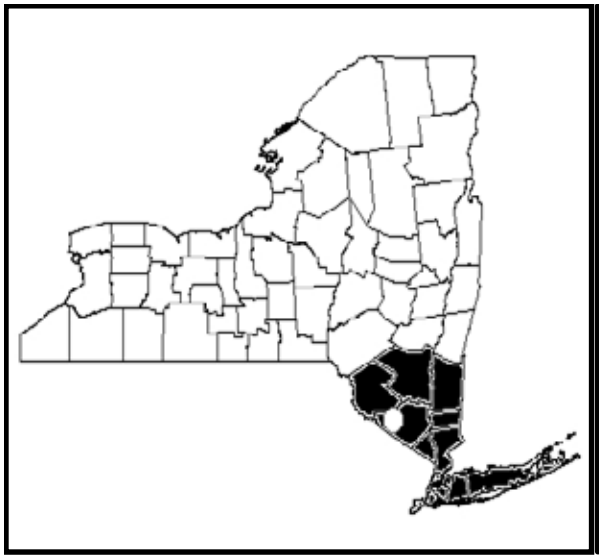


CSLAP 2015 Lake Water Quality Summary:
Montgomery Lake

General Lake Information

Location	Town of Highland
County	Sullivan
Basin	Delaware River
Size	7.8 hectares (19 acres)
Lake Origins	Natural?
Watershed Area	69 hectares (170 acres)
Retention Time	0.9 years
Mean Depth	4.7 meters (estimated)
Sounding Depth	10.0 meters
Public Access?	none
Major Tributaries	Perhaps unnamed ephemeral inlets
Lake Tributary To…	Unnamed outlet to Bodine Lake to Beaver Brook to Delaware River
WQ Classification	B (contact recreation = swimming)
Lake Outlet Latitude	41.524387
Lake Outlet Longitude	- 74.919119
Sampling Years	2013-2015
2015 Samplers	Brenda Derfner
Main Contact	Peter Kolesar

Lake Map



Background

Montgomery Lake is a 226 acre, class B lake found in the Town of Highland in Sullivan, near the Pennsylvania border just southwest of the Catskill Mountain region of New York State. It was first sampled as part of CSLAP in 2013.

It is one of nine CSLAP lakes among the more than 275 lakes and ponds found in Sullivan County, and one of 15 CSLAP lakes among the nearly 1000 lakes and ponds in the Delaware River drainage basin.

Lake Uses

Montgomery 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. Motorboats are not permitting on the lake.

It is not known by the report authors if Montgomery Lake has been stocked as part of any private stocking efforts. It is not stocked by the state of New York.

General statewide fishing regulations are applicable in Montgomery Lake. Bait fish can be taken from the lake, as per specific DEC regulations citing this lake among the *specially designated waters* (http://www.dec.ny.gov/regs/4019.html)

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

Historical Water Quality Data

CSLAP sampling was conducted on Montgomery Lake for the first time in 2013. The CSLAP reports for the lake can be found on the NYSFOLA website at http://nysfola.mylaketown.com, and the NYSDEC web page at http://www.dec.ny.gov/lands/77875.html.

It is not known if the lake has been sampled prior to CSLAP—there are no records of any historical lake monitoring in the DEC files.

None of the unnamed ephemeral tributaries to the lake, nor the outlet of the lake, have been monitored through the NYSDEC Rotating Intensive Basins (RIBS) or stream biomonitoring programs.

Lake Association and Management History

Montgomery Lake is represented by the Montgomery Lake Association. It is not known if the lake association maintains a website, or the extent of their lake management activities.

Summary of 2015 CSLAP Sampling Results

Evaluation of 2015 Annual Results Relative to 2013-2014

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 – Montgomery Lake" section in Appendix C.

Evaluation of Eutrophication Indicators

Chlorophyll *a* readings were higher than normal in 2015, and these readings have increased in each of the last several years. However, neither nutrient (phosphorus) nor water clarity readings have changed in a similar manner. This suggests that the change in each of these trophic indicators may be within the normal range of variability for the lake. The higher algae levels in 2015 may have been coincident with heavy rainfall (and associated runoff) reported during much of 2015.

Shoreline bloom frequency, timing, and duration have varied from year to year, but no open water blooms have been apparent.

Lake conditions normally change in late July; water clarity dropped in response to higher and nutrient algae levels through late July, while algae levels drop after that. These trends were generally apparent in 2015. Shoreline blue green algae blooms were regularly reported in mid to late summer in 2013, but only in late September in 2014 and in August to September in 2015.

The lake can be characterized as *mesoeutrophic,* or highly productive, based on water clarity, total phosphorus (typical of *mesotrophic* lakes), and chlorophyll *a* readings (typical of *eutrophic* lakes), including 2015. The trophic state indices (TSI) evaluation suggests that algae levels are much higher than expected given the nutrient and water clarity readings in the lake. This suggests that spotty algae growth may occur, consistent with the high frequency of shoreline 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 along the shoreline and at times in the open water 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. This may be particularly important along the shoreline, where blooms are much more frequent. However, 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

Ammonia, total nitrogen (TN) and conductivity readings were slightly higher in 2014 and 2015 than in 2013, but (these nitrogen levels) were probably not high enough to trigger the changes in algae. None of the other limnological indicators has exhibited any long-term trends, although these may be more apparent as more data are collected on the lake.

Chloride levels in the 2015 samples, collected for the first time through CSLAP and cited in Appendix A, ranged from 32 to 43 mg/l. These values are within the "moderate" runoff levels cited by the New Hampshire DES. These readings are well below the state potable water quality standard of 250 mg/l, but within the range of values found in most NYS lakes. 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

It is not known if phytoplankton, zooplankton, macrophyte, or macroinvertebrate studies have been conducted at the lake. The fluoroprobe data indicates low algae levels and low blue green algae levels in most open water samples, but very high blue green algae (and overall algae) levels in some samples collected along the shoreline. Late summer blue green algae levels in the open water were higher in 2013 than in 2014, but higher in 2015 than in 2014. The timing of these blooms has shifted in some years, but these blooms are generally more apparent later in the summer. Given only moderate nutrient levels in the lake, it is not yet known why these shoreline blooms are common.

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

Evaluation of Lake Perception

Recreational assessments have improved slightly in the last two years, while water quality assessments and aquatic plant coverage were close to normal. These (water quality and recreational) assessments degrade slightly in late summer, but no clear seasonal trends were apparent in 2015. It is not known if the aquatic plant community is comprised primarily of native or invasive plants. Overall lake perception is summarized on the Lake Scorecard and Lake Condition Summary Table.

Evaluation of Local Climate Change

It is not yet known if air or water temperature readings have exhibited any clear long-term changes, if these readings could indicate local climate change or if any changes can be evaluated through CSLAP. Temperatures have increased in the last few years, but this dataset is too small to evaluate longer-term trends.

Evaluation of Algal Toxins

Algal toxin levels can vary significantly within blooms and from shoreline to lake, and the absence of toxins in a sample does not indicate safe swimming conditions. Fluoroprobe algae levels were below the thresholds for harmful algal blooms (HABs) in the main body of the lake at nearly all times, resulting in low algal toxin levels in the open water. Shoreline blue green algae levels were highly elevated in several samples, indicating bloom conditions, moreso in 2013 and in 2015 than in 2014. However, microcystin (algae toxin) levels were well below the thresholds for safe swimming, and were undetectable in all samples.

Lake Condition Summary

Category	Indicator	Min	Overall Avg	Max	2015 Avg	Classification	2015 Change?	Long-term Change?
Eutrophication Indicators	Water Clarity	0.90	2.15	6.00	2.31	Mesotrophic	Within Normal Range	Not yet known
	Chlorophyll *a*	1.90	10.88	40.20	16.31	Eutrophic	Within Normal Range	Not yet known
	Total Phosphorus	0.010	0.017	0.034	0.017	Mesotrophic	Within Normal Range	Not yet known
Potable Water Indicators	Hypolimnetic Ammonia							
	Hypolimnetic Arsenic							
	Hypolimnetic Iron							
	Hypolimnetic Manganese							
Limnological Indicators	Hypolimnetic Phosphorus							
	Nitrate + Nitrite	0.00	0.01	0.02	0.01	Low NOx	Within Normal Range	Not yet known
	Ammonia	0.01	0.02	0.03	0.03	Low Ammonia	Higher than Normal	Not yet known
	Total Nitrogen	0.16	0.47	0.80	0.60	Low Total Nitrogen	Within Normal Range	Not yet known
	pH	6.49	7.67	9.18	7.85	Alkaline	Within Normal Range	Not yet known
	Specific Conductance	69	118	141	134	Softwater	Higher than Normal	Not yet known
	True Color	6	11	26	12	Intermediate Color	Within Normal Range	Not yet known
	Calcium	2.6	3.3	4.1		Not Susceptible to Zebra Mussels		Not yet known
Lake Perception	WQ Assessment	2	2.5	3	2.6	Definite Algal Greenness	Within Normal Range	Not yet known
	Aquatic Plant Coverage	3	3.0	3	3.0	Surface Plant Growth	Within Normal Range	Not yet known
	Recreational Assessment	2	2.3	4	2.1	Excellent	Within Normal Range	Not yet known
Biological Condition	Phytoplankton					Open water-high blue green algae biomass; Shoreline-high blue green algae in bloom	Not known	Not known
	Macrophytes					Not measured through CSLAP	Not known	Not known
	Zooplankton					Not measured through CSLAP	Not known	Not known
	Macroinvertebrates					Not measured through CSLAP	Not known	Not known
	Fish					Coolwater fishery	Not known	Not known
	Invasive Species					None observed	Not known	Not known
Local Climate Change	Air Temperature	12	24.1	31	26.1		Higher Than Normal	Not yet known
	Water Temperature	20	24.6	29	26.0		Higher Than Normal	Not yet known

Category	Indicator	Min	Overall Avg	Max	2015 Avg	Classification	2015 Change?	Long-term Change?
Harmful Algal Blooms	Open Water Phycocyanin	0	24	205	17	Most readings indicate low risk of BGA	Not known	Not known
	Open Water FP Chl.a	0	135	2893	17	Most readings indicate high algae levels	Not known	Not known
	Open Water FP BG Chl.a	0	107	2415	1	Most readings indicate high BGA levels	Not known	Not known
	Open Water Microcystis	<DL	<DL	0.6	<DL	Low to undetectable open water microcystins	Not known	Not known
	Open Water Anatoxin a	<DL	<DL	<DL	<DL	Open water Anatoxin-a consistently not detectable	Not known	Not known
	Shoreline Phycocyanin					No shoreline blooms sampled for PC	Not known	Not known
	Screening FP Chl.a	4325	60232	238031	140798	All readings indicate very high algae levels	Not known	Not known
	Screening FP BG Chl.a	3655	57596	238031	140798	All readings indicate very high BGA levels	Not known	Not known
	Shoreline Microcystis	<DL	0.7	2.7	<DL	Mostly undetectable shoreline bloom MC-LR	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

Montgomery Lake is presently listed among the lakes listed on the Delaware River drainage basin Priority Waterbody List (PWL) as “unassessed”.

Potable Water (Drinking Water)

The CSLAP dataset at Montgomery 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 within shoreline blooms indicate threats to any “unofficial” potable water use from water taken close to these blooms.

Public Bathing

The CSLAP dataset at Montgomery 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 levels and shoreline blue green algae blooms. Although 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 Montgomery Lake, including water chemistry data, physical measurements, and volunteer samplers’ perception data, suggest that recreation is *impaired* by shoreline algae blooms, excessive algae levels, and periodic low water clarity.

Aquatic Life

The CSLAP dataset on Montgomery Lake, including water chemistry data, physical measurements, and volunteer samplers’ perception data, suggest that aquatic life may be *stressed* by elevated pH associated with excessive algae levels, and *threatened* by road salt runoff.

Additional data are needed to evaluate the food and habitat conditions for aquatic organisms in the lake.

Aesthetics and Habitat

The CSLAP dataset on Montgomery Lake, including water chemistry data, physical measurements, and volunteer samplers' perception data, suggest that aesthetics may be *poor* due to excessive algae and shoreline algae blooms, consistent with occasional reports that the lake "looks bad". Habitat is likely to be *good*.

Fish Consumption

There are no fish consumption advisories posted for Montgomery Lake.

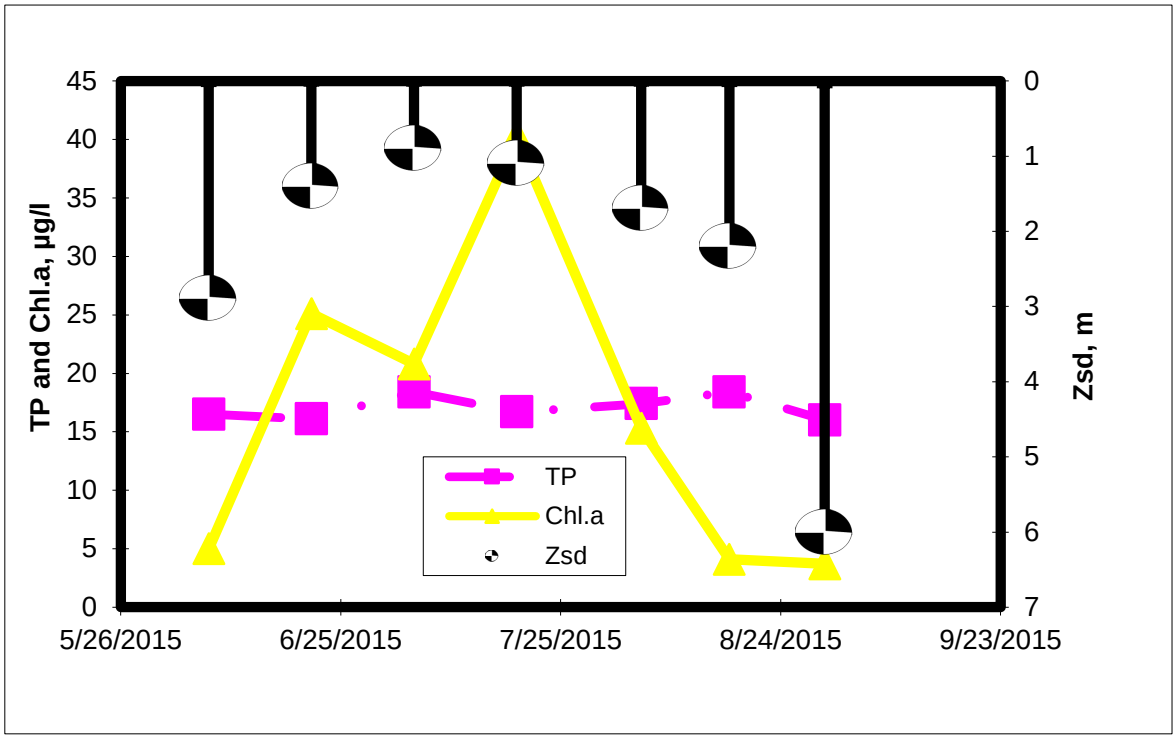
Additional Comments and Recommendations

Aquatic plant surveys will help to determine if aquatic plant communities are comprised primarily of native or invasive plants. Lake residents are advised to continue to report and avoid surface scums or heavily discolored water likely associated with blue green algae blooms.

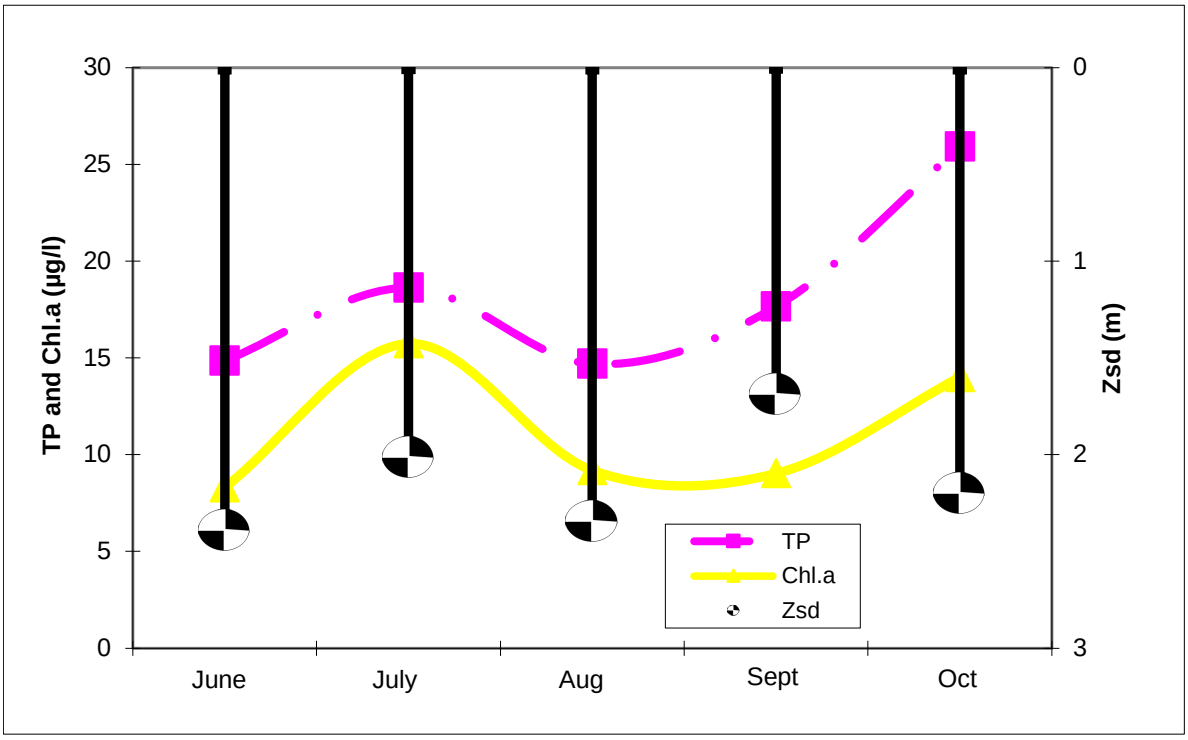
Aquatic Plant IDs-2015

None submitted for identification in 2015.

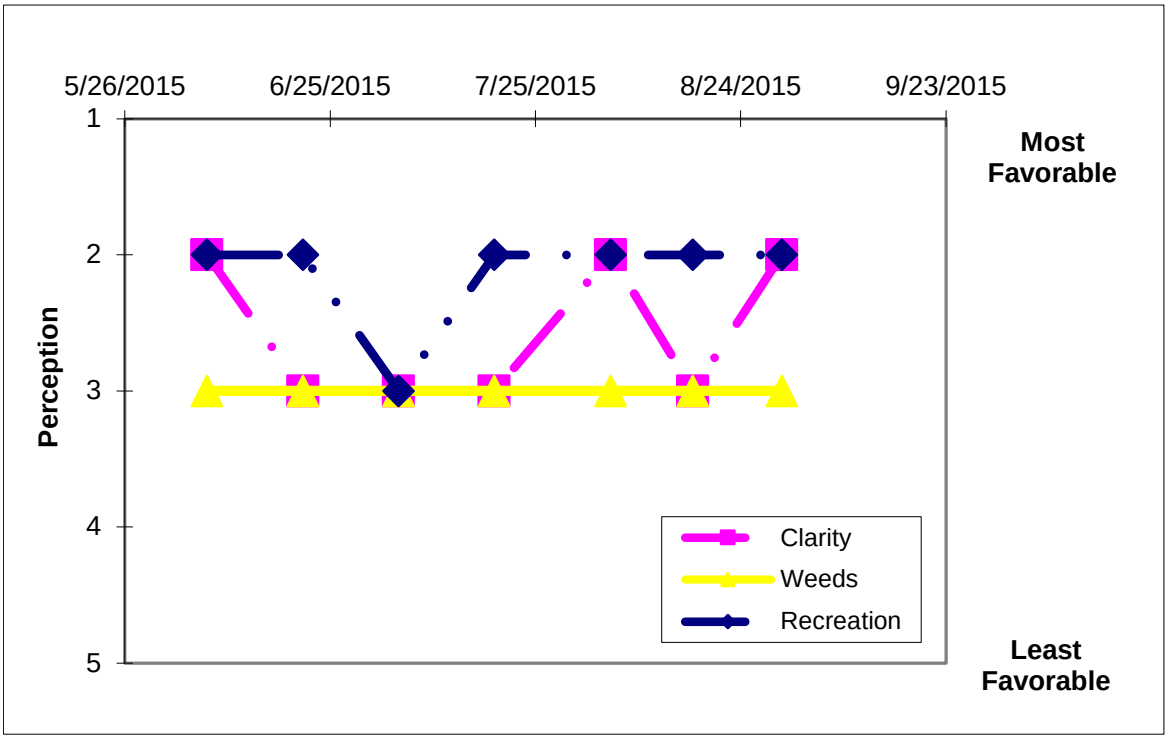
Time Series: Trophic Indicators, 2015



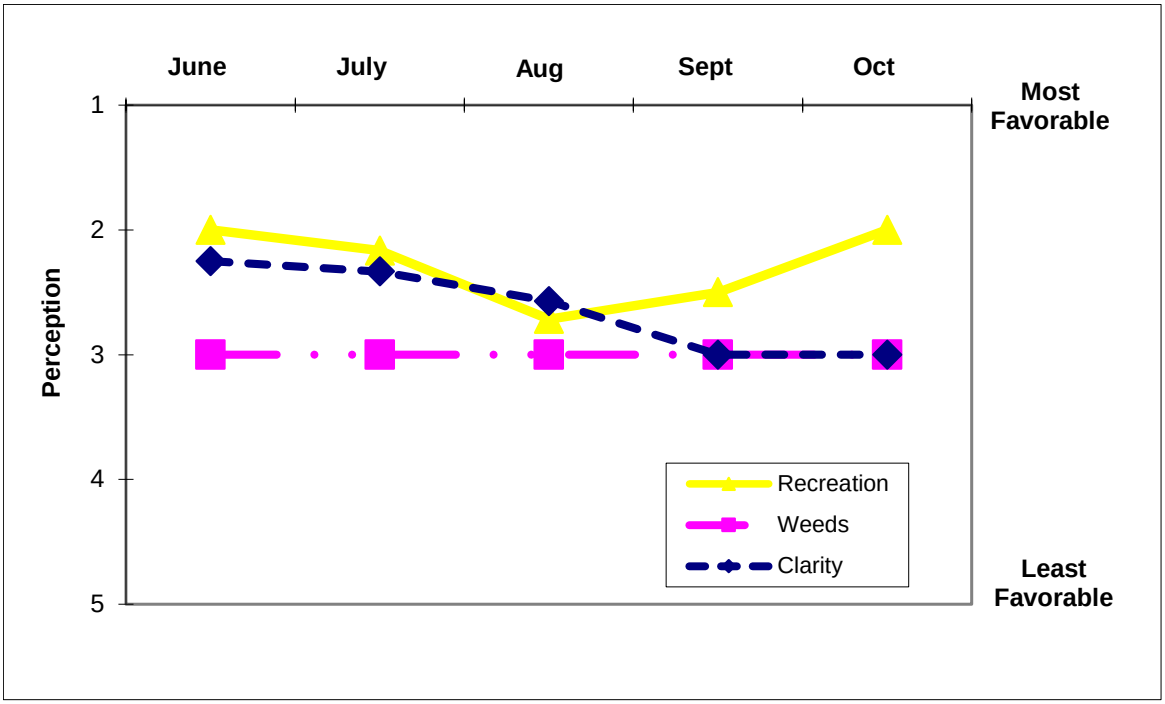
Time Series: Trophic Indicators, Typical Year (2013-2015)



Time Series: Lake Perception Indicators, 2015



Time Series: Lake Perception Indicators, Typical Year (2013-2015)



Appendix A- CSLAP Water Quality Sampling Results for Montgomery Lake

LNum	PName	Date	Zbot	Zsd	Zsamp	Tot.P	NO3	NH4	TDN	TN/TP	TColor	pH	Cond25	Ca	Chl.a	Cl
236	Montgomery Lake	7/7/2013	10	2.8	1.5	0.034	0.005	0.02	0.29	19.12	10	8.57	111		17.6	
236	Montgomery Lake	7/21/2013	10	3.0	1.5	0.016			0.30	40.40	7	7.5	104		2.9	
236	Montgomery Lake	7/27/2013			Bloom											
236	Montgomery Lake	8/11/2013			Bloom											
236	Montgomery Lake	8/18/2013			Bloom											
236	Montgomery Lake	8/4/2013	8	2.3		0.010	0.005	0.02	0.32	71.16	9	7.51	109		4.6	
236	Montgomery Lake	8/18/2013	10	2.1	1.5	0.015			0.30	43.89	13	8.41	111		5.7	
236	Montgomery Lake	9/2/2013	10	2.0		0.017	0.005	0.01	0.43	56.12	11	7.84	86		2.5	
236	Montgomery Lake	9/18/2013			Bloom											
236	Montgomery Lake	9/18/2013	9	1.8	1.5	0.016			0.45	61.97	26	7.12	114		5.4	
236	Montgomery Lake	9/28/2013	9	1.8	1.5	0.023	0.005	0.01	0.52	49.86	18	8.11	69		9.5	
236	Montgomery Lake	10/14/2013			bloom											
236	Montgomery Lake	10/14/2013	9	2.2	1.5	0.026	0.005	0.01	0.47	40.21	7	7.19	122		14	
236	Montgomery Lake	6/1/2014	10.0	2.58	1.5									4.1	6.60	
236	Montgomery Lake	6/15/2014	10.0	2.55	1.5	0.015			0.16	24.73	6	7.19	119		1.90	
236	Montgomery Lake	6/29/2014	10.0	2.55	1.5	0.012	0.01	0.02	0.33	58.31	11	7.10	122		2.90	
236	Montgomery Lake	7/13/2014	10.0	2.65	1.5	0.014			0.41	63.38	7	7.41	121		7.30	
236	Montgomery Lake	7/27/2014	7.9	1.70	1.5	0.013	0.01	0.03	0.36	63.03	7	7.59	119	2.6	5.60	
236	Montgomery Lake	8/9/2014		1.08	1.5	0.012			0.50	93.26	7	8.07	113		18.50	
236	Montgomery Lake	8/24/2014	2.0	1.10	1.5	0.014	0.01	0.01	0.64	98.31	7	7.29	120		12.40	
236	Montgomery Lake	9/21/2014														
236	Montgomery Lake	9/7/2014		1.18	1.5	0.015			0.60	88.15	7	6.81	119		18.70	
236	Montgomery Lake	6/7/2015	10.0	2.90	1.5	0.017	0.02	0.03	0.31	18.61	12	6.49	137		5.00	
236	Montgomery Lake	6/21/2015	8.7	1.40	1.5	0.016			0.57	35.22	13	7.55	133		25.10	
236	Montgomery Lake	7/5/2015	10.0	0.90	1.5	0.018	0.00	0.03	0.80	43.32	12	9.18	137		20.80	32.8
236	Montgomery Lake	7/19/2015	10.0	1.10	1.5	0.017	0.01	0.03	0.53	31.98	10	8.82	138		40.20	
236	Montgomery Lake	8/5/2015		1.70	1.5	0.017			0.70	40.46	11	8.18	141		15.30	
236	Montgomery Lake	8/17/2015	10.0	2.20	1.5	0.018	0.00	0.03	0.64	34.73	15	7.25	133		4.10	42.7
236	Montgomery Lake	8/17/2015														
236	Montgomery Lake	8/30/2015														
236	Montgomery Lake	9/20/2015														
236	Montgomery Lake	8/30/2015	7.5	6.00	1.5	0.016			0.67	41.63	10	7.47	121		3.70	

LNum	PName	Date	Site	TAir	TH20	QA	QB	QC	QD	QF	QG	AQ-PC	AQ-Chla	MC-LR	Ana-a	Cylin	FP-Chl	FP-BG	HAB form	Shore HAB
236	Montgomery L	7/7/2013	epi	30		2	3	2	0	0	0	4.6	3.1	<0.30	<0.510		4.60	0.00	fi	
236	Montgomery L	7/21/2013	epi	30	28	2	3	2	0	3	3	5.5	2.4	<0.30	<0.910		3.40	0.50	fi	I
236	Montgomery L	7/27/2013	Bloom											0.99	<1.200		4325	3655		d
236	Montgomery L	8/11/2013	Bloom											<0.60	<0.680		7734	5994		h
236	Montgomery L	8/18/2013	Bloom											<0.90	<1.530		31250	31200		
236	Montgomery L	8/4/2013	epi	18	22	2	3	2	5			10.7	2.9	0.56	<0.390		4.20	0.90	I	1
236	Montgomery L	8/18/2013	epi	23	23	3	3	4	134	4	4	18.3	5.6	<0.30	<0.390		6.60	1.60	adfg	
236	Montgomery L	9/2/2013	epi	27	27	3	3	3	15	34	3	205.1	0.5	<0.30	<1.100		2893	2415		
236	Montgomery L	9/18/2013	Bloom											<0.95	<3.470		17131	11958		
236	Montgomery L	9/18/2013	epi	18	22	3	3	2	1	4	0	28.6	8.1	<0.30	<19.130		9.40	1.90	fh	
236	Montgomery L	9/28/2013	epi	18	21	3	3	2	1	0	0	31.6	5.0	<0.30	<0.090		11.20	3.50		H
236	Montgomery L	10/14/2013	bloom											2.73	<0.510		25623	16005		
236	Montgomery L	10/14/2013	epi	12	20	3	3	2	3	0		12.2	6.5	<0.30	<10.600		8.20	0.70	H	
236	Montgomery L	6/1/2014	epi	21	20		3	2	0	0	0	0.20	1.20	<0.53	<0.40	<0.001	0.83	0.00	i	
236	Montgomery L	6/15/2014	epi	23	23	2	3	2	0	0	0	0.90	1.80	<0.61	<0.08	<0.002	3.73	0.54	i	i
236	Montgomery L	6/29/2014	epi	20	27	2	3	2	0	3	3	5.40	0.50	<0.48	<0.48	<0.002	1.19	0.25	fg	i
236	Montgomery L	7/13/2014	epi	27	26	2	3	2	0	3	3	10.20	0.30	<0.40	<0.21	<0.003	2.98	1.88	fgi	i
236	Montgomery L	7/27/2014	epi	26	25	2	3	2	0			15.70	0.80	<0.63	<0.03	<0.001	6.66	2.90	i	i
236	Montgomery L	8/9/2014	epi	26	27	3	3	3	4	4	34	26.20	1.10	<0.28	<0.05	<0.001	8.70	4.37	bf	bf
236	Montgomery L	8/24/2014	epi	28	25	3	3	4	1	0	0	10.20	1.00	<0.26	<0.10	<0.002	8.68	5.94	i	i
236	Montgomery L	9/21/2014	bloom											<0.97	<0.08	<0.002	33636.00	27156.00		d
236	Montgomery L	9/7/2014	epi	24	24	3	3	3	4	4	4	31.90	0.80	<0.29	<0.14	<0.002	8.22	4.80	bf	bf
236	Montgomery L	6/7/2015	epi	23	23	2	3	2	0	7	0	6.10	0.90	<0.77	<0.126	<1.739	2.86	0.00	I	I
236	Montgomery L	6/21/2015	epi	26	26	3	3	2	0	0	0	32.70	2.00	<0.55	<0.004	<0.001	11.58	3.82	F	F
236	Montgomery L	7/5/2015	epi	25	24	3	3	3	1	0	4	39.60	6.30	<0.88	<0.010	<0.000	36.52	2.69	F	F
236	Montgomery L	7/19/2015	epi	30	29	3	3	2	1	0	0	7.60	10.80	<0.30	<0.004	<0.015	47.24	0.00	F	I
236	Montgomery L	8/5/2015	epi	25	26	2	3	2	1	0	0	14.20	2.90	<0.44	<0.002	<0.014	11.14	0.43	DF	D
236	Montgomery L	8/17/2015	epi	31	29	3	3	2	1	4	4	4.50	1.20	<0.33	<0.006	<0.024	6.32	0.00		
236	Montgomery L	8/17/2015	bloom											<1.29	<0.010	<0.031	21917.50	21917.50		
236	Montgomery L	8/30/2015	bloom											<1.10	<0.024	<0.096	238031.25	238031.25		
236	Montgomery L	9/20/2015	bloom											<0.78	<0.019	<0.044	162443.75	162443.75	D	DH
236	Montgomery L	8/30/2015	epi	23	25	2	3	2	8	4	4			<0.49	<0.031	<0.028	0.39	0.00	I	I

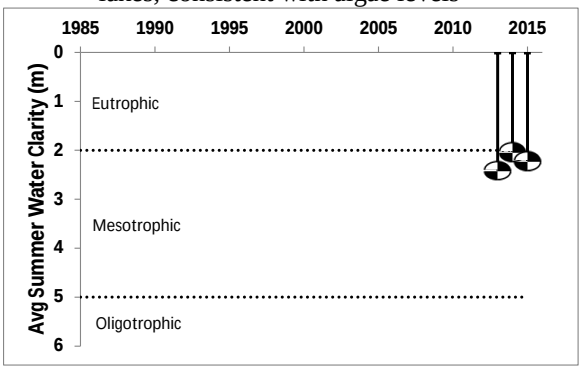
Legend Information

Indicator	*Description*	*Detection Limit*	*Standard (S) / Criteria (C)*
General Information			
Lnum	lake number (unique to CSLAP)		
Lname	name of lake (as it appears in the Gazetteer of NYS Lakes)		
Date	sampling date		
Field Parameters			
Zbot	lake depth at sampling point, meters (m)		
Zsd	Secchi disk transparency or clarity	0.1m	1.2m (C)
Zsamp	water sample depth (m) (epi = epilimnion or surface; bot = bottom)	0.1m	none
Tair	air temperature (C)	-10C	none
TH20	water temperature (C)	-10C	none
Laboratory Parameters			
Tot.P	total phosphorus (mg/l)	0.003 mg/l	0.020 mg/l (C)
NOx	nitrate + nitrite (mg/l)	0.01 mg/l	10 mg/l NO3 (S), 2 mg/l NO2 (S)
NH4	total ammonia (mg/l)	0.01 mg/l	2 mg/l NH4 (S)
TN	total nitrogen (mg/l)	0.01 mg/l	none
TN/TP	nitrogen to phosphorus (molar) ratio, = (TKN + NOx)*2.2/TP		none
TCOLOR	true (filtered) color (ptu, platinum color units)	1 ptu	none
pH	powers of hydrogen (S.U., standard pH units)	0.1 S.U.	6.5, 8.5 S.U. (S)
Cond25	specific conductance, corrected to 25C (umho/cm)	1 umho/cm	none
Ca, Cl	calcium, chloride (mg/l)	1 mg/l	none
Chl.a	chlorophyll a (ug/l)	0.01 ug/l	none
Fe	iron (mg/l)	0.1 mg/1	1.0 mg/l (S)
Mn	manganese (mg/l)	0.01 mg/l	0.3 mg/l (S)
As	arsenic (ug/l)	1 ug/l	10 ug/l (S)
AQ-PC	Phycocyanin (aquaflor) (unitless)	1 unit	none
AQ-Chl	Chlorophyll *a* (aquaflor) (ug/l)	1 ug/l	none
MC-LR	Microcystis-LR (ug/l)	0.01 ug/l to 0.6 ug/l	1 ug/l potable (C) 20 ug/l swimming (C)
Ana	Anatoxin-a (ug/l)	variable	none
Cyl	Cylindrospermposin (ug/l)	0.1 ug/l	none
FP-Chl, FP-BG	Fluoroprobe total chlorophyll, fluoroprobe blue-green chlorophyll (ug/l)	0.1 ug/l	none
Lake Assessment			
QA	water quality assessment; 1 = crystal clear, 2 = not quite crystal clear, 3 = definite algae greenness, 4 = high algae levels, 5 = severely high algae levels		
QB	aquatic plant assessment; 1 = no plants visible, 2 = plants below surface, 3 = plants at surface, 4 = plants dense at surface, 5 = surface plant coverage		
QC	recreational assessment; 1 = could not be nicer, 2 = excellent, 3 = slightly impaired, 4 = substantially impaired, 5 = lake not usable		
QD	reasons for recreational assessment; 1 = poor water clarity, 2 = excessive weeds, 3 = too much algae, 4 = lake looks bad, 5 = poor weather, 6 = litter/surface debris, 7 = too many lake users, 8 = other		
QF, QG	Health and safety issues today (QF) and past week (QG); 0 = none, 1 = taste/odor, 2 = GI illness humans/animals, 3 = swimmers itch, 4 = algae blooms, 5 = dead fish, 6 = unusual animals, 7 = other		
HAB form, Shore HAB	HAB evaluation; A = spilled paint, B = pea soup, C = streaks, D = green dots, E = bubbling scum, F = green/brown tint, G = duckweed, H = other, I = no bloom		

Appendix C- Long Term Trends: Montgomery Lake

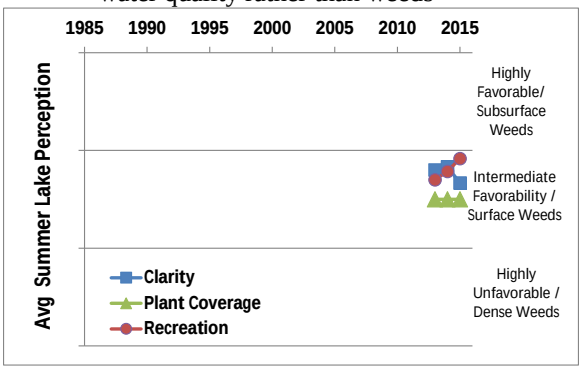
Long Term Trends: Water Clarity

- Too early to detect trends; variable clarity
- Most readings typical of *mesoeutrophic* lakes, consistent with algae levels



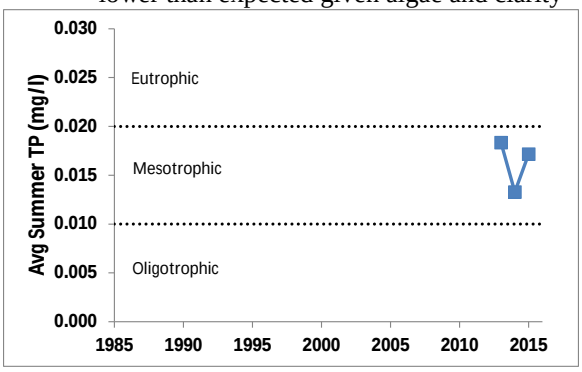
Long Term Trends: Lake Perception

- Improved rec assessments last few years
- Recreational perception linked to changes in water quality rather than weeds



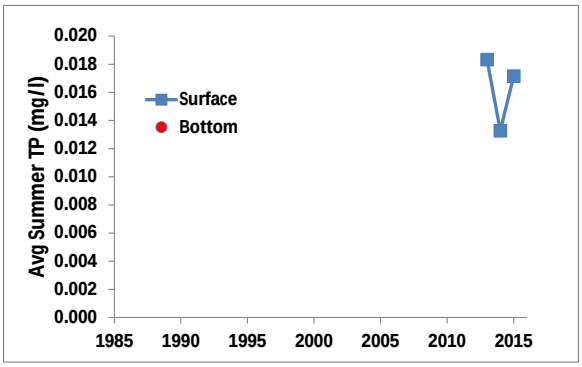
Long Term Trends: Phosphorus

- Variable TP readings
- Most readings typical of *mesotrophic* lakes, lower than expected given algae and clarity



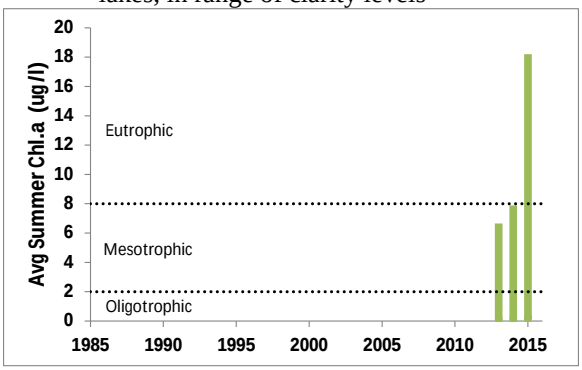
Long Term Trends: Bottom Phosphorus

- No bottom TP readings
- Bottom TP usually similar to surface P in shallow lakes



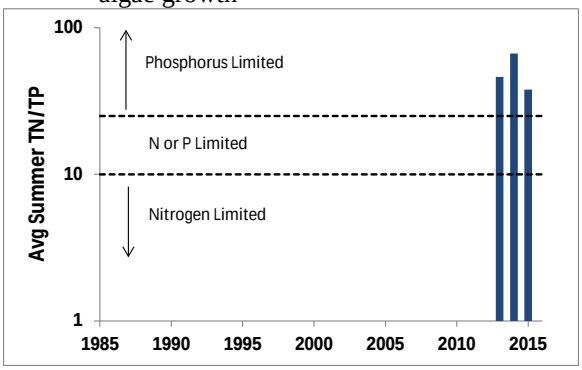
Long Term Trends: Chlorophyll a

- Increasing algae levels?
- Most readings typical of *mesoeutrophic* lakes, in range of clarity levels



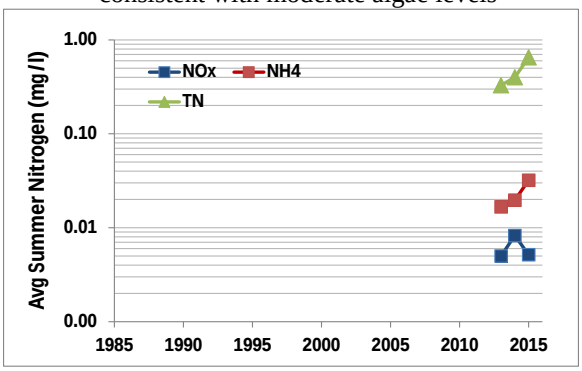
Long Term Trends: N:P Ratio

- Variable ratios year to year
- Most readings indicate phosphorus limits algae growth



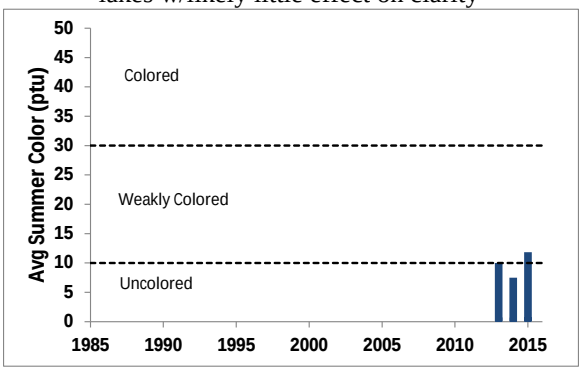
Long Term Trends: Nitrogen

- Increasing TN and NH4; variable NOx
- TN, NOx and ammonia fairly low and mostly consistent with moderate algae levels



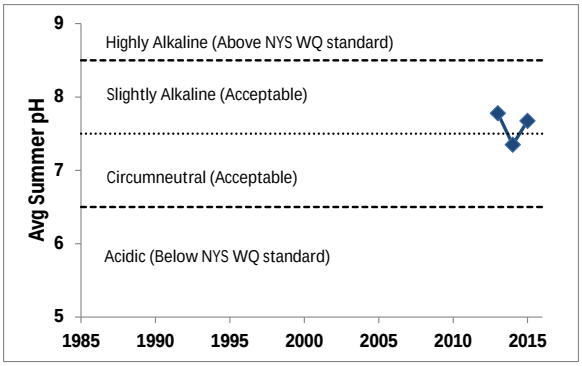
Long Term Trends: Color

- Variable color readings
- Most readings typical of *weakly colored* lakes w/likely little effect on clarity



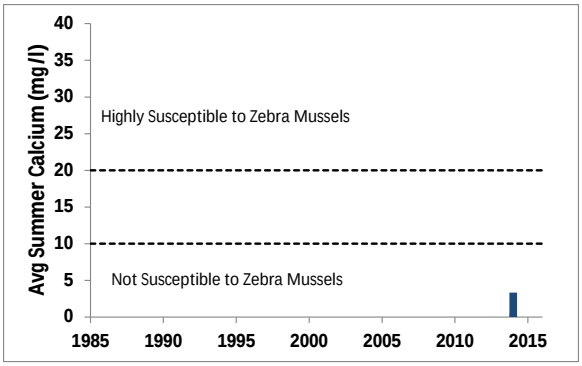
Long Term Trends: pH

- Variable pH readings
- Most readings typical of *slightly alkaline* to *circumneutral* lakes



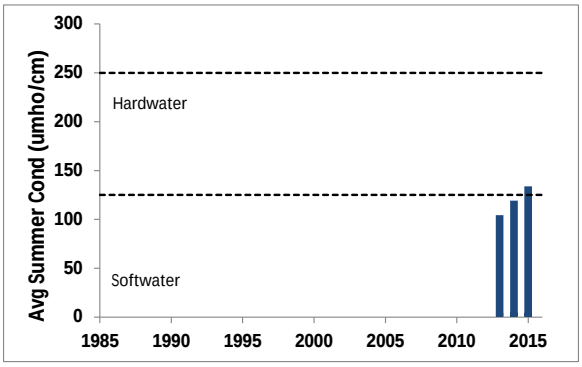
Long Term Trends: Calcium

- Only 2014 data available
- Readings indicate very low susceptibility to zebra mussels



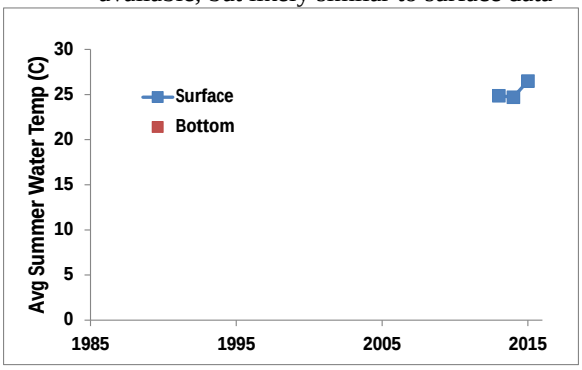
Long Term Trends: Conductivity

- Increasing conductivity
- Most readings typical of lakes with *soft water* to intermediate hardness



Long Term Trends: Water Temperature

- Slightly higher in 2014
- No deepwater temperature data (yet) available, but likely similar to surface data



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.

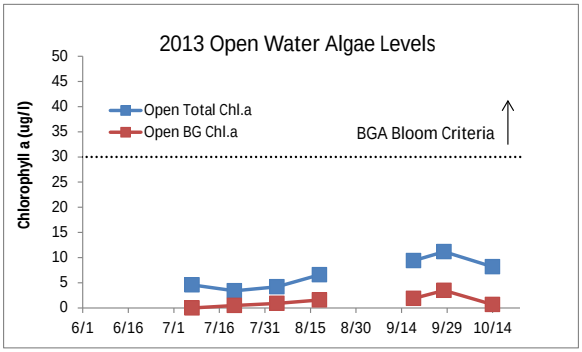


Figure D1:
2013 Open Water Total and BGA Chl.a

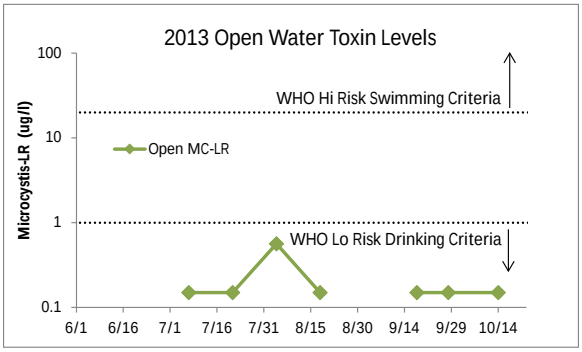


Figure D2:
2013 Open Water Microcystin-LR

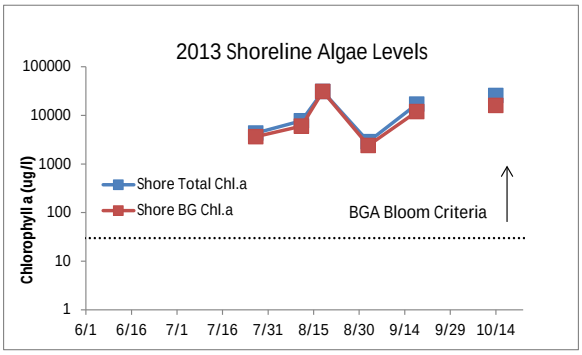


Figure D3:
2013 Shoreline Total and BGA Chl.a

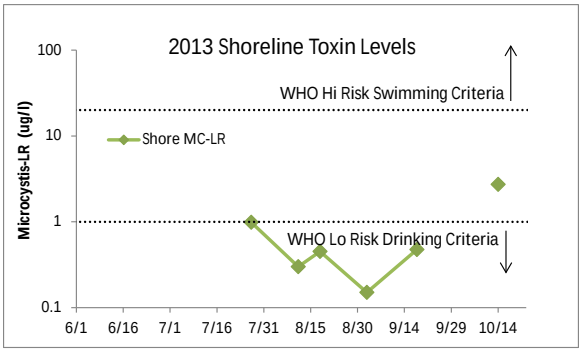


Figure D4:
2013 Shoreline Microcystin-LR

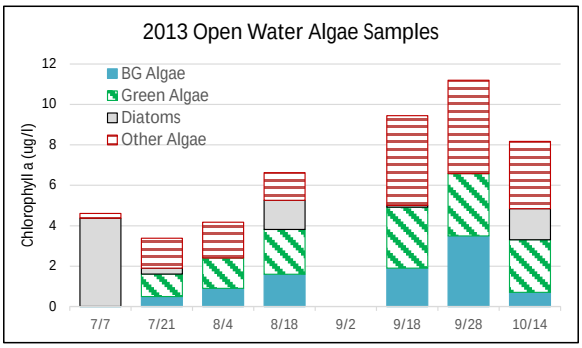


Figure D5:
2013 Open Water Algae Types

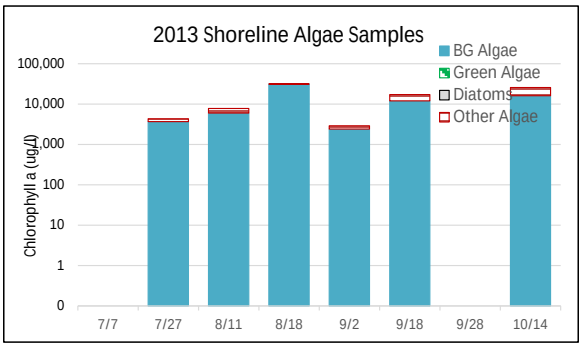


Figure D6:
2013 Shoreline Algae Types

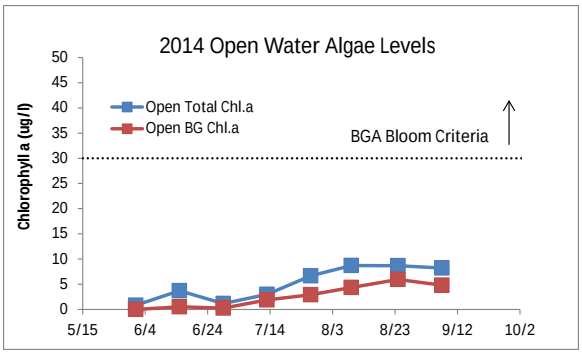


Figure D7:
2014 Open Water Total and BGA Chl.a

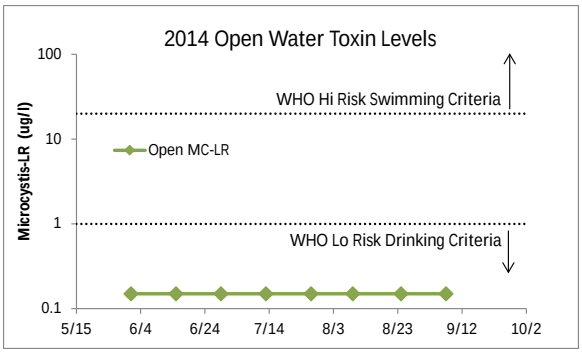


Figure D8:
2014 Open Water Microcystin-LR

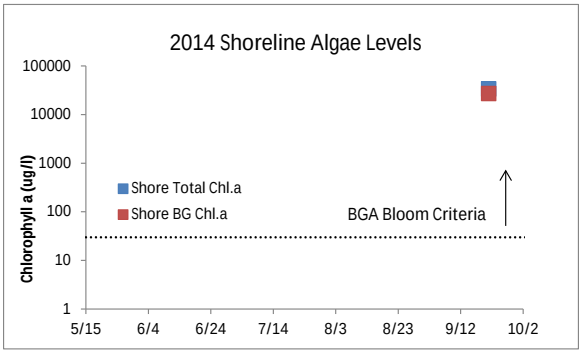


Figure D9:
2014 Shoreline Total and BGA Chl.a

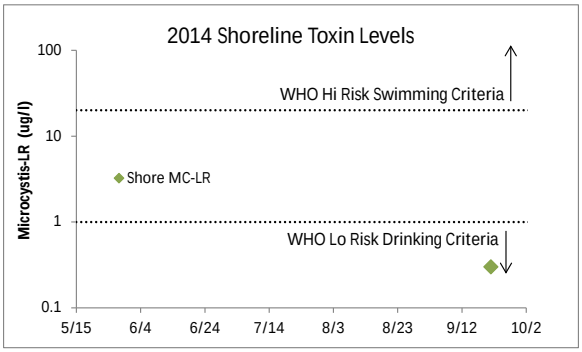


Figure D10:
2014 Shoreline Microcystin-LR

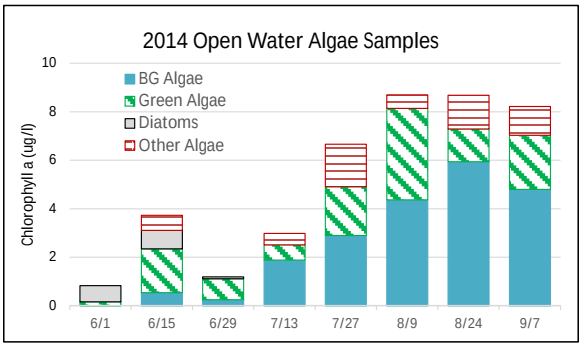


Figure D11:
2014 Open Water Algae Types

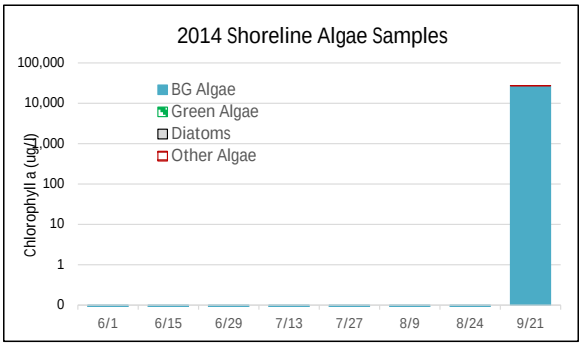


Figure D12:
2014 Shoreline Algae Types

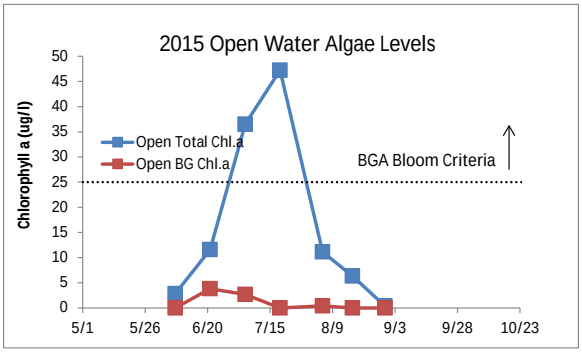


Figure D13:
2015 Open Water Total and BGA Chl.a

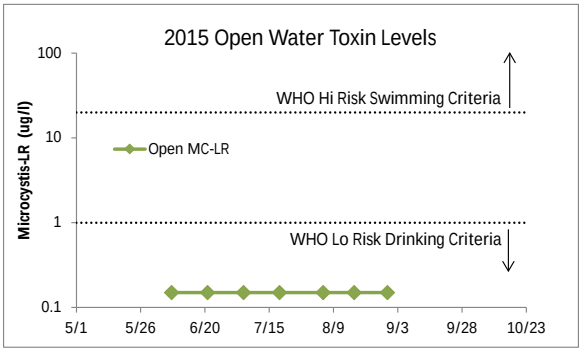


Figure D14:
2015 Open Water Microcystin-LR

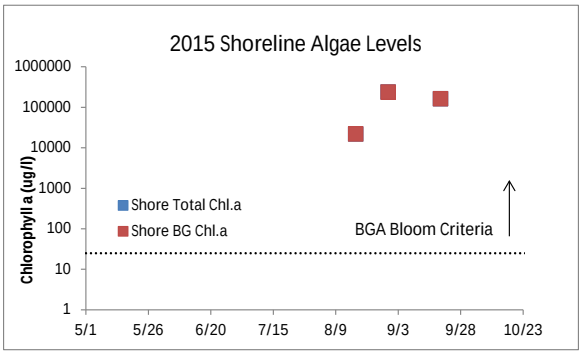


Figure D15:
2015 Shoreline Total and BGA Chl.a

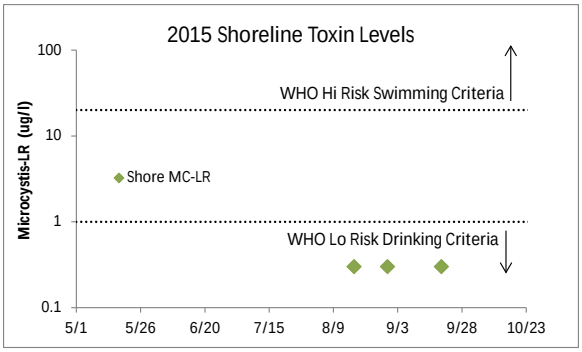


Figure D16:
2015 Shoreline Microcystin-LR

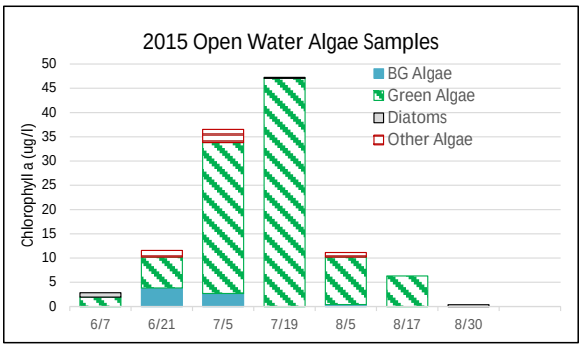


Figure D17:
2015 Open Water Algae Types

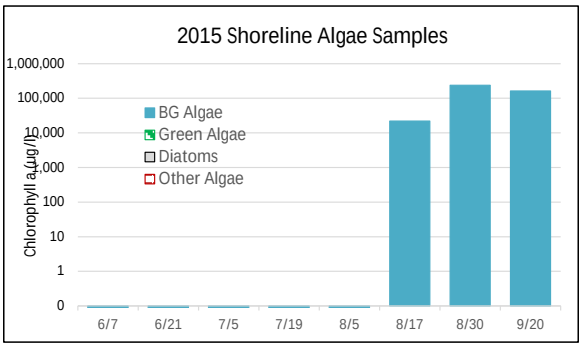


Figure D18:
2015 Shoreline Algae Types

Appendix E:
AIS Species in Sullivan County

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

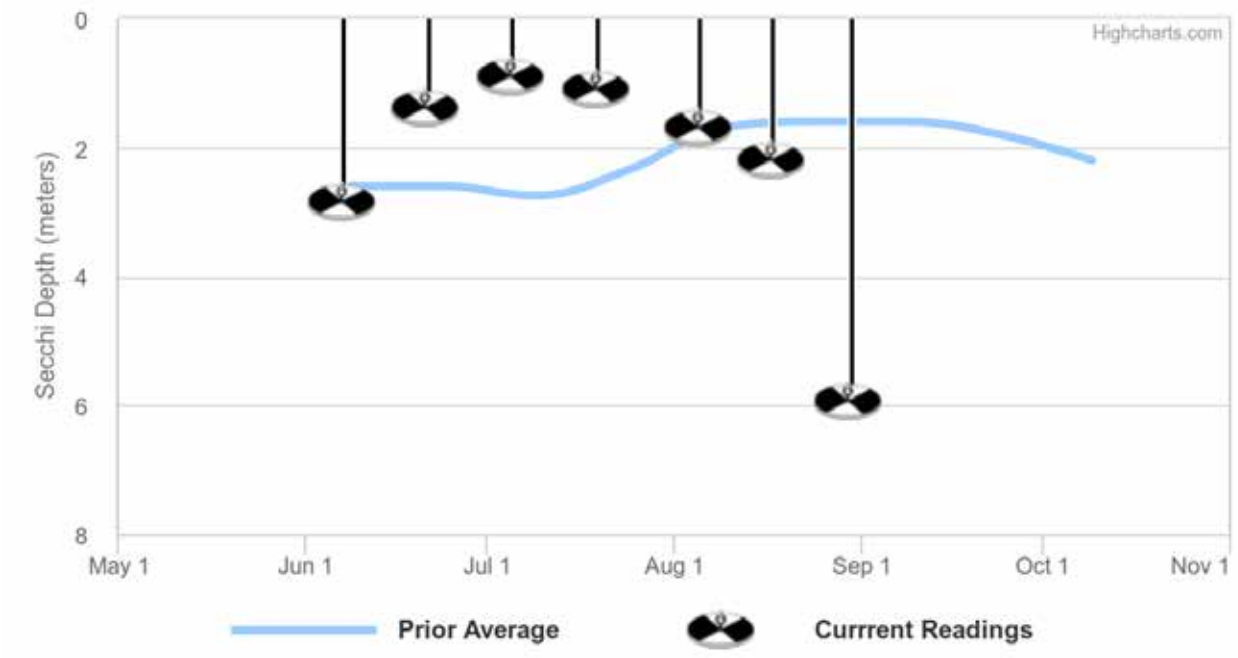
Aquatic Invasive Species - Sullivan County			
Waterbody	**Kingdom**	**Common name**	**Scientific name**
Beaverman Lake	Plant	European frogbit	*Hydrocharis morsus-ranae*
Black Lake	Plant	Water chestnut	*Trapa natans*
Cliff Lake	Plant	Fanwort	*Cabomba caroliniana*
Kiamesha Lake	Plant	Eurasian watermilfoil	*Myriophyllum spicatum*
Martin Lake	Plant	Fanwort	*Cabomba caroliniana*
Sackett Lake	Plant	Curly leafed pondweed	*Potamogeton crispus*
Saint Josephs Lake	Plant	Floating primrose willow	*Ludwigia peploides ssp. glabrescens*
Silver Lake	Plant	Curly leafed pondweed	*Potamogeton crispus*
Silver Lake	Plant	Water chestnut	*Trapa natans*
Swan Lake	Plant	Curly leafed pondweed	*Potamogeton crispus*
Swan Lake	Plant	Water chestnut	*Trapa natans*
Swinging Bridge Reservoir	Animal	Common carp	*Cyprinus carpio*
Waneta Lake	Plant	Eurasian watermilfoil	*Myriophyllum spicatum*
White Lake	Plant	Eurasian watermilfoil	*Myriophyllum spicatum*

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

Current Year Water Temperatures vs. Prior Average

There are not enough shallow water sample temperatures to determine a trend for the current year when compared to the average of readings collected from 2013 to 2014.

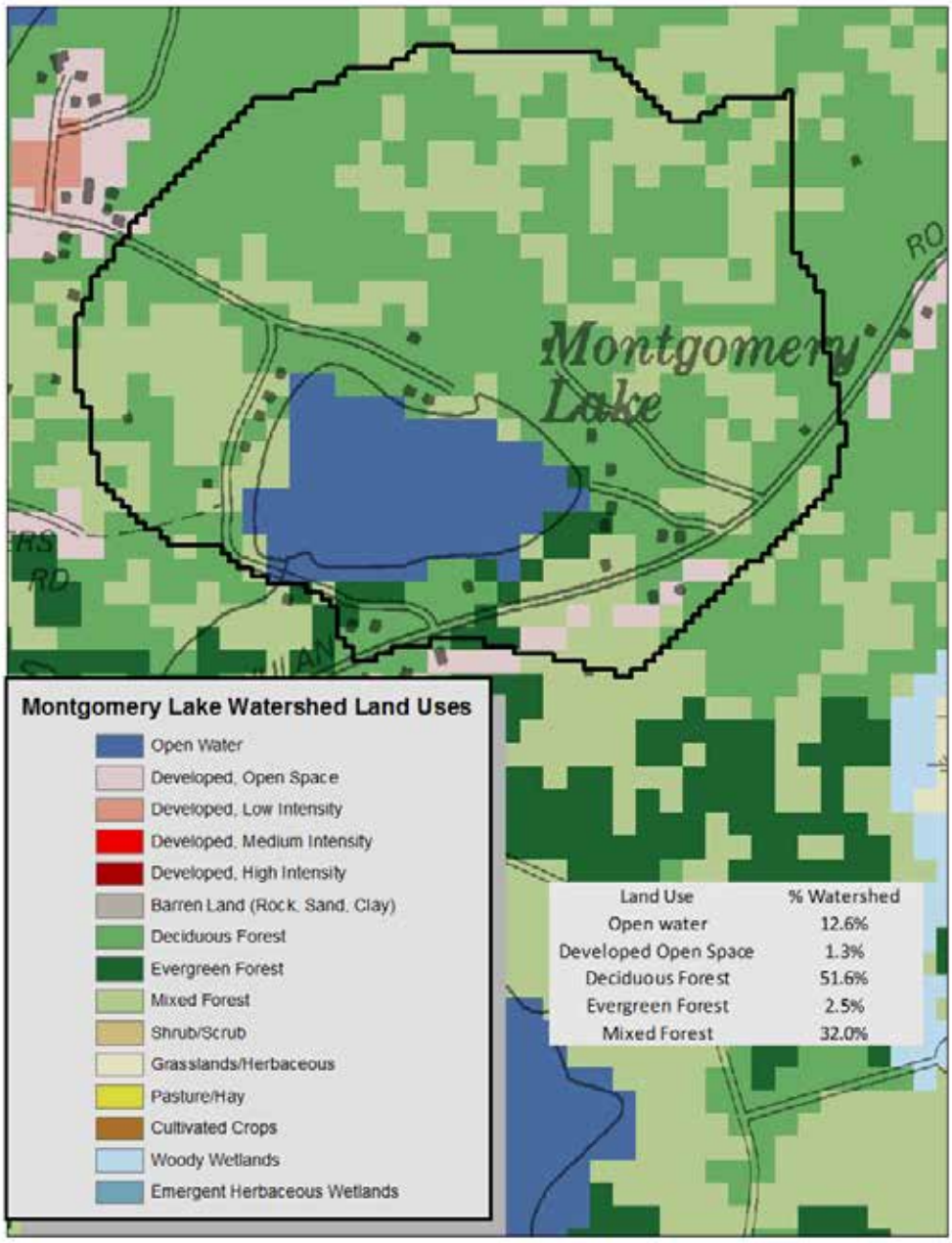
Current Year Secchi Readings vs. Prior Average



There are not enough session Secchi readings to determine a trend for the current year when compared to the average of readings collected from 2013 to 2014

Appendix G: Watershed and Land Use Map for Montgomery Lake

This watershed and land use map was developed using USGS StreamStats and ESRI ArcGIS using the 2006 land use satellite imagery. The actual watershed map and present land uses within this watershed may be slightly different due to the age of the underlying data and some limits to the use of these tools in some geographic regions and under varying flow conditions. However, these maps are intended to show the approximate extent of the lake drainage basin and the major land uses found within the boundaries of the basin.



Land Use	% Watershed
Open water	12.6%
Developed Open Space	1.3%
Deciduous Forest	51.6%
Evergreen Forest	2.5%
Mixed Forest	32.0%